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S.Y. B.Sc. (Sem. - I)

मराठी (MARATHI)

पाठ्यपुस्तक : विज्ञानवेध (नवा अभ्यासक्रम)

(New)(Theory)

वेळ : 2 तास]

[एकूण गुण : 40

सूचना :– 1) सर्व प्रश्न सोडविणे आवश्यक आहेत.

2) उजवीकडील अंक प्रश्नांचे पूर्ण गुण दर्शवितात.

प्रश्न 1) खालीलपैकी कोणत्याही एका विषयावर **400** (चारशे) शब्दांत निबंध लिहा. **[10]**

i) स्त्री भ्रूण हत्या–समाज आणि संस्कृती.

ii) यशवंतराव चव्हाण : व्यक्तित्व आणि कर्तृत्व.

iii) डोळे हे जुल्मी गडे! (ललित)

प्रश्न 2) निकोलस कोपर्निकस यांच्या व्यक्तिमत्वाचे गुणविशेष त्यांच्या विज्ञानविषयक कार्याच्या आधारे विशद करा. **[15]**

किंवा

'पुनर्जन्म' या कथेतून वैज्ञानिक दृष्टिकोन कसा प्रकट झाला आहे ते लिहा ?

प्रश्न 3) टिपा लिहा. (कोणत्याही तीन) **[15]**

i) चरकसंहिता.

ii) कालदमन मधील कालप्रवासी.

iii) आधुनिक विश्वामित्र.

iv) सुशिक्षितांच्या अंधश्रध्दा.

v) लीलावतीकार भास्कराचार्य

vi) विज्ञान साहित्य.

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S.Y. B.Sc. (Sem. - I)

मराठी (MARATHI)

पाठ्यपुस्तक : विज्ञान कथा विश्व (जुना अभ्यासक्रम)

(Old)

वेळ : 2 तास] [एकूण गुण : 40

सूचना :– 1) सर्व प्रश्न सोडविणे आवश्यक आहेत.

2) उजवीकडील अंक प्रश्नांचे पूर्ण गुण दर्शवितात.

प्रश्न 1) खालीलपैकी कोणत्याही एका विषयावर 400 शब्दांपर्यंत निबंध लिहा. [10]

अ) अंधश्रद्धा : विज्ञानापुढील एक आव्हान.

ब) माझ्या कल्पनेतील आदर्श नेता.

क) येरे येरे पावसा ..... (ललित)

प्रश्न 2) मानवी स्वभावाचे दर्शन 'यंत्र मानवाच्या हाताने' या कथेत कसे घडते ते स्पष्ट करा. [15]

किंवा

'गुगली' या कथेचा आशय स्पष्ट करा :

प्रश्न 3) टिपा लिहा. (कोणत्याही तीन) [15]

अ) 'कनेक्शन' या कथेतील मानवी जीवनातील विसंगती....

ब) 'वामलोचना'..... कथेतील लेखक व विश्वनाथ पंत यांच्यातील संवाद.

क) 'आकाश आणि जमीन' या कथेतील अस्तमान.

ड) 'यंत्रानी केलं बंड' मधील यंत्रमानव.

इ) 'तरंगणारा संशोधक' कथेतील संशोधक.

फ) 'अंतराळातील मृत्यू' मधील–डॉ. मंजिरी माटे.

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S.Y. B.Sc. (Semester - II)

GEOGRAPHY

Gg - 221 : Distribution, Development and Planning of Resources (Paper - I) (2008 Pattern)

Time :2 Hours] *[Max. Marks :40*

Instructions to the candidates:-

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Draw neat diagrams and sketches wherever necessary.***
4) ***Use of map stencil is allowed.***

Q1) Answer the following questions in two to three sentences each : **[10]**

a) Name the types of iron ore.

b) Name any two bauxite producing states in India.

c) List four leading iron ore producing countries of the world.

d) What are the various types of coal?

e) Give two advantages of wind energy.

f) Which countries of the world produce large amount of natural gas?

g) How population is a resource?

h) Which are the four sparsely populated regions of the world?

i) Which are the densely populated states of India?

j) Why are the energy resources necessary in economic development?

Q2) Write short notes on the following (Any Two) : **[10]**

a) Production of bauxite in the world.

b) Production of natural gas in the world.

c) Need of resource planning.

P.T.O

Q3) Answer the following questions (Any Two) : **[10]**

a) Give an account of production of iron ore in India.

b) Explain the significance of nuclear energy.

c) Explain the role of water resources in economic development.

Q4) Give an account of world production of coal. **[10]**

OR

Explain the concepts of over, optimum and under population.

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Total No. of Questions : 4]

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S.Y. B.Sc. (Semester - II)

GEOGRAPHY

Gg - 222 : Surface Water And Ground Water Hydrology

(Paper - II) (2008 Pattern)

Time :2 Hours] ***[Max. Marks :40***

Instructions to the candidates:-

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Draw neat diagrams and sketches wherever necessary.***
4) ***Use of map stencil is allowed.***

Q1) Answer the following questions in two to three sentences each : **[10]**

a) Define sublimation.

b) What is evapotranspiration?

c) Give any two methods of evaporation control.

d) What is river regime?

e) What do you mean by runoff?

f) What is meant by salt water intrysion?

g) What do you mean by rating curve?

h) Give any two general characteristics of ground water flow.

i) Name the approaches to urban hydrology.

j) Give full form of SWMM.

Q2) Write short notes on the following (Any Two) : **[10]**

a) Transpiration.

b) Snowmelt hydrology.

c) Annual hydrograph.

P.T.O

Q3) Answer the following questions (Any Two) : **[10]**

a) Explain the subsurface distribution of water.

b) Describe the groundwater basin development.

c) Explain effects of urbanisation on runoff.

Q4) Define flood. Explain its causes in detail. **[10]**

OR

Describe the peak flow method for urban areas.

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Total No. of Questions : 4]

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S.Y. B.Sc. (Semester - II)

MICROBIOLOGY

MB - 221 : Bacterial Systematics and Analytical Microbiology

(Paper - I) (2008 Pattern)

Time :2 Hours] *[Max. Marks :40*

Instructions to the candidates:-

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Draw neat labeled diagrams wherever necessary.***
4) ***Use of calculators, log tables & statistical tables is allowed.***
5) ***Use graph paper if necessary.***

Q1) Attempt the following : **[10]**

a) Define DNA hybridization.

b) $\frac{d}{dx}\left(\frac{1}{x}\right) =$ _____

c) Determine median for the following data

25, 15, 23, 40, 27, 25, 23, 25, 23, 25, 20

d) Two organisms with 70-80% DNA homology can be said to be _____

i) identical ii) closely related

iii) distantly related iv) none of the above

e) Find the value of $\log_3^9$.

f) State True or False :

The sample is drawn with deliberate subjective choice in case of random sampling.

g) Data obtained by investigator from personal experimental studies is called _____ .

i) Primary data ii) Chronological data

iii) Arrayed data iv) None of these

h) State True or False:

The standard deviation is equal to the positive square root of variance.

P.T.O

i) Write the formula for similarity coefficient.

j) State True or False:
The temperature at which 75% of the DNA molecule is in its single stranded form, is called melting temperature of DNA.

Q2) Attempt <u>any two</u> of the following : **[10]**

a) Comment on "chemotaxonomy based on cell wall composition".

b) Draw graph of following linear equation
$x + 3y < 1, x > 0, y > 0.$

c) Draw a pic diagram of following data of Tamilnadu state relating to the area under cultivation of crops, in year 2004 - 2005

Crops	Rice	Jowar	Bajra	Maize	Wheat
Area in thousand acres	60.5	20.5	12	4.5	2.5

Q3) Attempt <u>any two</u> of the following : **[10]**

a) Find :

i) $\int \left(x^5 + 5x^2 + c^x\right) dx$

ii) $\int \left(5x^8 + 7x^6 + 3x^3 + 2x + 3\right) dx$

b) Calculate the standard deviation from the following data
Variable $(x) = 10, 13, 17, 22, 27, 30, 31, 32$

c) Comment on Numerical taxonomy

Q4) Attempt <u>any two</u> of the following : **[10]**

a) Write a note on determination of G + C content and discuss its significance in bacterial taxonomy.

b) Hb% per 100cc of 15 persons was as follows:
Calculate the range and arithmatic mean.

11.5	13.8	14.3
11.7	13.1	14.5
11.8	14.0	14.7
12.5	14.1	14.8
12.9	14.2	14.9

c) Find derivative of the following function $y = f(x) = \dfrac{x^2 + 3x + 1}{e^x}$

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S.Y. B.Sc. (Semester - II)

MICROBIOLOGY

MB - 222 : Applied Microbiology - I

(Paper - II) (2008 Pattern)

Time :2 Hours] ***[Max. Marks :40***

Instructions to the candidates:-

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Draw neat labelled diagrams wherever necessary.***

Q1) Attempt the following: **[10]**

a) Enlist two methods of air sanitation.

b) Define total solids

c) What is meant by Eutrophication?

d) Vinegar fermentation is an example of _____ fermentation.
(Dual, continuous, Batch, None of these)

e) Give one function each of impellers and baffles in CSTR.

f) Give any two examples of bacteria causing air borne infections.

g) Name any two bacterial indicators of faecal water pollution.

h) What are aerosols?

i) Name any two temperature sensing devices used in monitoring fermentation process.

j) Enlist any two desirable characters of an ideal industrial strain.

P.T.O.

Q2) Attempt any two of the following: **[10]**

a) Describe the methods of secondary screening of industrially important microbes.

b) Comment on any one method of tertiary waste water treatment of effluent.

c) Enlist the methods of air sampling and explain any two in detail.

Q3) Attempt any two of the following: **[10]**

a) Compare batch and continuous fermentation processes with one example of each.

b) Define B.O.D. and C.O.D., give their significance in analysis of waste water.

c) Enlist sources and consequences of contamination in a commercial fermentation process.

Q4) Attempt any one of the following: **[10]**

a) Elaborate with example different components of fermentation media with respect to :

i) Carbon
ii) Nitrogen
iii) Inhibitors
iv) Amino acids and vitamins
v) Buffers

b) Explain the bacterial analysis of potable water with respect to:

i) Presumptive coliform corent
ii) Confirmed test
iii) Completed test

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Total No. of Questions : 4]

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S.Y. B.Sc. (Semester - II)

PSYCHOLOGY

Health Psychology

(Paper - I) (2008 Pattern)

Time :2 Hours] ***[Max. Marks :40***

Instructions to the candidates:-

1) ***Attempt all questions.***
2) ***Draw the diagrams & figures wherever necessary.***
3) ***Figures to the right indicate full marks.***

Q1) Answer in two or four sentences: **[16]**

a) Define mental health.

b) What is frustration?

c) Define defensive coping.

d) What is eustress?

e) What is health psychology?

f) Define alcohol dependence.

g) What is burnout?

h) What is psychosomatic disorder?

Q2) Attempt any two of the following in eight or ten sentences: **[8]**

a) Explain the health risks associated with drinking.

b) Describe benefits & risks of exercise.

c) Describe appraisal focused coping strategies.

P.T.O.

Q3) Write short notes on <u>any two</u> of the following: **[8]**

a) Biopsychosocial model of illness.

b) Overeating.

c) Mind and body connection.

Q4) Explain the concept of coping. Explain various coping patterns. **[8]**

OR

Define stress. Explain the major types of stress.

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Total No. of Questions : 4]

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S.Y. B.Sc. (Semester - II)

PSYCHOLOGY

Counselling Psychology

(Paper - II) (2008 Pattern)

Time :2 Hours] ***[Max. Marks :40***

Instructions to the candidates:-

1) ***All questions are compulsory.***
2) ***Draw the figures & diagrams wherever necessary.***
3) ***Figures to the right indicate full marks.***

Q1) Answer in two or four sentences: **[16]**

a) What is gestalt view?

b) Define counselling.

c) What are the ethics in counselling?

d) What is parenting?

e) What are communication techniques?

f) Define assessment in counselling.

g) What is confidentiality?

h) Which physical change is associated with counselling?

Q2) Attempt any two of the following questions in eight or ten sentences: **[8]**

a) Describe characteristics of older clients in counselling.

b) Explain stages of counselling.

c) Explain the difference between children & adults.

P.T.O

Q3) Write short notes (any two) : **[8]**

a) Cognitive theory of counselling.

b) Counselling agenda's of older adults.

c) Communication between children and parents.

Q4) Explain person centered counselling. **[8]**

OR

Illustrate the characteristics of effective counselor.

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Total No. of Questions : 4]

SEAT No. : ____

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[Total No. of Pages : 2

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S.Y. B.Sc. (Semester - II)

ELECTRONIC SCIENCE

EL - 221 : Digital System Design

(Paper - I) (Old Course)

Time :2 Hours] ***[Max. Marks :40***

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***

Q1) Attempt all of the following:

a) Define linearity error. **[1]**

b) Give any two applications of shift register. **[1]**

c) Define the fan-in and fan -out parameters for the digital IC's. **[1]**

d) What is meant by tristate outputs? **[1]**

e) "Synchronous counter is faster than asynchronous counter". Comment. **[2]**

f) "Exclusive - OR gates are useful as parity generator/checker". Comment. **[2]**

g) For a certain IC family propagation delay is 10 ns with an average power dissipation of 6mW. What is its speed - power product? **[2]**

h) Convert binary to gray of the following. **[2]**

i) 10101 ii) 11001

Q2) Attempt any two of the following:

a) Explain with logic diagram 3-bit up-down counter. **[4]**

b) With the help of suitable circuit diagram, explain the operation of CMOS NOR gate. **[4]**

c) Design a 4:2 line priority encoder using K-map. **[4]**

P.T.O

Q3) Attempt any two of the following:

a) Design 1- bit comparator using K-map. **[4]**

b) What is shift register? Explain shifting of data in different forms. **[4]**

c) Describe the important characteristics that are required to consider while interfacing DACs to digital system. **[4]**

Q4) Attempt all of the following:

a) Explain the working of 4-bit DAC using binary ladder. Derive the expression for its output voltage. **[6]**

b) Obtain the logical expression for segments b and c of the BCD to 7 segment decoder to drive common cathode. **[6]**

OR

Attempt all of the following:

a) A clock of 100 kHz is applied to 7491A. How long will it take to produce an input pulse at the output? **[4]**

b) What is the analog output voltage for 5-bit weighted resistive network if the logic 1 = 10 volts and logic 0 = 0 volts for the following? **[4]**

i) 110101 ii) 101010

c) What will be the conversion time and average conversion time of a 10-bit successive approximation type ADC with 10 MHz clock? **[4]**

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Total No. of Questions : 4]

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S.Y. B.Sc. (Semester - II)

ELECTRONIC SCIENCE

EL - 222 : Electronic Instrumentation - I

(Paper - I) (New Course)

Time :2 Hours] ***[Max. Marks :40***

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Draw the neat diagrams wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Use of Non programmable calculator is allowed.***

Q1) Attempt all of the following:

a) What is transducer? **[1]**

b) Specify the name of 'over range digit' in case of multimeter. **[1]**

c) Explain how galvanometer can be converted into DC voltmeter? **[1]**

d) What is tachometer? **[1]**

e) "Accuracy is measured in terms of In accuracy". Comment. **[2]**

f) "Initial Zero setting of pH meter measurement is at pH = 7". - Comment. **[2]**

g) For micro voltmeter the deflection is 0.1 division for 0.1 mV input. Estimate sensitivity of it. **[2]**

h) Sine wave observed on CRO is having peak to peak voltage 40 volts. Calculate **[2]**

i) Peak voltage and ii) RMS voltage.

Q2) Attempt any two of the following:

a) Draw the block diagram for measurement system.Explain function of each block in brief. **[4]**

b) Explain the working of DC - ammeter with the help of neat diagram by using PMMC. **[4]**

c) Explain the working of signal generator with the help of block diagram. **[4]**

P.T.O

Q3) Attempt <u>any two</u> of the following:

a) Draw the front panel diagram of CVCC power supply and explain current setting of it. **[4]**

b) Explain the working of digital thermometer with the help of neat diagram. **[4]**

c) Draw the block diagram of CRO and explain the use of delay line in it. **[4]**

Q4) Attempt <u>all</u> of the following:

a) Explain the working of Digital multimeter (DMM) with the help of block diagram. What are the advantages of DMM over analog multimeter. **[6]**

b) List the various types of contactless electrical tachometers hence explain any one in detail. **[6]**

OR

Attempt <u>all</u> of the following:

a) Draw the basic circuit diagram of DC-voltmeter, hence design 0-50 volt range voltmeter with D' Arsonval movement having full scale deflection current 100 μA and internal resistance of coil is 100Ω. **[4]**

b) The square wave observed on CRO is having 'ON' time (t_1) = 'OFF' time (t_2) and distance between two adjucent positive edges is 5 divisions. The position of time/div knob is no 100 μsec/div. Calculate the frequency and duty cycle of the square wave. **[4]**

c) Calculate the percentage load regulation for power supply, if output voltage with no load is 12volts and with full load 10 volts. Also calculate the line regulation if output voltage changes by 1 volt for the change in input voltage by 10 volts. **[4]**

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S.Y. B.Sc. (Sem. - II)

ELECTRONIC SCIENCE

EL - 222 : Communication System

(Paper - II) (2008 Pattern)

Time :2 Hours] ***[Max. Marks :40***

Instructions to the candidates:-

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Draw neat diagram wherever necessary.***
4) ***Use of Non programmable calculator is allowed.***

Q1) Attempt all of the following:

a) What is disadvantage of phase shift discriminator? **[1]**

b) State different tones in telephones. **[1]**

c) What is internet? **[1]**

d) Define Aspect ratio. **[1]**

e) "Fax is simple type of communication device", comment. **[2]**

f) "In pulse dialing to dial digit 1 less time is required than to dial digit 0", comment. **[2]**

g) Calculate frequency of local oscillator of superheterodyne receiver for receiving frequency of 1000 kHz, if IF is 455 kHz. **[2]**

h) The carrier amplitude after AM varies between 7 volts and 3 volts. Calculate depth of modulation. **[2]**

Q2) Attempt <u>any two</u> of the following:

a) What is noise? State its different types and explain shot noise. **[4]**

b) Explain the structure of co-axial cable. State its applications. **[4]**

c) Write a short note on Dish TV. **[4]**

P.T.O

Q3) Attempt any two of the following:

a) What is frequency modulation? Define modulation index and maximum frequency deviation. **[4]**

b) Explain synchronization and blanking in TV. **[4]**

c) With the help of block diagram, explain FM radio receiver. **[4]**

Q4) Attempt the following:

a) What is meant by propagation? Explain ground wave propagation.State limitations of it. **[6]**

b) Draw block diagram of digital communication system and explain it. Explain concept of ASK and FSK. **[6]**

OR

Attempt the following:

a) A carrier wave with amplitude 12v and frequency 10 MHz is amplitude modulated to 70% level with modulating frequency of 1.2 kHz. Write down the equation of AM wave. Sketch the waveform in frequency domain. **[4]**

b) In superheterodyne receiver Q of antenna coupling circuit is 50. If the IF is 455 kHz, calculate the image frequency and image frequency rejection at 750 kHz. **[4]**

c) A carrier wave of 10 kW is amplitude modulated at 80% depth of modulation by sinusoidal modulating signal. Calculate the power in side bands and total power. **[4]**

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Total No. of Questions : 4]

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S.Y. B.Sc. (Semester. - II)

DEFENCE AND STRATEGIC STUDIES

DS - 201 : Strategic Issues In International Relations

(Paper - I) (2008 Pattern)

Time :2 Hours] ***[Max. Marks :40***

Instructions to the candidates:-

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***

Q1) Answer in 2 to 4 sentences each : **[16]**

a) Define 'International Relations'.

b) Define 'War'

c) What is 'Military Technology'?

d) Define 'Diplomacy'.

e) What is Arms control?

f) What is Disarmament?

g) Write the objectives of ASEAN.

h) What is Global Warming?

Q2) Answer in 8 to 10 sentences (any two) : **[8]**

a) Explain the concept of Transfer of Military Technology.

b) Write the Functions of Diplomacy.

c) What is Defence Diplomacy?

P.T.O

Q3) Write short notes on (any two) : **[8]**

a) Terrorism

b) Human Rights

c) SAARC

Q4) Answer in 16 to 20 sentences (any one) : **[8]**

a) Explain the nature and characteristics of Diplomacy.

b) How war has become the instrument of Foreign Policy.

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Total No. of Questions : 4]

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[Total No. of Pages : 2

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S.Y. B.Sc. (Semester - II)

DEFENCE AND STRATEGIC STUDIES

DS - 202 : India's National Security

(Paper - II) (2008 Pattern)

Time :2 Hours] ***[Max. Marks :40***

Instructions to the candidates:-

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***

Q1) Answer in 2 or 4 Sentences each. **[16]**

a) Define National Security.

b) State the meaning of national Interest.

c) Define airspace security.

d) Write the meaning of insurgency.

e) Define Maritime Security.

f) Write any two objectives of India's Defence policy.

g) What do you mean by border Management.

h) Define Ethnic Conflict.

Q2) Answer in 8 to 10 Sentences each (any two) : **[8]**

a) Make a brief review of India's national values.

b) Write a note on India's maritime security.

c) Discuss importance of air-space security.

P.T.O.

Q3) Write short notes on (any two) : **[8]**

a) India - Pakistan war of 1971.

b) India - China war of 1962.

c) Write a note on India's land border management.

Q4) Answer in 18 to 20 sentences (Any one) : **[8]**

a) Explain India's nuclear Programme since 1980's.

b) Evaluate India's national security threats in 21st century.

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Total No. of Questions : 4]

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S.Y. B.Sc. (Semester - II)

DEFENCE AND STRATEGIC STUDIES

DS - 203 : Military Geography

(Paper - III) (2008 Pattern)

Time :2 Hours] ***[Max. Marks :40***

Instructions to the candidates:-

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***

Q1) Answer in 2 or 4 sentences. **[16]**

a) State the ideal period for Jungle warfare

b) Define 'strategy'.

c) Write any two means of grand strategy.

d) State an example of use of environment factor during war.

e) What do you mean by Military Geography?

f) State the weapons of high altitude warfare.

g) What do you understand by "ship of Desert"?

h) Write any two characteristics of plain warfare.

Q2) Answer in 8 to 10 sentences (any two) : **[8]**

a) Why the study of desert warfare is essential for India?

b) Explain any one example of Tactics.

c) Write in brief the uses of Military geography.

P.T.O

Q3) Write short notes on (any two) : **[8]**

a) Logistics problems in high altitude warfare.

b) Environment as a factor of National security.

c) Tactical problems in Desert warfare.

Q4) Answer in 16 to 20 sentences (Any one) : **[8]**

a) Explain in detail how the war affects on environment.

b) Discuss the principles of logistics with examples.

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Total No. of Questions : 4]

SEAT No. : ____

P149

[Total No. of Pages : 2

[4217] - 229

S.Y. B.Sc. (Semester - II)

ENVIRONMENTAL SCIENCE

ENV - 201 : Biological Diversity

(Paper - I) (2008 Pattern)

Time :2 Hours] ***[Max. Marks :40***

Instructions to the candidates:-

1) ***All questions are compulsory.***
2) ***Neat and labeled diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***

Q1) Attempt the following in 1-2 lines each. **[10]**

a) What is meant by genetic Diversity?

b) Define Endemism.

c) Write the full form of CBD.

d) Define Agrobiodiversity.

e) What is meant by Traditional Conservation Practices?

f) Name any 2 Hotspots.

g) Name any 2 characteristic animals of the Gangetic Plain.

h) What is meant by Gene Pool?

i) Define species - richness.

j) Write the full form of IUCN.

Q2) Write a short note on <u>any two</u> : **[10]**

a) GMO's & their effects on ecosystem.

b) India as a megadiversity nation.

c) Myers' Hotspots.

P.T.O

Q3) Answer <u>any two</u> of the following : **[10]**

a) Enumerate any 5 ecological significance of forest ecosystem.

b) Describe any 5 international & national efforts for biodiversity conservation.

c) Describe the various In - situ conservation methods with suitable examples.

Q4) Answer <u>any one</u> of the following : **[10]**

a) Explain Centres of Diversity. Describe the classification of Centres of Diversity on global scale.

b) Give the classification of Ecosystem. Discuss with examples for each.

❄❄❄

Total No. of Questions : 4]

SEAT No. :

P150

[Total No. of Pages : 2

[4217] - 230

S.Y. B.Sc. (Semester - II)

ENVIRONMENTAL SCIENCE

ENV - 202 : Soil Science

(Paper - II) (2008 Pattern)

Time : 2 Hours] *[Max. Marks : 40*

Instructions to the candidates :

1) ***All questions are compulsory.***
2) ***Neat and labelled diagram must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***

Q1) Attempt the following in one or two lines each. **[10]**

a) State the difference between Physical & Chemical weathering.

b) Define : Eluviation.

c) Enlist the components of soil.

d) What is humus? Give its role in soil.

e) Mention any two sources of soil pollution.

f) Name any two examples of green manures.

g) Enlist any two types of soil of Maharashtra.

h) Define : Soil erosion.

i) What is mulching?

j) Give the role of actinomycetes in soil.

Q2) Write short note on (Any two) : **[10]**

a) Soil profile with suitable diagram.

b) Effect of fertilizers on soil properties.

c) Soil structure evaluation and factors affecting soil structure.

P.T.O.

Q3) Answer any two of the following : **[10]**

a) Mention types of soil micro-organisms and explain their role in soil fertility.

b) Describe soils of India in detail with suitable examples.

c) Give the functions & deficiency syndromes of N_2 & Mn.

Q4) Answer any one of the following : **[10]**

a) Describe all physical & chemical properties of soil in detail.

b) Explain in detail Bioremediation of soils with appropriate examples.

❄❄❄

Total No. of Questions : 4]

SEAT No. : ____

P151

[Total No. of Pages : 2

[4217] - 231

S.Y. B.Sc. (Semester - II)

OPTIONAL ENGLISH

Enriching Oral and Written Communication in English

(2008 Pattern)

Time :2 Hours] ***[Max. Marks :40***

Instructions to the candidates:-

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***

Q1) Attempt any two of the following : **[10]**

a) Write a transcript of a group discussion on 'Corruption in India' using some expressions related to - expressing opinions, asking for opinion, expressing agreement, expressing disagreement, suggesting, interrupting, concluding, etc.

b) You have applied for the post of a Research Assistant, in the National Chemical Laboratory, Pune. Think of five questions that you could be asked and write them down along with your possible responses.

c) Imagine that you are the Sports Representative of your college. You have been asked to attend a meeting by the principal, to plan the Annual Sports Week. Prepare a Script of the meeting.

Q2) Attempt any two of the following : **[10]**

a) Write a paragraph of about 15 sentences on 'The importance of celebrations in our lives'.

b) Punctuate the following.

i) india exports many agricultural products rubber coffee tea rice sugar spices.

ii) it was a beautiful night millions of stars shone softly and there was a cool gentle breeze blowing.

iii) professor m albert chairman department of archaeology is inaugurating the exhibition.

P.T.O.

iv) you must visit the qutubminar before you leave dont tell me you are tired already.

v) i found the chapter administration in colonial india very interesting.

c) Summarize the following paragraph to one third of its length. Suggest a suitable title. Prepare a rough draft as well.

Euthanasia is the act of helping a person who is terminally ill to die painlessly. It is considered as an option only when the patient is either in terrible pain and longs for death or is in a prolonged comatose state. Euthanasia may be achieved by administering drugs that would lead to a painless death. It could, on the other hand, simply be the result of taking the patient off all life-support systems, which some doctors may do more readily than killing the patient with the help of a lethal drug. The act is an offence in most countries and has been made legal only in places like Holland and Belgium. The two sides of the controversy regarding euthanasia involve the conflicting aspects of the right of an individual to die with dignity under a very specific set of circumstances and that of the essential sacredness of life.

Q3) Attempt <u>any two</u> of the following : **[10]**

a) Write a review of a film you have seen recently. Comment on the script, dialogue, acting, music, choreography, editing, cinematography etc.

b) Write a few lines on ' A visit to a sea - shore'.

c) Prepare an advertisement for a health drink.

Q4) Attempt <u>any two</u> of the following : **[10]**

a) You are planning a visit to Kerala with your friends. Write a transcript of the telephonic conversation you had with your travel planner.

b) Write an e-mail letter to your friend in Boston, USA, seeking information regarding a course in Animation in a university there.

c) Prepare 5 slides of about 20 words each for a power point presentation that you would like to make on 'Careers in the Sciences'.

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Total No. of Questions : 4]

SEAT No. : ____

P100

[Total No. of Pages : 3

[4217]-113

S.Y. B.Sc. (Semester - I)

STATISTICS

ST-211: Discrete Probability Distributions and Time Series

(2008 Pattern) (Paper - I)

Time :2 Hours] ***[Max. Marks :40***

Instructions to the candidates :

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Use of scientific calculator and statistical tables is allowed.***
4) ***Symbols have their usual meanings.***

Q1) Attempt each of the following :

a) Choose the correct alternative in each of the following : **[1 each]**

i) If the second and fourth cumulants of a random variable (r.v) X are 2 and 8 respectively then the fourth central moment is .....

(A) 20 (B) 8
(C) 16 (D) 32

ii) If $X \rightarrow$ Poisson (3.5) then mode of X is ....

(A) 3 (B) 3.5
(C) 4 (D) 3 and 4

iii) Let $X \rightarrow$ NB (k 1/4) such that variance of X is 60 then the value of k is .....

(A) 12 (B) 15
(C) 5 (D) 3

b) State whether the given statement is true or false in each of the following: **[1 each]**

i) $M_{X+Y}(t) = M_{X,Y}(t, t)$

ii) Suppose X and Y are independent random variables such that $X \rightarrow$ NB (k_1, p_1) and $Y \rightarrow$ NB (k_2, p_2) then $X + Y \rightarrow$ NB $(k_1 + k_2, p_1 + p_2)$.

iii) If the components in time series are independent then additive model is suitable.

P.T.O.

c) State uniqueness property of moment generating function (m.g.f.). **[1]**

d) State a real life situation of Poisson distribution. **[1]**

e) Define time series. **[1]**

f) For the following p.m.f, find the value of K. **[1]**

$$P(x) = k\,(1/3)^x \quad ; x = 1, 2, 3, ...$$
$$= 0 \quad ; \text{otherwise.}$$

Q2) Attempt <u>any two</u> of the following : **[5 each]**

a) State and prove the additive property of Poisson distribution.

b) The joint p.m.f. of r.v. (X, Y) is

$$P(x,y) = \frac{9}{4^{x+y}} \quad ; x = 1,2,3,.....$$
$$y = 1,2,3,.....$$
$$= 0 \quad ; \text{otherwise.}$$

Find E(X| Y = y).

c) A personal officer interviews the candidates for 5 posts of the same rank. If probability that a candidate is found suitable is 0.65, what is the probability that the officer has to interview 10 candidates to fulfill his requirement?

Q3) Attempt <u>any two</u> of the following : **[5 each]**

a) The joint p.m.f. of r.v. (X,Y) is

$$P(x,y) = \frac{e^{-1}\,p^y\,q^{x-y}}{y!(x-y)!} \quad ; x = 0,1,2,3,.... \quad .$$
$$y = 0,1,2,3,.....x$$
$$0 < p < 1,\ q = 1 - p$$
$$= 0 \quad ; \text{otherwise.}$$

Find:

i) Marginal distribution of X.

ii) Marginal distribution of Y and

iii) Whether X and Y are independent.

b) Show that the sum of k independent and identically distributed geometric random variables follows negative binomial distribution.

c) Describe any two components of time series.

Q4) Attempt <u>any one</u> of the following :

a) i) Describe the method of ratio to moving averages for computing seasonal indices. **[6]**

ii) State and prove lack of memory property of geometric distribution. **[4]**

b) i) Customers arrive at a certain petrol pump is a Poisson process with an average time of 6 minutes between two successive arrivals. The service time for each vehicle is exponentially distributed with mean 3 minutes.

Find :

A) The probability that the pump is idle.

B) The probability that there are 3 customers in the system. **[5]**

ii) Show that all the cumulants except the first are invariant to the change of origin. **[5]**

Total No. of Questions : 4]

SEAT No. : ____

P101

[Total No. of Pages : 3

[4217]-114

S.Y. B.Sc. (Semester - I)

STATISTICS

ST-212: Continuous Probability Distributions - I

(2008 Pattern) (Paper - II)

Time :2 Hours] ***[Max. Marks :40***

Instructions to the candidates :

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Use of calculator and statistical tables is allowed.***
4) ***Symbols and abbreviations have their usual meaning.***

Q1) Attempt each of the following :

a) Choose the correct alternative in each of the following : **[1 each]**

i) Distribution function of continuous random variable (r.v.) is

A) step function B) monotonic decreasing

C) monotonic non-increasing D) monotonic non-decreasing

ii) If (X, Y) is a continuous bivariate r.v. then

A) $E(XY) = E(X)\,E(Y) \Rightarrow$ X and Y are independent.

B) X and Y are independent $\Leftrightarrow E(XY) = E(X)\,E(Y)$

C) X and Y are independent $\Rightarrow E(XY) = E(X)\,E(Y)$

D) $M_{X+Y}(t) = M_X(t) + M_Y(t)$

iii) If X follows exponential distribution with mean $\frac{1}{\alpha}$ then moment generating function of X is

A) $\left(1-\frac{t}{\alpha}\right)^{-1}$ B) $(1-\alpha t)^{-1}$

C) $\left(1-\frac{t}{\alpha^2}\right)^{-1}$ D) $\left(1-\alpha^2 t\right)^{-1}$

P.T.O.

b) State whether the given statement is true or false in each of the following: **[1 each]**

i) If (X, Y) is a two dimensional continuous r.v. then E[E(X|Y)] = E(Y).

ii) For N(3, 4) distribution, the point of inflexions are 1 and 5.

iii) If $X \to G(\alpha,\lambda)$ then variance of X is $\frac{\lambda}{\alpha^2}$.

c) Define expectation of a continuous r.v.X. **[1]**

d) If the joint probability distribution of (X, Y) is

$$f(x,y) = \frac{x(x-y)}{8},\ 0 < x < 2, -x < y < x$$
$$= 0 \quad ,\text{otherwise}$$

[1]

Find the marginal probability distribution of X.

e) If $X \to N(10, 4)$ find first quartile of X. **[1]**

f) If X follows exponential distribution with mean $\frac{1}{\alpha}$, state the standard deviation of X. **[1]**

Q2) Attempt any <u>two</u> of the following : **[5 each]**

a) Let X be a continuous r.v. with probability distribution

$$f(x) = 3(1-x)^2 \ ,\ 0 < x < 1$$
$$= 0 \quad ,\text{otherwise}$$

Find the probability distribution of $Z = \frac{X}{1-X}$.

b) i) If X is a continuous random variable with probability density function (p.d.f.) $f(x)$ and distribution function $F(x)$ then $Y = F(x)$ follows U(0, 1) distribution.

ii) If $X \to U(a,b)$ with mean 5 and variance 3, determine the values of a and b.

c) If $X \to N(\mu,\sigma^2)$, find median of X.

Q3) Attempt any <u>two</u> of the following : **[5 each]**

a) The probability density of continuous r.v. X is

$$f(x)=\begin{cases} x^3 & ,\ 0\le x\le 1 \\ (2-x)^3 & ,\ 1\le x\le 2 \\ 0 & ,\ \text{otherwise} \end{cases}$$

Find standard deviation of X.

b) Let (X, Y) be continuous bivariate r.v. with joint probability distribution

$$f(x,y)=e^{-(x+y)} \ ,\ x>0, y>0$$
$$=0 \quad ,\ \text{otherwise}$$

Find the probability distribution of $\frac{X}{Y}$.

c) State and prove lack of memory property of exponential distribution. Further X follows exponential distribution with mean 2, find P(X>5|X>2).

Q4) Attempt any <u>one</u> of the following :

a) i) If $X \to P(m)$, then show that as $m \to \infty$, the probability distribution of $\frac{X-m}{\sqrt{m}}$ tend to N(0, 1). Also if $X_1, X_2, ..., X_{100}$ are independent Poisson random variables with mean 4 then find approximately $P\left(\sum_{i=1}^{100} X_i > 430\right)$. **[7]**

ii) If (X, Y) is a bivariate r.v. with p.d.f. $f(x, y)$ then show that $E(X + Y) = E(X) + E(Y)$. **[3]**

b) i) Let X and Y have gamma distribution with parameters α and λ. Find moment generating function of X. Hence, prove additive property of gamma distribution. Also justify whether the difference of two independent gamma variates follows gamma distribution. **[7]**

ii) If (X, Y) is bivariate r.v. such that $E(X \mid Y=y)=\frac{1+y}{2}$ and $E(Y \mid X=x)=\frac{1+x}{2}$, find correlation coefficient between X and Y. **[3]**

Total No. of Questions : 4]

SEAT No. :

P102

[Total No. of Pages : 2

[4217]-115
S.Y. B.Sc. (Semester - I)
GEOGRAPHY
Gg-211: Fundamentals of Geography of Resources
(2008 Pattern) (Paper - I)

Time :2 Hours] *[Max. Marks :40*

Instructions to the candidates :

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Draw neat diagrams wherever necessary.***
4) ***Use of map stencil is allowed.***

Q1) Answer the following questions in two to three sentences each : **[10]**

a) Define a resource.

b) Name any four components of natural resources.

c) Give any two examples of renewable abiotic resources.

d) Give any two examples of non-renewable biotic resources.

e) State the measures of conservation of forests.

f) What is tourism?

g) State the domestic uses of water.

h) State any two causes of land degradation.

i) Give any two advantages of ground water?

j) What is mining?

Q2) Write short notes on the following (any two) : **[10]**

a) Importance of renewable biotic resources.

b) Causes of deforestation.

c) Significance of land resources.

P.T.O.

Q3) Answer the following questions (any two) : **[10]**

a) Explain how resources are classified.

b) Explain the various sources of water.

c) Describe the uses of land resources.

Q4) Explain the various uses of forest resources. **[10]**

OR

Explain the need and various methods of conservation of water resources.

Total No. of Questions : 4]

SEAT No. : ____

P103

[Total No. of Pages : 2

[4217]-116
S.Y. B.Sc. (Semester - I)
GEOGRAPHY
Gg-212: Introduction to Hydrology
(2008 Pattern) (Paper - II)

Time :2 Hours] ***[Max. Marks :40***

Instructions to the candidates :

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Draw neat diagrams and sketches wherever necessary.***
4) ***Use of map stencil is allowed.***

Q1) Answer the following questions in two or three sentences each : **[10]**

a) Define hydrologic budget.

b) Give any two applications of hydrology.

c) Give the distribution of global water reserves.

d) Give two examples of high rainfall regions in the world.

e) What is meant by stream flow?

f) Write the unit of water supply flow.

g) Define precipitation.

h) What do you mean by point precipitation?

i) What do you mean by Probable Maximum Precipitation (PMP)

j) What is meant by depression storage?

Q2) Write short Notes (Any Two) : **[10]**

a) Palaeohydrology.

b) Orographic precipitation.

c) Throughfall.

P.T.O.

Q3) Answer the following questions (Any Two) : **[10]**

a) Explain the sources of hydrologic data.

b) Describe the gross and net precipitation.

c) Describe "Interception".

Q4) Define hydrologic cycle and explain it with suitable diagram. **[10]**

OR

Explain the precipitation frequency analysis.

Total No. of Questions : 4]

SEAT No. : ____

P104

[Total No. of Pages : 2

[4217]-117
S.Y. B.Sc. (Semester - I)
MICROBIOLOGY
MB-211: Microbial Physiology
(2008 Pattern) (Theory) (Paper - I)

Time :2 Hours] ***[Max. Marks :40***

Instructions to the candidates :

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Draw neat labelled diagrams wherever necessary.***

Q1) Answer the following : **[10]**

a) What is Autoradiography?

b) Define respiration.

c) $A + B + ATP \longrightarrow AB + ADP + Pi$
The above reaction is catalysed by _____ class.
   i) Transferases
   ii) Lyases
   iii) Ligases
   iv) Isomerases

d) State the principle of Affinity chromatography.

e) Write the biochemical reaction of conversion of pyruvate to ethanol.

f) End product of aerobic respiration of glucose is nitrate– True or False.

g) State Beer and Lambert's law.

h) Write one example of biochemical oxidation reaction.

i) Enlist any one application of Warburg's respirometer.

j) Draw the structure of Lactic acid.

P.T.O.

Q2) Attempt any two of the following : **[10]**

a) What is ultracentrifugation? Enlist any two of its application.

b) Describe with structures ED pathway and state its significance.

c) Explain the effect of temperature on enzyme activity.

Q3) Attempt any two of the following : **[10]**

a) Schematically represent glycolysis with enzymes and energy yield.

b) Explain methodology and applications of Ion-exchange chromatography.

c) Describe properties of active site of an enzyme.

Q4) Attempt the following (any one) : **[10]**

a) Explain transition state and induced fit model for enzyme catalysis.

b) Describe with structures the reactions of HMP pathway. Add a note on its significance.

Total No. of Questions : 4]

SEAT No. : ____

P105

[Total No. of Pages : 2

[4217]-118
S.Y. B.Sc. (Semester - I)
MICROBIOLOGY
MB-212: Microbial Genetics
(2008 Pattern) (Theory) (Paper - II)

Time :2 Hours] ***[Max. Marks :40***

Instructions to the candidates :

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Draw neat labelled diagrams wherever necessary.***

Q1) Attempt the following : **[10]**

a) Which of the following forms of DNA has left handed helical structure?

i) 'A' ii) 'Z'
iii) 'B' iv) 'C'

b) Name any two Stop/Non-sense codons.

c) Define : 'Mutation'.

d) State true or false.

DNA replicates by dispersive mode of replication.

e) Draw the structure of thymine.

f) Which of the following enzymes affected the conversion of 'R' strain of streptococci to 'S' strain in Avery and MacLeod's experiment?

i) DNAase ii) Proteiase
iii) Lipase iv) RNAase

g) The central dogma in molecular biology was put forth by -

i) F. Griffith ii) J. Cairns
iii) F. Crick iv) Benzer

h) Bacterial DNA replicates by _____ mechanism.

i) D-loop ii) Rolling circle
iii) θ Replication iv) Continuous

P.T.O.

i) Define : Linking number of DNA.

j) State true or false -

Bacterial nucleoid organization involves Histone proteins.

Q2) Attempt the following (Any two) : **[10]**

a) Diagrammatically represent the antiparallel and complementary strands of B form of DNA.

b) Diagrammatically represent the D loop mechanism of DNA replication.

c) Using a flow chart/tabular form, represent the protocol and observations of F. Griffith's experiment. Comment on its interpretation.

Q3) Attempt the following (Any two) : **[10]**

a) Justify: Degeneracy of genetic code may result into silent mutation.

b) Describe Messelson & Stahl's experiment revealing the mode of DNA replication.

c) Explain the replica plate technique used for isolation of mutants.

Q4) Attempt any one of the following : **[10]**

a) Explain the mode of action of the following mutagenic agents on DNA.

i) U.V. rays.
ii) Base analogues (Any one)
iii) Acridine orange.
iv) HNO_2

b) What is 'gene expression'? Explain the concepts of transcription and translation in bacteria.

Total No. of Questions : 4]

SEAT No. : ____

P106

[Total No. of Pages : 3

[4217]-121
S.Y. B.Sc. (Semester - I)
STATISTICAL TECHNIQUES
STT-211: Statistical Techniques - I
(2008 Pattern) (Paper - I)

Time :2 Hours] ***[Max. Marks :40***

Instructions to the candidates :

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Use of scientific calculator and statistical tables is allowed.***
4) ***Symbols and abbreviations have their usual meanings.***

Q1) Attempt each of the following :

a) Choose the correct alternative in each of the following : **[1 each]**

i) A geometric random variable X with parameter p and taking values 1, 2, 3, ... has arithmetic mean .....

(A) $\frac{q}{p}$ (B) $\frac{1}{p}$

(C) $\frac{q}{p^2}$ (D) $\frac{p}{q}$

ii) If X and Y are independent negative binomial random variables with parameters (k_1, p) and (k_2, p) respectively, then X + Y follows ..... distribution.

(A) NB $(k_1 + k_2, p)$ (B) B $(k_1 + k_2, p)$
(C) Geometric (p) (D) NB (k_1, k_2, p)

iii) If X is a random variable with probability density function

$f(x) = 5e^{-5x}$, $x \geq 0$
$= 0$, otherwise ,

then the distribution function of X is given by

(A) $1\text{-}5e^{-5x}$ (B) $1\text{-}e^{-5x}$
(C) e^{-5x} (D) $1\text{-}e^{-5x}$

P.T.O.

b) State whether each of the following statements is true or false. **[1 each]**

i) Normal distribution is positively skewed.

ii) Negative binomial random variable takes negative values.

iii) Geometric distribution satisfies lack of memory property.

c) State the probability density function of N(M, σ^2). **[1]**

d) State the relation between geometric distribution and negative binomial distribution. **[1]**

e) State the dispersion matrix of multinomial distribution. **[1]**

f) State the range in which numerical values of $R_{1.23}$ lic. **[1]**

Q2) Attempt any TWO of the following :

a) State any two important properties of normal distribution. If $X \rightarrow N(2, 9)$ find **[5]**

i) $P(X^2 \leq 4)$

ii) $P(2X + 5 \geq 15)$.

b) Define the multiple correlation. State the formula for $R_{1.23}$. Interpret the cases $R_{1.23}=0$ and $R_{1.23}=1$. Also state the relation between $R_{1.23}$ and $r_{12.3}$ **[5]**

c) Define the negative binomial distribution, state its mean and variance. Give two real life situations where negative binomial distribution is experienced. Show that the variance of negative binomial distribution is larger than mean. **[5]**

Q3) Attempt any TWO of the following :

a) Define multinomial probability distribution. State the marginal probability distribution of X_i. State $E(X_i)$ and $Var(X_i)$. Also state the conditional distribution of X_i given X_j $(j \neq i)$. **[5]**

b) If $\overline{X}_1 = \overline{X}_2 = \overline{X}_3 = 0, \sigma_1 = \sigma_2 = \sigma_3 = 1, r_{12} = r_{13} = r_{23} = \rho,$ find the equation of regression plane of X_1 on X_2 and X_3. Also estimate X_1 if $X_2 = X_3 = 1$ and $\rho = \frac{1}{2}$. **[5]**

c) Define the partial correlation, multiple regression coefficient $b_{12.3}$. Give the interpretation of $b_{12.3}$. Also show that $b_{12.3}.b_{21.3} = r^2_{12.3}$. **[5]**

Q4) Attempt any <u>one</u> of the following :

a) i) Define the exponential distribution. State the lack of memory property. Give its interpretation. Also find P(X>10|X>3) if X is exponential random variable with mean 1/2. **[5]**

ii) If $X \rightarrow N(1, 16)$ independent of $Y \rightarrow N(2, 9/4)$, find P(X + 2Y<9) and P(1X – 2Y1>1). **[5]**

b) i) If $(X_1, X_2, X_3) \rightarrow MN(6, 1/3, 1/3, 1/3)$. State $E(X_1)$, Var (X_1). Also find $P(X_1 = X_2 = X_3)$ and $P(X_1 = 1, X_2 = 3)$. **[6]**

ii) If $r_{12} = 0.7$, $r_{13} = r_{23} = 0.5$, compute $R_{1.23}$, $r_{13.2}$, $\sigma_{1.23}$ **[4]**

Total No. of Questions : 4] **SEAT No. :**

P107 **[Total No. of Pages : 3**

[4217]-122
S.Y. B.Sc. (Semester - I)
STATISTICAL TECHNIQUES
STT-212: Statistical Techniques - II
(2008 Pattern) (Paper - II)

Time :2 Hours] ***[Max. Marks :40***

Instructions to the candidates :

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Use of statistical tables is allowed.***
4) ***Use of scientific calculator is allowed.***
5) ***Symbols and abbreviations have their usual meanings.***

Q1) Attempt each of the following :

a) Choose the correct alternative in each of the following cases : **[1 each]**

i) The number of samples of each of size 2 that can be drawn by SRSWR from a population containing 6 observations is

(A) 2^6 (B) 12
(C) 15 (D) 6^2

ii) In double sampling plan, $\{N, n_1, n_2, c_1, c_2\}$ with d_1, d_2 denote respectively the number of defectives in the first and second samples drawn, the decision of rejecting the lot is taken on the basis of first sample when

(A) $d_2 > c_2$ (B) $d_1 > c_1$ and $d_2 < c_2$
(C) $d_1 + d_2 > c_2$ (D) $d_1 > c_2$

iii) For a single sampling plan $\{N = 1000, n = 100, c = 1\}$, the probability of accepting the lot of quality $p = 0.02$ is 0.406 then AOQ will be

(A) 0.3 (B) 0.0073
(C) 0.5 (D) 0.73

b) State whether each of the following statements is true or false: **[1 each]**

i) Under SRSWOR, $E(s^2) = \sigma^2$.

P.T.O.

ii) Under Stratified random sampling, $\bar{x}_{st} = \sum_{i=1}^{k} W_i \bar{x}_i, W_i = \frac{N_i}{N}$ is an unbiased estimator of population mean.

iii) For a single sampling plan with N = 100, n = 20, if ATI = 50 then the probability of rejecting the lot is $\frac{3}{8}$.

c) In stratified random sampling, state the formula of the sample size(n_i) under optimum allocation. **[1]**

d) State one real life situation where sampling for proportions is used. **[1]**

e) Discuss the nature of operating characteristic curve for a single sampling plan. **[1]**

f) Explain the term AQL. **[1]**

Q2) Attempt any <u>two</u> of the following : **[5 each]**

a) Show that in simple random sampling without replacement the probability that a specified unit of the population being selected at any given draw is equal to the probability that it is being selected at any given draw.

b) From a lot consisting of 1000 items, a sample of size 100 is taken. If it contains 1 or less defective, the lot is accepted, otherwise it is rejected. Draw an O.C. curve for the above sampling plan taking lot quality AQL = 0.01, 0.02, 0.04, 0.1.

c) What is stratified random sampling? Give any one real life situation where stratified random sampling is an appropriate method of sampling. State the expression of an estimator of population mean and its standard error under stratified random sampling.

Q3) Attempt any <u>two</u> of the following : **[5 each]**

a) A sample of 30 students is to be drawn from a 400 students belonging to two schools A and B. The total number of students in each school, the mean and standard deviation of scores of students in both the schools are given below :

Stratum (school)	Total number of students (Ni)	Mean ($\bar{Y}_{Ni}$)	S.D. (σ_i)
A	250	60	10
B	150	80	20

Determine the stratum sample sizes under proportional allocation. Obtain the estimate of population mean and the estimate of its variance of under proportional allocation.

b) Define simple random sampling with replacement (SRSWR) and simple random sampling without replacement (SRSWOR) from a finite population. State the unbiased estimators of the population mean and their variances based on the above two methods.

c) Explain the terms: LTFD, Producers risk, Consumers risk.

Q4) Attempt any <u>one</u> of the following :

a) i) A random sample of 100 pineapples is selected from a consignment containing 2000 pineapples and 6 are found to be bad. Estimate the total number of bad pineapples in the consignment. Also estimate the standard error of the estimate. **[5]**

ii) Calculate ATI for a double sampling plan : **[5]**
$\{N = 1000, n_1 = 100, n_2 = 50, c_1 = 1, c_2 = 2\}$.
Given that the lot quality is 0.04.

b) Draw all possible samples of size 2 by the method of SRSWOR from the population consisting of five observations 2, 3, 5, 6, 7. Further calculate the sample mean $\bar{x}$ for all the samples drawn and verify that : **[10]**

i) $E(\bar{x}) = \bar{X}$.

ii) $V(\bar{x}) = \frac{(N - n)}{Nn} S^2$

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Total No. of Questions : 4]

SEAT No. :

P108

[Total No. of Pages : 2

[4217]-123

S.Y. B.Sc. (Semester - I)

ELECTRONIC SCIENCE

EL-211: Analog Circuits and Systems

(Common to Old & New) (Paper - I) (2008 Pattern)

Time :2 Hours] *[Max. Marks :40*

Instructions to the candidates :

1) ***All questions are compulsory.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Use of non-programmable calculator is allowed.***

Q1) Answer all of the following :

a) State the classification of the amplifier on the basis of input frequency range. **[1]**

b) State any one condition required for sustain oscillation. **[1]**

c) What is the unit of slew rate. **[1]**

d) Define output offset voltage of the differential amplifier. **[1]**

e) Comment "Efficiency of class A amplifier is less than class C amplifier". **[2]**

f) In a CE Amplifier circuit, calculate the value of emitter bypass capacitor. [Given $R_E = 10k\Omega$ & $f = 1kHz$]. **[2]**

g) "In Colpitts oscillator circuit, two capacitors are used in tank circuit to produce phase shift of 180º". Comment. **[2]**

h) Calculate the gain of an amplifier with positive feedback. Given $\beta = 0.005$ and gain without feedback is 40. **[2]**

Q2) Attempt any <u>two</u> :

a) Explain the classification of amplifier in detail. **[4]**

b) Write short note on thermal runaway and heat sink. **[4]**

c) Draw the circuit diagram of differential amplifier with constant current source and hence explain, how the constant current source helps to increase CMRR. **[4]**

P.T.O.

Q3) Attempt any <u>two</u> :

a) Explain, In a class A amplifier, how the value of R_C and R_E are calculated. **[4]**

b) With the help of neat diagram, explain the working of complementary symmetry class B push pull amplifier. **[4]**

c) Draw and explain class A common emitter amplifier. Sketch the graph indicating input signal, V_{CE} and I_C. **[4]**

Q4) Answer all of the following :

a) Draw the circuit diagram of active low pass filter using op-Amp, hence derive the equation for output voltage. **[6]**

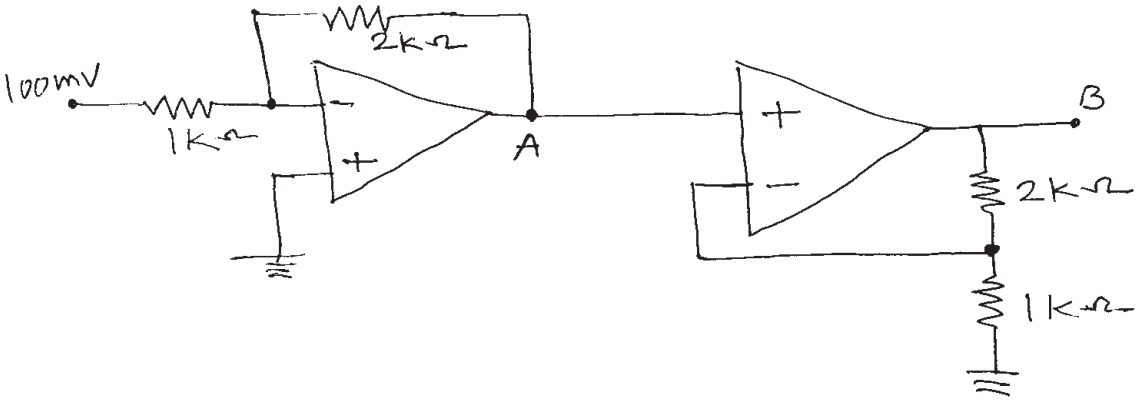
b) Draw and explain transisterized Hartley oscillator, hence obtain the formula for output frequency. **[6]**

OR

a) Calculate CMRR of differential amplifier which produces output of 1000 mV for V_1 = 100 mV, V_2 = 200 mV and output of 10 mV for $V_1 = V_2$ = 100 mV. **[4]**

b) The silicon transistor is biased with the help of potential divider circuit. Plot the dc load line and find the co-ordinates of Q point.
[Given :- R_C = 1 kΩ, R_E = 1 kΩ, V_{CC} = +20 volts, R_1 = 5 kΩ & R_2 = 5 kΩ]. **[4]**

c) Calculate the voltages at points A and B in the circuit given below. **[4]**



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Total No. of Questions : 4]

SEAT No. :

P109

[Total No. of Pages : 2

[4217]-124
S.Y. B.Sc. (Semester - I)
ELECTRONIC SCIENCE
EL-5222A1: Digital System Design
(New Course) (Paper - II)

Time :2 Hours] *[Max. Marks :40*

Instructions to the candidates :

1) ***All questions are compulsory.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***

Q1) Answer all of the following :

a) What is priority encoder? **[1]**

b) Define Resolution of digital to analog convertor. **[1]**

c) What is tristate buffer? **[1]**

d) What do you mean by sequential logic circuit. **[1]**

e) "Decade counter is called as a truncated counter", comment. **[2]**

f) "Propagation delay time puts the limit on switching speed". Comment. **[2]**

g) A clock of 100 kHz is applied to 7491A. How long will it take to produce an input pulse at output. **[2]**

h) Add an even parity bit to each of following code. **[2]**

i) 110100
ii) 01100011

Q2) Answer any two of the following :

a) Design 3-bit parity generator using the basic gates to produce digital words with even parity. **[4]**

b) With block diagram explain working of Flash ADC. **[4]**

c) What is meant by open collector gate? State its advantage and disadvantage. **[4]**

P.T.O.

Q3) Answer any two of the following :

a) Draw block diagram of 3-bit synchronous counter. Show its state diagram and state table. **[4]**

b) Draw suitable diagram of LED interfacing to logic gate and explain it. **[4]**

c) What do you mean by totalizer? Give its application. **[4]**

Q4) Answer all of the following :

a) Design MOD-10 counter using J-K Flip-Flop. **[6]**

b) Using K-map obtain logical expression for segment a and b of the BCD to 7-segment decoder to drive common anode display. **[6]**

OR

Answer all of the following :

a) A 12 bit counter type A/D convertor with 1 MHz clock. Obtain value of maximum conversion time and average conversion time. **[4]**

b) If A = 1000 and B = 0010 binary inputs are applied to the input of 4-bit logic comparator IC 7485. Determine outputs. **[4]**

c) For 6-bit resistive divider network. **[4]**

Determine

i) Weight assign to LSB and MSB.

ii) Change in voltage due to change in LSB.

Assume '0' = 0V and '1' = 20V.

Total No. of Questions : 4] **[Total No. of Pages : 2**

P109

[4217]-124
S.Y. B.Sc. (Semester - I)
ELECTRONIC SCIENCE
EL-212: Electronic Instrumentation - II
(Old Course) (Paper - II)

Time :2 Hours] ***[Max. Marks :40***

Instructions to the candidates :

1) ***All questions are compulsory.***
2) ***Draw the neat diagrams wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Use of Non programmable calculator is allowed.***

Q1) Answer all of the following :

a) What is Resolution of an instrument? **[1]**

b) State working principle of DC voltmeter. **[1]**

c) Draw the block diagram of SMPS. **[1]**

d) List front panel controls on CRO. **[1]**

e) "Tachometers are used as speedometers". Comment. **[2]**

f) "The waveform on CRO is not stable, we adjust intensity". Comment. **[2]**

g) Sine wave observed on CRO is having V_{PP} = 80 mV calculate RMS peak voltage. **[2]**

h) When input voltage of an instrument changes from 10 to 12V, the corresponding output voltage changes from 50 to 60V. What will be the sensitivity of the instrument? **[2]**

Q2) Attempt any two of the following :

a) What is static error? Explain different errors involved in measurement system. **[4]**

b) Draw the block diagram of dual beam CRO and explain function of each block in brief. **[4]**

c) Explain working of signal generator with neat block diagram. **[4]**

P.T.O.

Q3) Attempt <u>any two</u> of the following :

a) Draw the block diagram of DFM and explain working principle of DFM. **[4]**

b) Explain the fixed voltage power supply with neat block diagram. **[4]**

c) How Sawtooth waveform is achieved from triangle wave in function generator? **[4]**

Q4) Attempt <u>all</u> of the following :

a) Explain with block diagram, working of digital pH meter, state working principle of pH meter. **[6]**

b) Draw the block diagram of LCR meter and explain each block in brief. State the procedure to measure resistance by using LCR meter. **[6]**

OR

Attempt all of the following :

a) Consider voltage divider circuit in which a fixed resistor (R) of 50Ω is connected in series of LDR. If change in LDR resistance is 50Ω when light is incident on it. Calculate output voltage across LDR

(Given V_{in} = 10V). **[4]**

b) Draw the circuit diagram of DC voltmeter by using PMMC and calculate the value of Rs for the measurement of 0 to 10V with internal resistance of 500Ω and full scale deflection current is 50μA. **[4]**

c) Find the percent load regulation for a fixed voltage power supply when load voltage with zero load current is 10V and load voltage with full load current is 9.5V. **[4]**

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Total No. of Questions : 4]

SEAT No. : ____

P110

[Total No. of Pages : 2

[4217]-128
S.Y. B.Sc. (Semester - I)
ENVIRONMENTAL SCIENCE
ENV-201: Ecology & Ecosystem
(2008 Pattern) (Paper - I)

Time :2 Hours] ***[Max. Marks :40***

Instructions to the candidates :

1) ***All questions are compulsory.***
2) ***Neat and labelled diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***

Q1) Attempt the following in 1-2 lines each : **[10]**

a) Define - Environmental Heterogeneity.

b) Who coined the term Ecosystem & when?

c) Define - Ecotone.

d) State the difference between primary & secondary production?

e) Define - Synecology.

f) What is meant by Absolute Maximum Carrying Capacity?

g) Define - Ecological Succession.

h) What is edge effect?

i) State the difference between hydrosere & xerosere.

j) What is meant by Aggregate distribution pattern?

Q2) Write a short note on (Any two) : **[10]**

a) Limiting factors.

b) Carbon cycle with diagram.

c) Components of ecosystem.

P.T.O.

Q3) Answer any two from the following : **[10]**

a) Give an overview of the various stages of the evolution of atmosphere.

b) Describe the pattern of primary production & biomass in any one major ecosystem of the world.

c) Describe any 4 interspecific relationship with examples.

Q4) Attempt any one of the following : **[10]**

a) Explain in detail any 5 population dynamics characteristic features.

b) Describe the characteristics, composition & structure of a community.

Total No. of Questions : 4]

SEAT No. : ____

P111

[Total No. of Pages : 2

[4217]-129
S.Y. B.Sc. (Semester - I)
ENVIRONMENTAL SCIENCE
ENV-202: Hydrology
(2008 Pattern) (Paper - II)

Time :2 Hours] ***[Max. Marks :40***

Instructions to the candidates :

1) ***All questions are compulsory.***
2) ***Neat and labeled diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***

Q1) Attempt the following in 1-2 lines each : **[10]**

a) State the difference between meteoric and juvenile water.

b) Give the chemical composition of ground water.

c) State the difference between primary & secondary acquifers.

d) What is meant by Ground water Management?

e) Define Water Pollution.

f) What is blue baby syndrome?

g) Which bacterial species is responsible for Dysentery?

h) Give the full form of DDT.

i) Enlist the ground water problems.

j) Define Biological Oxygen Demand.

Q2) Write a short note on (Any two) : **[10]**

a) Problems of Arsenic and Nitrates.

b) Rain water harvesting with suitable diagram.

c) Effects of water pollution on environment.

P.T.O.

Q3) Answer any two from the following : **[10]**

a) Explain the sources and effects of ground water contamination.

b) Explain the problem of fluoride with suitable case study.

c) Describe occurrence and distribution of surface water.

Q4) Attempt any one of the following : **[10]**

a) Explain any 4 physical, 3 chemical and 3 biological properties of water.

b) Describe the effects of surface water pollution on water quality and diversity of aquatic life.

Total No. of Questions : 4]

SEAT No. :

P112

[Total No. of Pages : 3

[4217]-130
S.Y. B.Sc. (Semester - I)
OPTIONAL ENGLISH
Enriching Oral and Written Communication in English
(2008 Pattern)

Time :2 Hours] ***[Max. Marks :40***

Instructions to the candidates :

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***

Q1) Attempt any two of the following : **[10]**

a) Explain briefly the roles played by the different forms of communication that exist at the work place. How much importance in your opinion, should managements give to each of them?

b) Write down ways in which you will prepare for the nonverbal part of your interaction at an interview.

c) State whether communication in each of the following situations would be formal or informal.

i) Panel discussion on examination reforms.
ii) An ex-students' meet.
iii) A meeting of a company's board of directors.
iv) Internet-chatting.
v) A reality show on television.

Q2) Attempt any five of the following : **[10]**

a) Guess the meaning of the underlined word in the sentences below.

i) He won a lucky draw.
ii) Please draw a chair for yourself.

b) Write four words each, closely related in meaning to the following words.

i) Walk.
ii) Wash.

P.T.O.

c) Match the synonyms in the two columns.

	'A'		'B'
i)	Perhaps	i)	Guaranteed
ii)	Wreck	ii)	May be
iii)	Seldom	iii)	Destroy
iv)	Certain	iv)	Rarely

d) Fill in the blanks choosing the correct alternatives given. (hardly, hard)

i) He works _____.
ii) He _____ works.

e) Fill the blanks in the sentences below using suitable prefixes for the words in brackets.

i) What _____ patience you have! (finite)
ii) The party has _____ its commitment to primary education. (affirmed).

f) Choose the suitable collocations from the following :

i) Severe bleeding/heavy bleeding.
ii) Fulfil a need/fulfil a vacancy.

Q3) Attempt <u>any five</u> of the following : **[10]**

a) Write four words belonging to the following lexical webs.

i) Election.
ii) Corruption.

b) Write down the correct spellings of the following words.

i) Maintenance, maintainance, maintenence.
ii) Definitely, definately, definetely.

c) Identify the parts of speech of the underlined words.

i) I drove <u>fast</u> to the hospital.
ii) He is a <u>fast</u> worker.

d) Make two phrasal verbs each, using the words given below and give their meanings.

i) Look.
ii) Break.

e) Write down the synonyms or antonyms as directed in brackets for the following words. (two each)

i) Exactly (synonyms)
ii) Transient (antonyms)

f) Rearrange the jumbled letters to form meaningful words.

i) Mutatile.

ii) Cerum pot.

Q4) Attempt <u>any two</u> of the following : **[10]**

a) Give two expressions each for the following situations.

i) Closing a conversation.

ii) Responding to bad news.

b) Write the phonetic transcription for the following words.

i) Need.

ii) Fun.

iii) Calf.

iv) Vase.

v) Pen.

c) You have missed a practical. You wish to seek your teacher's permission to allow you to attend the practical on another day. Write a short dialogue using expressions that you have learnt.

Total No. of Questions : 4]

SEAT No. :

P115

[Total No. of Pages : 2

[4217] - 134
S.Y. B.Sc. (Semester - I)
ARABIC
Functional Arabic
(2008 Pattern)

Time : 2 Hours] *[Max. Marks : 40*

Q. I. Translate into Arabic any five of the following Sentences :- (10)

(1) The chair is comfortable.

(2) That car is beautiful —.

(3) The Student is going to the School.

(4) This bus is coming from the college.

(5) There is a table in the room.

(6) In the fridge there is an apple.

(7) His office is far from his home.

(8) She is busy in her office —.

Q. 2. Explain with Examples any Two of the following topics= (10)

(١) أَحْرَفُ أَوَّلِ كَلِمَةٍ - (٢) إِسْمُ الإِشَارَةِ -

(٣) اَلْمُبْتَدَأُ وَالْخَبَرُ - (٤) اَلإِعْرَابُ -

P.T.O.

Q.3. Translate in to English any Five of the following Sentences: (10)

① هٰذِهِ المَدْرَسَةُ جَيِّدَةٌ ـــــ

② عَلِيٌّ رَاجِعٌ مَعَ فَاطِمَةَ مِنَ السُّوقِ ـ

③ تِلْكَ الحَافِلَةُ ذَاهِبَةٌ إِلَى الجَامِعَةِ ـ

④ فِي الفَصْلِ تِلْمِيذٌ ـ ⑤ فِي الغُرْفَةِ طَاوِلَةٌ ـ

⑥ الوَلَدُ ذَكِيٌّ ـ ⑦ البِنْتُ جَالِسَةٌ عَلَى الكُرْسِيِّ ـ ⑧ عَلَى النَّافِذَةِ سِتَارَةٌ ـ

Q.4. Write in Arabic any Ten of the following Terminologies: (10)

① Matter. ② Motion. ③ Gas ④ Soft.
⑤ Astrology. ⑥ Science. ⑦ computer.
⑧ Solid. ⑨ Zone. ⑩ Microscop.
⑪ Solid. ⑫ Axis. ⑬ Compound.
⑭ Vaccine ⑮ Voltage. ⑯ Nutrition.

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Total No. of Questions : 4]

SEAT No. :

P117

[Total No. of Pages : 2

[4217]-139

S.Y. B.Sc. (Vocational)

ELECTRONIC EQUIPMENT AND MAINTENANCE - I

VOC-EEM-211: Audio, Video & Office Equipments - A

(2008 Pattern) (Paper - I) (Sem. - I)

Time :2 Hours] *[Max. Marks :40*

Instructions to the candidates :

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***

Q1) Answer the following :

a) Give the frequency of transmission of Pune AM and one of the FM channels. **[1]**

b) Give at least two points of comparision between flat screen and conventional TVs. **[1]**

c) Tape recorders have become obsolete. Comment. **[1]**

d) What is preamplifier? Where is it used? **[1]**

e) Compare FM transmission with AM transmission. **[2]**

f) Explain the role of modulation w.r.t. multichannel communication. **[2]**

g) Draw composite video signal. Why is it called so? **[2]**

h) Explain the terms B.W, SSB, DSB, VSB. **[2]**

Q2) Answer <u>any two</u> of the following :

a) Explain with neat diagram the recording of audio signal on tape. **[4]**

b) What is PA system? Explain its working with the help of neat block diagram. **[4]**

c) Explain sound reproduction from a CD. **[4]**

P.T.O.

Q3) Answer any two of the following :

a) What is mobile phone? Explain the principle of reception of radio signals in mobile phones. **[4]**

b) List the types of monitors. Explain in brief the construction of video monitor. **[4]**

c) Explain the working of MP3 player. **[4]**

Q4) Answer the following :

a) Draw the block diagram of radio receiver using superheterodyne principle or by using receiver IC. Explain the function of each block. **[6]**

b) Explain the recording and playback mechanism in ACD. **[6]**

OR

a) Draw the block diagram of B/W TV receiver. Explain its working.

b) Draw the block diagram of VCD player. Explain audio, video separation in it.

Total No. of Questions : 4]

SEAT No. : ____

P120

[Total No. of Pages : 2

[4217] - 146

S.Y. B.Sc. (Vocational) (Semester - I)

ELECTRONIC EQUIPMENT MAINTENANCE (EEM) - II

VOC-EEM-212 : Maintenance Concepts and Repair II - A (Paper - II) (2008 Pattern)

Time : 2 Hours] ***[Max. Marks : 40***

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Use of log table or calculator is allowed.***

Q1) Answer the following :

a) Define the term 'Availability'. **[1]**

b) On what factors does reliability depend? **[1]**

c) What are buffered test points? **[1]**

d) State the effect of preventive maintenance on MTBF. **[1]**

e) List typical causes of failure in equipment. **[2]**

f) Define the terms 'maintenance' and 'repair'. **[2]**

g) Preventive maintenance helps keeping the instrument functioning for longer time - Comment. **[2]**

h) State name of four test instruments and give their function. **[2]**

Q2) Answer <u>any two</u> of the following :

a) Explain the term passive redundancy with necessary block diagram. **[4]**

b) State the name of tools and give their purpose for servicing and maintenance. **[4]**

c) Write a note on 'Maintenance Log book'. Explain its importance. **[4]**

P.T.O.

Q3) Answer any two of the following :

a) Discuss installation plan for a personal computer. **[4]**

b) What is artificial earth? Explain the pipe earthing with suitable diagram. **[4]**

c) Describe typical periodic routines for carrying out preventive maintenance of a studio taperecorder. **[4]**

Q4) Answer the following :

a) Define quality. Discuss the scope of ISO-9000, ISO-9001 and ISO-9002 standards. **[4]**

b) Describe preventive maintenance schedule for Lead-Acid battery. **[4]**

c) Write a note on 'Power Supply System'. **[4]**

OR

Answer the following :

a) Write a note on 'Service manual'. **[6]**

b) Describe a typical Installation manual. **[6]**

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Total No. of Questions : 4]

SEAT No. : ____

P121

[Total No. of Pages : 2

[4217] - 148
S.Y. B.Sc. (Vocational)
SEED TECHNOLOGY - II
Seed Testing
(Semester - I) (Paper - II)

Time : 2 Hours] ***[Max. Marks : 40***

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Draw neat and labelled diagrams wherever necessary.***

Q1) Attempt the following : **[10 × 1 = 10]**

a) What is seed testing?

b) Give any one role of State Seed Testing Laboratory.

c) Name any two equipments used in seed testing laboratory.

d) Define seed sampling.

e) Give types of seed samples.

f) Define ODV.

g) What is moisture testing?

h) Define seedling evaluation.

i) What is seed vigour?

j) Define guard samples.

Q2) Attempt any two of the following : **[2 × 5 = 10]**

a) Comment on physical purity work board.

b) Sketch the diagrammatic layout of Seed Testing Laboratory.

c) Write the general principles of seed sampling.

P.T.O.

Q3) Write notes on (any two) : **[2 × 5 = 10]**

a) State Seed Testing Laboratory.

b) Moisture meter.

c) Seed vigour testing.

Q4) What is seed germination? Explain in detail, soil and TZ methods used for testing seed germination. **[10]**

OR

Explain precautions and procedure for registration in detail.

❖❖❖❖

Total No. of Questions : 4]

SEAT No. : ____

P122

[Total No. of Pages : 2

[4217] - 149

S.Y. B.Sc. (Vocational)

INDUSTRIAL MICROBIOLOGY - II

VOC-IND-MIC-212 : Screening & Process Optimisation

(Semester - I) (Theory) (Paper - II) (2008 Pattern)

Time : 2 Hours] ***[Max. Marks : 40***

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***All questions carry equal marks.***
4) ***Draw neat labelled diagrams wherever necessary.***

Q1) Answer each subquestion in one or two lines; Fill in the blanks; State whether the statement is true or false. **[10]**

a) Define 'primary metabolite'.

b) Define 'lyophilisation'.

c) State whether following statements are true or false :

i) Crowded plate technique is a secondary screening method.

ii) Working cultures of fermentation product strains are normally not in lyophilised state.

d) Fill in the blank :

Media used for animal cell culture are sterilised using_____

e) Name any two precursors used in fermentation media.

f) State the role of dummy variable in plackett-Burman design.

g) What does the term 'inoculum build up' mean in fermentation?

h) With the help of example explain the role of inducer.

i) Name any one sensor based on potentiometric measurements.

P.T.O.

Q2) Answer any two of the following : **[10]**

a) Define 'screening'. Explain the objectives of primary screening.

b) Describe the process & use of soil cultures (dried cultures) for industrially important microorganisms.

c) State the objectives of scale-up.

Q3) Answer any two of the following : **[10]**

a) What is Del factor? Give the importance of Del factor in process of media sterilisation.

b) Enlist different types of antifoam agents and give its role in fermentation media.

c) Describe the procedure for estimating total no. of species in an ecosystem.

Q4) Answer any one of the following : **[10]**

a) Define 'secondary metabolite'. Explain the role of revertant mutants in over production of secondary metabolite.

b) Enlist the parameters scaled up during fermentation. Explain any two of them.

❖ ❖ ❖ ❖

Total No. of Questions : 4] **SEAT No. :**

P123 **[Total No. of Pages : 2**

[4217] - 201
S.Y.B.Sc. (Semester - II)
MATHEMATICS
MT - 221 : Linear Algebra
(Paper - I) (2008 Pattern)

Time :2 Hours] ***[Max. Marks :40***

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***

Q1) Attempt any five of the following: **[10]**

a) Let W = $\{(x, y, z) \in V / x^2 - y^2 = 0\}$
Is W a subspace of $V = R^3$? Justify.

b) Check whether the following set of vectors is linearly independent
S = {(2, –1, 3), (5, 1, –3), (0, 0, 0)}.

c) Find the co-ordinate vector of $\bar{v} = (3, 4)$ relative to the basis
S = {(0, –1), (1, –1)} in R^2.

d) State the dimension theorem for matrices and hence find the nullity of matrix A, if A is of order 4 × 6 and of rank 3.

e) If T : V $\rightarrow$ V is a linear operator defined by T ($\bar{u}$) = $\bar{0}$ then find Ker (T) and R(T).

f) Let W = $\left\{\left(\frac{1}{\sqrt{2}}, 0, \frac{1}{\sqrt{2}}\right), \left(\frac{-1}{\sqrt{2}}, 0, \frac{1}{\sqrt{2}}\right)\right\}$ be the orthonormal set of vectors in R^3, with Euclidean Inner Product. If $\bar{u}$ = (1, 2, 3) then compute projection of $\bar{u}$ on W.

g) Let $A = \begin{bmatrix} 2 & 7 \\ 1 & -2 \end{bmatrix}$. Find the eigen values of A^4.

Q2) Attempt any two of the following: **[10]**

a) If W_1 and W_2 are two subspaces of a vector space V. Prove that $W_1 + W_2$ is a subspace of vector space V.

b) Find the standard matrix for the linear transformation T : $R^3 \rightarrow R^4$ defined by T (*x, y, z*) = (3*x* – 4*y* + *z*, *x* + *y* – *z*, *y* + *z*, *x* + 2*y* +3*z*).

P.T.O.

c) Determine the basis and dimension for the solution space of the system.

$x - 3y + z = 0$

$2x - 6y + 2z = 0$

$3x - 9y + 3z = 0$

Q3) Attempt <u>any two</u> of the following: **[10]**

a) In an inner product space V, show that for $\bar{u}, \bar{v} \in V$

$\langle \bar{u}, \bar{v} \rangle = 0$ if and only if $\| \bar{u} + \bar{v} \| = \| \bar{u} - \bar{v} \|$.

b) Use Gram-schmidt's process to transform the basis {(1, –3), (2, 2)} to orthonormal basis of R^2.

c) Verify Cayley - Hamilton theorem and hence find A^{-1}, where $A = \begin{bmatrix} 1 & 2 \\ 3 & 2 \end{bmatrix}$.

Q4) Attempt <u>any one</u> of the following: **[10]**

a) Let $A = \begin{bmatrix} 2 & 1 & 1 \\ 2 & 3 & 4 \\ -1 & -1 & -2 \end{bmatrix}$

Find eigen values of A. Also find basis and dimension of the eigenspace corresponding to each eigen value.

b) i) Let T : V $\rightarrow$ W be a Linear Transformation and B = $\{\bar{u}_1, \bar{u}_2, \bar{u}_3, ..., \bar{u}_n\}$ be a basis for V. Show that range of T is spanned by the set B' = $\{T(\bar{u}_1), T(\bar{u}_2), T(\bar{u}_3), ..., T(\bar{u}_n)\}$.

ii) Let A be a 2 × 3 matrix and T : $R^3 \rightarrow R^2$ be a matrix transformation T(X) = AX given by $T\left(\begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix}\right) = \begin{bmatrix} 1 \\ 1 \end{bmatrix}, T\left(\begin{bmatrix} 0 \\ 1 \\ 0 \end{bmatrix}\right) = \begin{bmatrix} 3 \\ 0 \end{bmatrix}, T\left(\begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix}\right) = \begin{bmatrix} 4 \\ -7 \end{bmatrix}$.

Find $T\left(\begin{bmatrix} a \\ b \\ c \end{bmatrix}\right)$. Hence find matrix A.

Total No. of Questions : 4] **SEAT No. :**

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[4217] - 202

S.Y.B.Sc. (Semester - II)

MATHEMATICS - II

MT - 222(A) : Vector Calculus

(Paper - II) (2008 Pattern) (511A2)

Time :2 Hours] ***[Max. Marks :40***

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***

Q1) Attempt any five of the following: **[10]**

a) Find $\lim_{t\to 2}\left[\frac{\sin(t-2)^2}{t-2}\bar{i}+\frac{t^2-4}{t-2}\bar{j}\right]$.

b) If $\bar{r}=(t^2+1)\ \bar{i}+(4t-3)\ \bar{j}+(2t^2-6t)\ \bar{k}$.

Find $\left|\frac{d^2\bar{r}}{dt^2}\right|$ at $t=-2$.

c) For the curve $\bar{r}\ (t)=(t^2+1)\ \bar{i}+(3t-4)\ \bar{j}+(t^2-1)\bar{k}$. Find the unit tangent vector to the curve at t = 2.

d) Evaluate $\int_c \bar{f}.d\bar{r}$, where $\bar{f}=xy\ \bar{i}+(x^2-y^2)\ \bar{j}$ and c is the segment of straight line $y=x$ from the point (0, 0) to (2, 2).

e) State Gauss's divergence theorem.

f) Prove that Curl $\bar{f}=\bar{0}$, if $\bar{f}$ is constant vector.

g) Show that $\nabla(\bar{a}.\bar{r})=\bar{a}$, where $\bar{a}$ is a constant vector and $\bar{r}=x\bar{i}+y\bar{j}+z\bar{k}$.

Q2) Attempt any two of the following: **[10]**

a) If $\bar{f}(t)=f_1(t)\ \bar{i}+f_2(t)\ \bar{j}+f_3(t)\ \bar{k}$ is differentiable at $t=t_0$. Then show that $f_1(t), f_2(t), f_3(t)$ are differentiable at $t=t_0$.

b) A particle moves along the curve $\bar{r}=(t^3-4t)\bar{i}+(t^2+4t)\ \bar{j}+(8t^2-t^3)\bar{k}$. Find the magnitude of the tangential and normal components of its acceleration at $t=2$.

P.T.O.

c) Show that the angle between the tangents to the curve $x = t, y = t^2, z = t^3$ at $t = 1$ and $t = -1$ is $\cos^{-1}\left(\frac{3}{7}\right)$.

Q3) Attempt any <u>two</u> of the following: **[10]**

a) If $\phi\ (x, y, z)$ is a scalar function and $\bar{u}\ (x, y, z)$ is a vector function which possesses first partial derivatives then prove that

$\text{div}\ (\phi\ \bar{u}) = \text{grad}\ \phi\ .\bar{u}\ +\ \phi\ \text{div}\,\bar{u}$.

b) Find the directional derivative of $\varphi\,(x, y, z) = 4e^{2x-y+z}$ at point $(1, 1, -1)$ in a direction towards to the point $(-3, 5, 6)$.

c) Prove that $\nabla^2 r^n = n(n + 1)r^{n-2}$.

Q4) Attempt any <u>one</u> of the following: **[10]**

a) State Green's theorem in a plane. And verify it for the vector function $\bar{F} = (xy + y^2)\ \bar{i}\ + x^2\ \bar{j}$ over the region bounded by $y = x$ and $y = x^2$.

b) i) Evaluate $\iint_s \bar{f}\ .\bar{n}\ \text{ds}$; using Gauss's divergence theorem for

$\bar{f} = (2x + 3z)\ \bar{i}\ -(xz + y)\ \bar{j}\ +(y^2 + 2z)\bar{k}$ and S is the surface of the sphere having the centre at $(3, -1, 2)$ and radius 3.

ii) Evaluate $\int_c \bar{f}.d\bar{r}$, by using stoke's theorem for the function

$\bar{f}\ = (2x - y + z)\ \bar{i}\ + (x + y - z^2)\ \bar{j}\ + (3x - 2y + 4z)\bar{k}$ over the surface of the cylinder $x^2 + y^2 = 4$ bounded by the plane $z = 9$ and open at the end $z = 0$.

Total No. of Questions : 4] **SEAT No. :**

P125 **[Total No. of Pages : 2**

[4217] - 203

S.Y.B.Sc. (Sem. - II)

MATHEMATICS

MT - 222(B) : Discrete Mathematics

(2008 Pattern) (Paper - II(B)) (511B2)

Time :2 Hours] ***[Max. Marks :40***

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Use of non-programmable scientific calculator is allowed.***

Q1) Attempt any five of the following: **[10]**

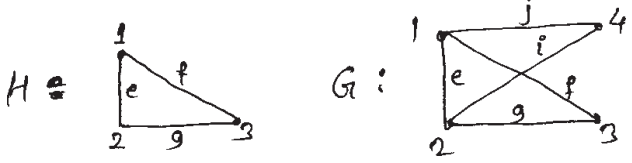
a) Consider the recurrence relation $a_n = a_{n-1} + 3a_{n-2} - a_{n-3}$. Is it linear? What is its order?

b) Prove the statement. '$1 + 2^n < 3^n$; $n \geq 2$' using the principle of Mathematical induction.

c) Verify hand shaking lemma for the graph K_5.

d) Find the number of distinguishable permutations of the letters in 'MATHEMATICS'.

e) Define 'Subgraph of a graph'. State whether H is subgraph of G. Where



f) Define 'spanning tree of connected graph'. Draw any two spanning trees of graph $K_{2,3}$.

g) Give an example of a graph which is Eulerian but not Hamiltonian.

Q2) Attempt any two of the following: **[10]**

a) Solve the recurrence relation

$a_n - 7\,a_{n-2} + 6a_{n-3} = 0$ with $a_0 = 8$, $a_1 = 6$, $a_2 = 22$

b) If five points are chosen in a square whose sides have length 2, show that there must be at least two points which are at most $\sqrt{2}$ distance appart.

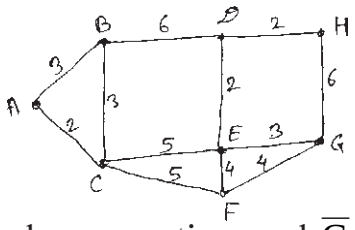
P.T.O.

c) Using the principle of Mathematical induction, prove that

$$1^2 + 2^2 + 3^2 + \ldots + n^2 = \frac{n(n+1)(2n+1)}{6}.$$

Q3) Attempt any <u>two</u> of the following: **[10]**

a) Find the Hamiltonian circuit of minimal weight for the graph G if you must begin and end at F.

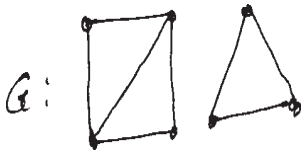


b) Let G be a simple graph on p vertices and $\overline{G}$ be its complement. Prove that, for each vertex v in G, $d_G(v) + d_{\overline{G}}(v) = p - 1$, where $d_G(v)$ denotes the degree of v in G.

c) Prove that, a simple graph with n-vertices and more than $\frac{(n-1)(n-2)}{2}$ edges is connected.

Q4) Attempt any <u>one</u> of the following: **[10]**

a) i) Find the cromatic polynomial P_G for the following graph and use P_G to find $\chi(G)$.



ii) Prove that, if n pigeons are assigned to m pigeons, then one of the pigeonholes must contain at least $\left[\frac{n-1}{m}\right]+1$ pigeons.

b) i) Prove that, a connected graph G with n vertices and $(n-1)$ edges is a tree.

ii) A committee of 5 is to be selected from 6 boys and 5 girls. Determine the number of ways of selecting the committee if it is to consists of at least one boy and one girl.

Total No. of Questions : 4]

SEAT No. : ____

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[Total No. of Pages : 2

[4217] - 204

S.Y.B.Sc. (Semester - II)

PHYSICS

PH - 221 : Oscillations, Waves and Sound

(2008 Pattern) (Paper - I)

Time :2Hours] ***[Max. Marks :40***

Instructions to the candidates:-

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Use of calculator and log table is allowed.***
4) ***Neat diagrams must be drawn wherever necessary.***

Q1) Attempt All of the following:

a) Define Angular S.H.M. **[1]**

b) What do you mean by phase of SHM? **[1]**

c) For an oscillator mass 5 gm. Its periodic time is 0.2 sec and coefficient of damping is 0.3142 dyne/cm-s^{-1} then find its Log decrement. **[1]**

d) Distinguish between damping force & restoring force. **[1]**

e) Define Reverberation time. **[1]**

f) What are coupled oscillations? **[1]**

g) The velocity of sound in water of density 1gm/cm^3 is 1.5×10^5 cm/s. Determine Bulk modulus of water. **[1]**

h) What are forced oscillations? **[1]**

i) Define pitch of sound. **[1]**

j) What are longitudinal waves? **[1]**

Q2) Attempt any two of the following:

a) Derive an expression for average energy of a damped harmonic oscillator. **[5]**

b) What is amplitude resonance? Derive the condition for amplitude resonance in case of forced oscillations. **[5]**

c) Prove that the velocity of transverse waves over a string of linear density is $c = \sqrt{T/\mu}$, where T is tension. **[5]**

P.T.O.

Q3) Attempt any Two of the following:

a) A particle is subjected to two rectangular SHM's such that the displacements at an instant are given by $x = 2\cos(\omega t + \pi/4)$ & $y = 2\cos \omega t$. Find the nature and equation of path. **[5]**

b) An alternating e.m.f. of amplitude 230 V is applied across a circuit in which an inductance of 10 mH, a capacitance of $1\,\mu F$ and resistance of 23 ohms are connected in series. Determine the resonant angular frequency, quality factor & band width. **[5]**

c) A person blowing a whistle is moving with a speed of 20 m/s towards hill. Determine the apparent rise in frequency of echo heard by the person due to reflection from the hill. Assume air at rest, speed of sound 330 m/s and frequency of whistle sound 155 Hz. **[5]**

Q4) a) Attempt any one of the following:

i) I) What do you mean by Lissajous Figures? Explain optical method for obtaining Lissajous figures. **[4]**

II) Show that frequency of damped oscillations is expressed by $\nu_d = \nu\sqrt{1 - \frac{1}{4}Q^2}$ Where Q is Quality factor. **[4]**

OR

ii) I) Show that the differential equation for a wave motion in a continuous media is $\frac{\partial^2 \phi}{\partial x^2} = \frac{1}{C^2}\frac{\partial^2 \phi}{\partial t^2}$, where C is speed of wave. **[4]**

II) Describe stroboscope method to determine frequency of tunning fork. **[4]**

b) Attempt any one of the following:

i) Explain in short Red shift & voilet shift. **[2]**

ii) The intensity of two sounds are 1.2×10^{-9} w/m^2 and 5×10^{-10} w/m^2. Determine their relative loudness in decibels. **[2]**

Total No. of Questions : 4] **SEAT No. :**

P127 **[Total No. of Pages : 2**

[4217] - 205

S.Y.B.Sc. (Semester - II)

PHYSICS - II

PH - 222 : Optics

(2008 Pattern) (Paper - II)

Time :2Hours] ***[Max. Marks :40***

Instructions to the candidates:-

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Use of calculator and log table is allowed.***
4) ***Neat diagrams must be drawn wherever necessary.***

Q1) Attempt All of the following:

a) Define the term Linear Magnification. **[1]**

b) What is resolving power of grating? **[1]**

c) What do you mean by fringes of equal thickness? **[1]**

d) A convex lens of power 20 dioptre is used as simple microscope. Find the focal length of lens. **[1]**

e) What is Chromatic aberration? **[1]**

f) What is an Astronomical telescope? **[1]**

g) The polarizing angle for air and transparent material is 60º. Calculate refractive index of material. **[1]**

h) What is positive crystal? Give any one example. **[1]**

i) What is Fresnel's diffraction? **[1]**

j) What do you understand by the term polarization of light? **[1]**

Q2) Attempt any two of the following:

a) What do you mean by spherical aberration? Explain how it is reduced using plano-convex lens. **[5]**

b) Obtain the condition $2\mu t \cos r = m\lambda$ for destructive interference in the reflected system of rays from a thin film. **[5]**

c) Describe the process of production of plane polarized light by reflection. **[5]**

P.T.O.

Q3) Attempt any <u>two</u> of the following:

a) A convex lens made up of crown glass has radii of curvature 40 cm and 30 cm. Find the longitudinal chromatic aberration for an object situated at infinity. (Given: $\mu v = 1.523$ and $\mu r = 1.514$) **[5]**

b) A converging lens of focal length 6.25 cm is used as a magnifying glass. If the near point of the observer is 25 cm from the eye and the lens is held close to the eye. Calculate: **[5]**

i) The distance of the object from the lens and

ii) The angular magnification.

c) Two thin convex lenses each of focal length 10 cm are placed Co-axially at a distance of 5 cm apart. Calculate the equivalent focal length of an optical system and position of principal points. **[5]**

Q4) Attempt the following:

a) i) Draw ray diagram of Huygen's eye piece, label it and find the condition for equivalent focal length. **[4]**

ii) Derive lens maker's formula for a thin lens. **[4]**

OR

i) Distinguish between fresnel and fraunhoffer type of diffraction. **[4]**

ii) Explain use of polaroid as a linear polarizer. **[4]**

b) Attempt any <u>one</u> of the following:

i) Explain the term division of amplitude by interference with proper diagram. **[2]**

ii) Write applications of Brewster's law. **[2]**

Total No. of Questions : 4]

SEAT No. : ____

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[Total No. of Pages : 2

[4217] - 206

S.Y.B.Sc. (Semester - II)

CHEMISTRY - I

CH - 221 : Inorganic Chemistry

(2008 Pattern) (Paper - I)

Time :2 Hours] ***[Max. Marks :40***

Instructions to the candidates :

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Neat diagrams must be drawn wherever necessary.***

Q1) Answer the following. **[10]**

a) What is flux?

b) Mention any two ores containing Aluminium.

c) Define wrought iron.

d) Draw the structure of H_2SO_4.

e) Define electron deficient compound.

f) What are different allotropes of Carbon?

g) Why transition metals and their salts are mostly paramagnetic?

h) What do you mean by liquid temperature range of a solvent?

i) BF_3 is stronger Lewis acid. Explain.

j) What is differential aeration principle?

Q2) Answer <u>any two</u> of the following: **[10]**

a) Give the names and electronic configurations of III A group elements and explain trends in

   i) Atomic and ionic sizes.

   ii) Oxidation states.

b) Give the general formula of oxyacids. Comment on the relation between the strength of oxyacids and the number of non-hydrogenated oxygen atoms.

c) Answer the following:

   i) Magnetic separation ii) Biochemical effect of lead

P.T.O.

Q3) Attempt <u>any two</u> of the following: **[10]**

a) Write the electronic configuration and names of elements of I^{st} series of d-block elements. Comment on their magnetic properties.

b) Describe the oxide film theory to explain passivity.

c) Explain the electrolysis of Al_2O_3 with the help of diagram and chemical reactions.

Q4) a) Attempt <u>any one</u> of the following: **[6]**

i) Describe the extraction of iron using blast furnace with the help of neat diagram and chemical reactions.

ii) Explain L.D. process and give its advantages. Draw the diagram and discuss chemical reactions.

b) Answer <u>any one</u> of the following: **[4]**

i) Discuss the factors affecting the rate of corrosion of metals.

ii) Explain the bonding and shape of CO_2 molecule.

Total No. of Questions : 4]

SEAT No. :

P129

[Total No. of Pages : 2

[4217] - 207

S.Y.B.Sc. (Semester - II)

CHEMISTRY

CH - 222 : Analytical Chemistry

(2008 Pattern) (Paper - II)

Time :2Hours] ***[Max. Marks :40***

Instructions to the candidates:-

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Use of logarithmic table and calculator is allowed.***
4) ***Neat diagrams must be drawn whenever necessary.***

Q1) Answer the following. **[10]**

a) What is a gross sample?

b) What is a group reagent? Give its suitable example.

c) Define 'Neutralization point' in volumetric analysis.

d) What is bleaching powder?

e) Give a relation between molecular formula and emperical formula.

f) Determine the correct number of significant figures in 0.00373 litre and 2400 gm.

g) How will you detect hydrogen from given organic compound?

h) Define the term qualitative and quantitative analysis.

i) Give the principle of solvent extraction.

j) What are the disadvantages of starch indicator?

Q2) Answer <u>any two</u> of the following: **[6]**

a) i) Explain applications of solvent extraction.

ii) Explain the theory of interference of phosphate radical in inorganic qualitative analysis.

iii) Describe the procedure of preparation of 0.1 N $Na_2S_2O_3$ solution. What precautions are to be taken to preserve $Na_2S_2O_3$ solution?

b) A dibasic acid contain 26.66% of carbon, 2.22% H and rest of oxygen. Its molecular weight is 90. calculate its molecular formula. **[4]**

P.T.O.

Q3) a) Answer <u>any two</u> of the following: **[6]**

i) What is a primary standard substance? What are the requirements of primary standard?

ii) What are the causes of

I) Operational and personal error.

II) Instrumental and reagent error and

III) Errors of method?

iii) How is phenol detected? Give two characteristics test for phenolic group.

b) Solve any one of the following: **[4]**

i) By using equal volumes of aqueous and organic phases Nickel was extracted to the extent of 90%. What will be the percentage extraction if the volume of organic phase is triple?

ii) On analysis of gold sample by four different students following results were obtained.

Student	1	2	3	4
% of gold	1.2	1.24	1.26	1.28

Calculate mean deviation, standard deviation and relative mean deviation in the result.

Q4) a) What is indicator? Explain the titration curve of NaOH and CH_3COOH. Which indicator will you choose for this titration? Why? **[6]**

OR

Discuss the carius' method for estimation of halogens in the organic compound.

b) Answer any one of the following: **[4]**

i) Describe the Fajan's method for estimation of chloride in a given sample.

ii) What is yellow ammonium sulphide? Discuss its use in qualitative analysis?

Total No. of Questions : 4]

SEAT No. : ____

P130

[Total No. of Pages : 2

[4217] - 208

S.Y.B.Sc. (Semester - II)

BOTANY

BO - 221 : Structural Botany

(Anatomy, Embryology and Palynology)

(2008 Pattern) (Paper - I) (Theory)

Time :2 Hours] ***[Max. Marks :40***

Instructions to the candidates:-

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Draw neat and labelled diagrams wherever necessary.***

Q1) Attempt the following: **[10]**

a) What is embryology?

b) Enlist the mechanical tissues distributed in dicot stem.

c) What is isobilateral microspore tetrad?

d) Enlist the elements of xylem.

e) Give the role of generative cell in pollen grain.

f) What is Chalazogamy?

g) Enlist the epidermal outgrowths.

h) What is exine?

i) Write the principle of inflexibility.

j) What is distal pole in pollen grain?

Q2) Answer <u>any two</u> of the following: **[10]**

a) Describe the structure and functions of Stomata.

b) Describe elements of phloem.

c) Describe the structure of orthotropous ovule.

P.T.O.

Q3) Write short notes on <u>any two</u> of the following: **[10]**

a) Applications and importance of palynology.

b) Structure of dicot embryo.

c) Growth rings.

Q4) What is anomalous secondary growth? Describe it in <u>Raphanus</u> root. **[10]**

OR

Describe the bisporic development of embryo sac with suitable example.

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Total No. of Questions : 4]

SEAT No. :

P131

[Total No. of Pages : 2

[4217] - 209

S.Y.B.Sc. (Semester - II)

BOTANY

BO - 222 : Fundamentals of Plant Biotechnology

(Paper - II) (2008 Pattern)

Time :2 Hours] ***[Max. Marks :40***

Instructions to the candidates:-

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Draw neat labelled diagrams wherever necessary.***

Q1) Attempt the following: **[10]**

a) Define plant Biotechnology.

b) Sketch and label chloroplast D.N.A.

c) Define single cell culture.

d) What is a bioprocess?

e) What is plant Genome?

f) Define energy.

g) Give any two economic implications of SCP.

h) What is cybrid?

i) What are synthetic seeds?

j) Define land fill.

Q2) Answer any two of the following: **[10]**

a) Explain the role of Biotechnology in developing world.

b) Describe techniques of Genetic engineering.

c) Describe the steps for commercial production of enzymes.

P.T.O.

Q3) Write short notes on any two: **[10]**

a) Concept and advantages of Biodiesel.

b) SCP from agricultural crop residues.

c) Oxidation ponds.

Q4) What is somatic hybridization? Describe the various steps involved in the process. **[10]**

OR

What is Bioreactor? Explain the design and working of tubular tower bioreactor.

Total No. of Questions : 4]

SEAT No. : ____

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[Total No. of Pages : 2

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S.Y.B.Sc. (Semester - II)

ZOOLOGY

ZY - 221 : General Zoology and Biological Techniques - II

(Paper - I) (2008 Pattern)

Time :2Hours] ***[Max. Marks :40***

Instructions to the candidates:-

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Neat labelled diagrams must be drawn wherever necessary.***

Q1) Attempt the following. **[10]**

a) What is the function of membranous Labyrinth of Scoliodon?

b) Write any two names of the insectivorous beak.

c) Enlist any two disadvantages of migration in birds.

d) What is the function of scroll valve in Scoliodon?

e) Enlist the names of any two fossils.

f) Name the portal systems in Scoliodon.

g) Write any two uses of fins in fishes.

h) Define heterocercal tail.

i) Enlist any two aquatic mammals.

j) What is leucocytosis?

Q2) Write short notes on (Any two) **[10]**

a) Preparation of Janus Green B and acetocarmine.

b) Swimming and raptorial feet.

c) Ampullae of Lorenzini.

P.T.O.

Q3) Attempt the following (Any two) **[10]**

a) Determination of haemoglobin by Sahli method.

b) Sketch and label - V.S. of heart of Scoliodon.

c) Desert adaptations in vertebrates regarding conservation of water.

Q4) Describe in details the central nervous system of Scoliodon. **[10]**

OR

Describe the method of total erythrocyte (RBC) count by haemocytometry.

Total No. of Questions : 4] **SEAT No. :**

P133 **[Total No. of Pages : 2**

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S.Y.B.Sc. (Semester - II)

ZOOLOGY

ZY - 222 : Applied Zoology - II (Apiculture and Sericulture)

(Paper - II) (2008 Pattern)

Time :2Hours] ***[Max. Marks :40***

Instructions to the candidates:-

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Neat labelled diagrams must be drawn wherever necessary.***

Q1) Attempt the following. **[10]**

a) Define Apiculture.

b) What is pruning?

c) What is bee-bread?

d) Explain use of paraffin paper.

e) What is the use of Queen excluder?

f) Define bivoltine.

g) What is absconding?

h) Enlist any two varieties of mulberry.

i) What is Nuptial Flight?

j) Define stifling.

Q2) Write short notes on (any two) **[10]**

a) Economic importance of honey.

b) Mounting and harvesting of silkworm.

c) Cohesive force (Queen).

P.T.O.

Q3) Attempt the following (any two) **[10]**

a) Nature of damage of greater wax moth.

b) Describe morphology of caterpillar of Bombyx mori.

c) Sketch and label standard Langsmoth frame.

Q4) What is bee communication? Explain various types of honey bee communication. **[10]**

OR

What is harvesting of mulberry? Explain the methods of harvesting.

Total No. of Questions : 4]

SEAT No. :

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[Total No. of Pages : 2

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S.Y.B.Sc. (Semester - II)

GEOLOGY

GL - 221 : Petrology

(Paper - I) (2008 Pattern)

Time :2Hours] ***[Max. Marks :40***

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***

Q1) Answer the following questions: **[10]**

a) Define labile region of crystallisation.

b) What are orthosilicates?

c) Define devitrification.

d) Name any two Volcanic - acidic - alkaliseries rocks.

e) Define diagenesis.

f) Define stratification.

g) What is crush breccia?

h) Define pyrometamorphism.

i) What is slaty cleavage?

j) Name any two 'anti-stress' minerals.

Q2) Write notes on (Any two): **[10]**

a) Intergranular and intersertal texture.

b) Competence and capacity of transporting medium.

c) Graded bedding.

P.T.O.

Q3) Write notes on (Any two): **[10]**

a) Thermal metamorphism of pure limestone.

b) Barrowian zones of Regional metamorphism.

c) Biochemical deposits.

Q4) Define texture of igneous rocks. Explain the various factors controlling the texture of igneous rocks with suitable examples. **[10]**

OR

Explain cataclastic metamorphism of Argillaceous rocks with suitable examples.

☛ ☛ ☛

Total No. of Questions : 4] **SEAT No. :**

P135 **[Total No. of Pages : 2**

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S.Y.B.Sc. (Semester - II)

GEOLOGY

GL - 222 : Stratigraphy & Palaeontology

(Paper - II) (2008 Pattern)

Time :2Hours] ***[Max. Marks :40***

Instructions to the candidates:-

1) ***All questions are compulsory.***
2) ***All questions carry equal marks.***
3) ***Figures to the right indicate full marks.***
4) ***Neat diagrams must be drawn wherever necessary.***

Q1) Answer the following questions. **[10]**

a) What are the three principles of stratigraphy?

b) What are the terms used in lithostratigraphic unit?

c) Define a stratum.

d) What is a lineage zone in biostratigraphic units?

e) What is an orderly variation in lithology?

f) Define evolution.

g) Define micropalaeontology.

h) Define palynology.

i) What is marine regression?

j) What is a proximal view of spores?

Q2) Write notes on (any two) **[10]**

a) Chronostratigraphic units.

b) Chemical factors controlling stratification.

c) Use of marker beds and radioactivity in correlation.

P.T.O.

Q3) Explain the following (any two) **[10]**

a) Evolutionary trends in the eyes of trilobites.

b) Types of spores based on their aperture.

c) Types of microfossils.

Q4) Describe the environmental classification of unconformities. **[10]**

OR

Explain the laboratory techniques for separation of microfossils.

Total No. of Questions : 4] **SEAT No. :**

P136 **[Total No. of Pages : 2**

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S.Y.B.Sc. (Semester - II)

STATISTICS

ST - 221 : Statistical Methods & National Income

(Paper - I) (2008 Pattern)

Time :2 Hours] ***[Max. Marks :40***

Instructions to the candidates:-

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Use of calculator and statistical tables is allowed.***
4) ***Symbols and abbreviations have their usual meaning.***

Q1) Attempt each of the following:

a) Choose the correct alternative in each of the following: **[1 each]**

i) If $x_1 + 2x_2 - 21x_3 = 75$ is the equation of regression plane of x_3 on x_1 and x_2, then $b_{31.2}$ is equal to,

A) $\frac{1}{21}$ B) 21 C) $\frac{2}{21}$ D) 2

ii) If prices are in Rs. and quantities are in kg. then the unit of price index number is.

A) kg B) Rs. C) Rs. per kg D) unitless

iii) Rejecting H_0 when it is true leads to,

A) No error B) Type-I error

C) Type - II error. D) Both Type - I and Type - II errors

b) State whether the following statements are true or false: **[1 each]**

i) Level of significance lies between 0 and 1.

ii) If Var $(x_{1.23}) = 0$ then $R_{1.23} = 0$.

iii) The technique of spilicing is used to find real income.

c) If $R_{1.23} = 1$ find the value of $R_{2.13}$. **[1]**

d) State the test statistic to test $H_0 : p = p_0$ by Fisher's Z transformation. **[1]**

e) A shopkeeper claims that every pack of detergent powder contains 1 kg. of powder. Set up null hypothesis and alternative hypothesis to test his claim. **[1]**

f) Define per capita income (PCI). **[1]**

P.T.O.

Q2) Attempt <u>any two</u> of the following: **[5 each]**

a) Derive the expression for partial correlation coefficient ($r_{12.3}$) in terms of total correlation coefficients.

b) With usual notations prove that,

$b_{12.3}\ b_{23.1}\ b_{31.2} = r_{12.3}\ r_{23.1}\ r_{31.2}$

c) Describe large sample test for testing $H_0 : \mu_1 = \mu_2$ against,

i) $H_1 : \mu_1 \neq \mu_2$ ii) $H_1 : \mu_1 > \mu_2$

Where μ_1 and μ_2 are the means of two different populations from which samples are drawn.

Q3) Attempt <u>any two</u> of the following: **[5 each]**

a) Discuss any two problems in the construction of cost of living index numbers.

b) Construct 100 $(1 - \alpha)$% confidence interval for population proportion (p).

c) A random sample of 200 bolts manufactured by machine A and 100 bolts by machine B showed 19 and 5 defective bolts respectively. Is machine B better than machine A? Justify. use 5% level of significance.

Q4) Attempt <u>any one</u> of the following:

a) i) Derive the equation of the least square plane of regression of x_2 on x_1 and x_3. **[7]**

ii) Explain the importance of national income. **[3]**

b) i) From the following series of chain base indices construct fixed base index numbers. **[4]**

Years	2004	2005	2006	2007	2008	2009	2010
Chain base Index No	100	108	122	130	128	132	140

ii) If $r_{12} = 0.7$, $r_{13} = r_{23} = 0.5$ and $\sigma_1^2 = 4$, find $R_{1.23}$ and $\sigma_{1.23}$. **[4]**

iii) Explain the national income as given by pigou. **[2]**

Total No. of Questions : 4]

SEAT No. : ____

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[Total No. of Pages : 3

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S.Y.B.Sc. (Semester - II)

STATISTICS

ST - 222 : Continuous Probability Distributions-II and Demography

(2008 Pattern) (Paper - II)

Time :2 Hours] ***[Max. Marks :40***

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Use of calculator and statistical tables is allowed.***
4) ***Symbols and abbreviations have their usual meaning.***

Q1) Attempt each of the following: **[1 each]**

a) Choose the correct alternative in each of the following:

i) If X follows t- distribution with 6 degrees of freedom (d.f.) then the second ordered central moment of X is

A) $\frac{2}{3}$ B) $\frac{3}{2}$ C) $\frac{3}{4}$ D) 6

ii) The population growth mainly depends on

A) number of female births B) number of male births

C) total number of births D) total number of deaths

iii) Chi-Square test for goodness of fit is

A) two tailed test B) one sided left tailed test

C) one sided right tailed test D) none of these

b) State whether the given statement is true or false in each of the following:

[1 each]

i) The probability density function of Chi-Square distribution with n d.f. is same as that of $G\left(\frac{1}{2},\frac{1}{2}\right)$ distribution.

ii) If $X_1, X_2, ..., X_n$ is a random sample from $N(\mu, \sigma^2)$ then the sample mean $\overline{X}$ and sample variance S^2 are not in dependent.

P.T.O.

iii) A random sample $X_1, X_2, ..., X_{25}$ drawn from normal population with unknown parameters μ and σ^2 has mean square 625, then under H_0: $\mu = 50$, the test statistics $\frac{\overline{X}-50}{5}$ follows t-distribution with 24 d.f.

c) If $X \to F_{9,7}$, $Y \to F_{7,9}$ and $P(X \geq 5) + (Y \geq k) = 1$ then find the value of k. **[1]**

d) For a bivariate population we wish to test whether the dependent variable say Y is a linear function of variable X. State the hypothesis for testing the situation. **[1]**

e) State the $100(1-\alpha)\%$ confidence interval for the difference in population means when population variances σ_1^2 and σ_2^2 are unknown. **[1]**

f) If T follows t - distribution with n d.f. then find $P(|T_{10}| > 1.812)$. **[1]**

Q2) Attempt any <u>two</u> of the following: **[5 each]**

a) Define Chi-Square distribution and derive the expression of its probability density function (p.d.f.).

b) Explain pair t-test. State underline assumptions clearly.

c) The table given below gives the number of females in child bearing age, corresponding number of births and survival rates. The proportion of female births is 0.48. Find the net reproduction rate (NRR).

Age group	15-20	20-25	25-30	30-35	35-40	40-45	45-50
Female Population	16000	15000	14000	13000	12000	11000	9000
No.of births	400	1710	2100	1391	960	330	36
Survival rate	0.95	0.94	0.92	0.90	0.88	0.81	0.85

Q3) Attempt any <u>two</u> of the following: **[5 each]**

a) Let F follows F-distribution with n_1 and n_2 degrees of freedom (d.f.). Find mode of F.

b) Define sampling distribution of a statistics. Also, obtain the sampling distribution of a sample mean of size *n* drawn from gamma distribution with parameters α and λ.

c) Find mean deviation about mean for t-distribution with n d.f.

Q4) Attempt any <u>one</u> of the following:

a) i) Describe the test procedure for testing $H_0 : \sigma_1^2 = \sigma_2^2$ against $H_0 : \sigma_1^2 \neq \sigma_2^2$ where σ_1^2 and σ_2^2 are the variances of two populations. State the underlying assumptions. **[5]**

ii) Let X_i, $i = 1, 2, ..., 145$ be independent and identically distributed N (0, 2) variates. Find $P(X_1^2 + X_2^2 + ... + X_{145}^2 \leq 162)$. **[5]**

b) i) The machine producing ball bearing is operating properly if the variance of the diameter is 1.44 cm^2. A random sample of 14 ball bearings showed variance of 2.08 cm^2. Will you conclude that the machine is operating properly based on these data at 5% level of significance? **[5]**

ii) Define general fertility rate, age specific fertility rate and total fertility (T.F.R.) rate. Also, state two limitations of T.F.R. **[5]**

Total No. of Questions : 4]

SEAT No. :

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[Total No. of Pages : 3

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S.Y. B.Sc.

ARABIC (Functional)

(Sem. - II) (2008 Pattern)

Time : 2 Hours] ***[Max. Marks : 40***

Q.1. Translate into English or Urdu or Marathi any TWO of the following Passages: (10)

(الف) هٰذَا الرَّسْمُ جَمِيلٌ جِدًّا - فِي الرَّسْمِ قَفَصٌ - كَيْفَ ذٰلِكَ الطَّائِرُ -؟ هٰذَا فَارٌ - ذٰلِكَ القِطُّ كَبِيرٌ - اَلوَقْتُ عِنْدَهُ شَيْءٌ ثَمِينٌ - اَلوَلَدُ الكَسْلَانُ مَذْمُومٌ - وَفِي ذٰلِكَ الكِتَابِ مِنْهَاجٌ جَدِيدٌ -

(ب) ذٰلِكَ الرَّجُلُ مَشْغُولٌ بِالقِرَاءَةِ - هٰذَا دُكَّانُ الفَاكِهَانِيِّ، فِيهِ كُلُّ قِسْمٍ مِنَ الفَاكِهَةِ - وَهُوَ وَاقِفٌ عَلَى الأَرْضِ - أَنَا مُسْلِمٌ وَهُوَ أَيْضًا مُسْلِمٌ - اَلسَّمَكُ فِي المَاءِ - أَنْتَ طَوِيلٌ - هُوَ قَصِيرٌ - اَللَّعِبُ ضَرُورِيٌّ - وَالعِلْمُ مُفِيدٌ -

P.T.O.

(ج) اَلْاَدَبُ وَاجِبٌ - هَلْ ذٰلِكَ قُرْاٰنٌ -
ذٰلِكَ الطَّائِرُ غُرَابٌ - وَهُوَ اَسْوَدُ -
هٰذَا رَجُلٌ مُسْلِمٌ - فِي يَدِهٖ كِتَابٌ عَرَبِيٌّ -
هَلْ اَنْتَ كَبِيرٌ -؟ لَا - اَنَا صَغِيرٌ - نَعَمْ
هٰذَا كِتَابٌ - ذٰلِكَ وَلَدٌ مُجْتَهِدٌ - مَاذَا ذٰلِكَ؟

Q.2. Translate and Explain any Five couplets of the following: (10)

① يَا رَبِّ حَمْدًا وَشُكْرًا
وَهَبْتَ لِيْ مِنْكَ يُسْرًا

② جَمَّلْتَ بِالْعِلْمِ قَلْبِيْ
وَزِنْتَ بِالْحِلْمِ لُبِّيْ

③ كِتَابِيْ! اَنْتَ الصَّدِيْقُ الْوَفِيُّ
وَاَنْتَ الْمُعَلِّمُ وَالْمُرْشِدُ

④ بِنُوْرِكَ اَسْعٰى لِنَيْلِ الْكَمَالِ
وَفِيْ دَرَجَاتِ الْعُلَا اَصْعَدُ

⑤ فَاَنْتَ رَفِيْقِيْ فِيْ وَحْدَتِيْ
اِذَا مَا طَلَبْتُكَ لَا تَبْعُدُ

⑥ فِي رِضَابِي حُلْوُ شَهْدٍ
يَشْتَفِي مِنْهُ العَلِيلُ

⑦ لَيْسَ لِلنَّرْجِسِ نَبَارٍ نَفْحُ
فَعَلَامَ ذَا العَوِيلُ

Q.3 Give the Answers in Arabic any Five of the following: (10)

① هَلْ أَنْتَ صَغِيرٌ؟ ② كَيْفَ الزَّهْرُ؟
③ أَيُّ لِسَانٍ ضَرُورِيٌّ لِلْمُسْلِمِ؟ ④ مَاذَا لَكَ؟
⑤ هَلِ الفَارُ كَبِيرٌ؟ ⑥ مَنْ أَنْتَ؟
⑦ أَيْنَ هُوَ؟ ⑧ أَيُّ حَيَوَانٍ طَوِيلٌ؟

Q.4. Write the Letter in Arabic to the Bank Manager: (10)

أُكْتُبِ الرِّسَالَةَ فِي العَرَبِيَّةِ
إِلَى مُدِيرِ البَنْكِ ـــــ

❖❖❖❖

Total No. of Questions : 4]

SEAT No. : ____

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[Total No. of Pages : 2

[4217] - 237

S.Y. B.Sc. (Vocational)

INDUSTRIAL CHEMISTRY

VOC-221 : Unit Processes in Organic Industries

(Semester - II) (Paper - I) (2008 Pattern)

Time : 2 Hours] ***[Max. Marks : 40***

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Draw neat diagrams where necessary.***

Q1) Answer the following questions in brief :

a) Give two examples of reduction reaction with metal and acid.

b) How is ethyl acetate obtained from ketene?

c) Write the reaction for manufacture of toluene from benzene.

d) How is dinitrobenzene converted to m-nitroaniline?

e) Give the balanced equation for the preparation of dodecylbenzene from benzene.

f) Give the correct structure of p-nitrophenol.

g) Write the reaction for the manufacture of acetaldehyde.

h) How is benzoic acid is obtained from toluene?

Q2) Answer <u>any two</u> of the following :

a) Discuss the different types of alkylating agents.

b) Write a note on ozonolysis.

c) What is oxidation? Describe the role of dichromate as an oxidizing agent in different reactions.

P.T.O.

Q3) Attempt any two of the following :

a) Discuss the different nitrating agents giving suitable examples of the reaction.

b) Explain Friedal-Craft reaction.

c) Discuss the types of esterification processes.

Q4) Discuss the synthesis of methanol with the help of flow sheet diagram.

OR

What is halogenations? Discuss the manufacture of chlorobenzene with the help of flowsheet.

❖❖❖❖

Total No. of Questions : 4]

SEAT No. : ____

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[Total No. of Pages : 2

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S.Y. B.Sc. (Vocational)

BIOTECHNOLOGY

VOC-Biotech-221 : Plant and Animal Tissue Culture

(Semester - II) (Paper - I) (2008 Pattern)

Time : 2 Hours] ***[Max. Marks : 40***

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***All questions carry equal marks.***

Q1) Answer each of the following in 1-2 lines : **[10]**

a) What is Callus?

b) Give the role of Agar -Agar in PTC.

c) What is Somatic hybridization?

d) Write any two applications of PTC.

e) What do you mean by subculture?

f) Enlist any two cell lines used in ATC.

g) Give the role of CO_2 incubator in ATC.

h) Give any two limitations of Animal Tissue Culture.

i) What is a finite cell line?

j) What is organotypic culture?

Q2) Write short notes on <u>any two</u> of the following : **[10]**

a) Cytokinins.

b) Hardening.

c) Monolayer culture.

P.T.O.

Q3) Attempt any two of the following : **[10]**

a) Write in brief the composition of plant Tissue culture medium.

b) Discuss the role of cell banks in ATC.

c) Write a note on applications of ATC.

Q4) What is plant Tissue Culture? Give detailed account of advantages of PTC in Agriculture. **[10]**

OR

What are cell lines? Describe different techniques used in cell line characterization.

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Total No. of Questions : 4]

SEAT No. : ____

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[Total No. of Pages : 2

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S.Y. B.Sc. (Vocational) (Semester - II)

ELECTRONIC EQUIPMENT & MAINTENANCE

VOC-EEM-221 : Audio, Video and Office Equipments - B

(Paper - I) (2008 Pattern)

Time : 2 Hours] ***[Max. Marks : 40***

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Use of log tables and calculators is allowed.***

Q1) Attempt all of the following :

a) What is multimedia computer? **[1]**

b) Differentiate between mouse and keyboard. **[1]**

c) What is screen saver? **[1]**

d) What is light pen? **[1]**

e) Classify storage devices used in PC. Give an example of each. **[2]**

f) What is bar code? Where is it used? **[2]**

g) What is FAX machine? Give its one application. **[2]**

h) How touch screens work? **[2]**

Q2) Attempt any two of the following :

a) Write a note on multimedia projector. **[4]**

b) Explain the working principle of ink jet printer. **[4]**

c) What is flat bed scanner? How it works? **[4]**

P.T.O.

Q3) Attempt any two of the following :

a) Which video standards are used for PC monitors? **[4]**

b) Explain with neat diagram the working of dot matrix printer. **[4]**

c) What is meant by Fax? Explain in brief the working of Fax machine. **[4]**

Q4) Answer the following :

a) How photocopier works? Give its sequence of copying. **[6]**

b) Give one example of large screen display. Explain its working. **[6]**

OR

Answer the following :

a) Draw the block diagram of motherboard of PC. Explain the function of each block. Write a note on different connections available in it. **[6]**

b) Explain the working principle of over head projector. **[6]**

❖ ❖ ❖ ❖

Total No. of Questions : 4]

SEAT No. : ____

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[Total No. of Pages : 2

[4217] - 241

S.Y. B.Sc. (Vocational)

COMPUTER HARDWARE & NETWORK ADMINISTRATION

Microprocessor & Interfacing Techniques

(Semester - II) (Paper - I) (2008 Pattern)

Time : 2 Hours] ***[Max. Marks : 40***

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***

Q1) a) Attempt the following : **[4 × 1 = 4]**

i) What are add-on cards?

ii) Write full form of LAN.

iii) List different output devices.

iv) Write any one important function of Peripheral Controller.

b) Attempt the following : **[4 × 2 = 8]**

i) What are features of Multimedia PC?

ii) List the different types of Printers available. Which Printer provides best quality?

iii) Which type of Area Network is used for a span of few kilometers?

iv) What is flash drive? What storage media is used in flash drive?

Q2) Attempt <u>any two</u> of the following : **[2 × 4 = 8]**

a) What is BIOS? Explain functions of BIOS.

b) Explain the different types of Mouse available? State their advantages and disadvantage.

c) Compare Asynchronous and Synchronous serial Data Communication Protocols.

P.T.O.

Q3) Attempt any two of the following : **[2 × 4 = 8]**

a) Write a note on display adaptors.

b) Explain the different types of Scanner and their typical applications.

c) Explain the concept of speech recognition.

Q4) Attempt any two of the following : **[2 × 6 = 12]**

a) Describe thick and thin concept with reference to Green PC.

b) List different controllers. Describe working of Memory Controller.

c) Describe wired and wireless communication protocol. Explain features of atleast one wireless protocol.

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Total No. of Questions : 4]

SEAT No. : ____

P161

[Total No. of Pages : 2

[4217] - 242
S.Y. B.Sc. (Vocational)
SEED TECHNOLOGY
Vegetable Seed Production
(Semester - II) (Paper - I) (2008 Pattern)

Time : 2 Hours] ***[Max. Marks : 40***

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Draw neat and labeled diagrams wherever necessary.***

Q1) Attempt the following : **[10 × 1 = 10]**

a) What is asexual reproduction?

b) Define pollen viability.

c) What is hybridization?

d) Write any two objectives of population improvement.

e) Draw the diagrammatic representation for classifying the vegetable crops based on plant parts used for consumption.

f) Give the isolation distance for foundation seed production in Brinjal.

g) What is seed storage?

h) Which type of nursery bed is required for growing Brinjal seedlings?

i) What do you mean by CGMS?

j) Write any two objectives of vegetable seed production.

Q2) Attempt <u>any two</u> of the following : **[2 × 5 = 10]**

a) Define microsporogenesis? Describe microspore formation process in detail, with a neat labeled diagram.

b) What is pollination? Describe any two modes of pollination.

c) Explain any two hybridization types in vegetable crops.

P.T.O.

Q3) Write notes on (any two) : **[2 × 5 = 10]**

a) Pure line selection.

b) Mass selection.

c) Classification of vegetable crops based on growing season.

Q4) Give an account of seed production in Brinjal with reference to land requirement, isolation, nursery management, cultural practices, roguing, plant protection, harvesting, seed extraction, drying and storage. **[10]**

OR

Explain in detail seed production in Onion.

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Total No. of Questions : 4]

SEAT No. : ____

P162

[Total No. of Pages : 2

[4217] - 243
S.Y. B.Sc. (Vocational)
INDUSTRIAL MICROBIOLOGY
VOC-IND-MIC-221 : Microbial Fermentations and Downstream Processing
(Sem. - II) (Paper - I) (Theory) (2008 Pattern)

Time : 2 Hours] ***[Max. Marks : 40***

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***All questions carry equal marks.***
4) ***Draw neat labeled diagrams wherever necessary.***
5) ***Use of scientific calculators is allowed.***

Q1) Answer the following : **[10]**

a) State 'Stoke's law'.

b) Define 'Vinegar'.

c) Name any two solvents used for separation of Penicillin G by solvent extraction.

d) Give the role of limited biotin concentration in medium for achieving over production of glutamic acid.

e) State whether the statement is True or False. Antibiotics are primary metabolites of cells.

f) Fill in the blank :

Basket centrifuges are used for separating _____.

g) Define 'precursor'.

h) Name the chemical used as filter aids in process of filteration for fermented broth.

i) State any two uses of methane gas.

j) Fill in the blank :

_____enzyme can be used to lyse bacterial cells.

P.T.O.

Q2) Attempt any two of the following : **[10]**

a) Enlist the types of continuous filters used in removal of microbial cells from harvested fermentation broth and describe any one in detail.

b) Give the principle of salt precipitation and state its use in the recovery of fermentation product.

c) Draw the flow chart for explaining steps involved in cheese production.

Q3) Attempt any two of the following : **[10]**

a) Write a note on biochemical mechanism involved in methane production.

b) With the help of diagram explain co-current extraction.

c) Explain the principle of ion-exchange chromatography and state how it is used for purifying a product.

Q4) Attempt any one of the following : **[10]**

a) Describe over production of primary metabolite which is achieved by modification of cell wall permeability.

b) Describe in detail the process of downstream processing for recovery of vitamin B_{12}.

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Total No. of Questions : 4]

SEAT No. : ____

P163

[Total No. of Pages : 2

[4217] - 244

S.Y. B.Sc. (Vocational) (Semester - II)

INDUSTRIAL CHEMISTRY

VOC-222 : Industrial Pollution

(Paper - II) (2008 Pattern)

Time : 2 Hours] ***[Max. Marks : 40***

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Draw neat diagrams wherever necessary.***

Q1) Answer the following questions in brief : **[16]**

a) What is meant by 'Nitrogen Fixation'?

b) Define the term 'atmosphere'.

c) Define flocculation process of waste water treatment.

d) Write important features of primary waste water treatment.

e) Name the ill effects of NOx on plant and humans.

f) Write the important properties of activated sludge.

g) What are the major constituents of air?

h) What are trickling filters?

Q2) Answer <u>any two</u> of the following : **[8]**

a) Explain Anaerobic treatment on sewage water.

b) Discuss radiation pollution.

c) Discuss the types of smog.

P.T.O.

Q3) Attempt any two of the following : **[8]**

a) Explain quality characteristics of water.

b) Write a note on 'Ion-Exchange method' of industrial waste water treatment.

c) Discuss peticide pollution.

Q4) Name the sources of oxides of nitrogen in air and explain their hazardous effects on human health. **[8]**

OR

Write notes on Ultrafiltation and Electrodialysis.

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Total No. of Questions : 4]

SEAT No. : ____

P164

[Total No. of Pages : 2

[4217] - 245

S.Y. B.Sc. (Vocational) (Semester - II)

BIOTECHNOLOGY

VOC-Biotech-222 : Immunology

(Paper - II) (2008 Pattern)

Time : 2 Hours] ***[Max. Marks : 40***

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***All questions carry equal marks.***

Q1) Answer each of the following in 1-2 lines : **[10]**

a) Define : antibody.

b) Give function of IgG in humoral immunity.

c) Explain the role of macro phages in immunity.

d) What is HAT selection method?

e) Enlist any two examples of vaccines.

f) What is innate immunity?

g) Name any two cytokines.

h) What is precipitations?

i) Which molecules are involved in T-lymphocyte activation?

j) Name the immunologicals involved in Type I hypersensitivity reaction.

Q2) Write short notes on <u>any two</u> of the following : [8-10 lines] **[10]**

a) Attenuated vaccines.

b) MHC I complex.

c) T_H cells.

P.T.O.

Q3) Attempt <u>any two</u> of the following [8-10 lines] : **[10]**

a) What is ELISA? Explain the types of ELISA.

b) Define : Humoral immunity. Explain role of any one molecule involved in Humoral immunity.

c) Comment on primary immune response.

Q4) What are antibodies? Explain the structure and types of antibodies in detail. **[10]**

OR

What are antigens? Explain the various techniques involved in antigen detection.

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Total No. of Questions : 4]

SEAT No. : ____

P165

[Total No. of Pages : 2

[4217] - 247

S.Y. B.Sc. (Vocational)

ELECTRONIC EQUIPMENT AND MAINTENANCE (EEM)

VOC-EEM-222 : Maintenance and Repair of Audio, Video, Office and Communication Equipment

(Semester - II) (Paper - II) (2008 Pattern)

Time : 2 Hours] ***[Max. Marks : 40***

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Use of log table/calculator is allowed.***

Q1) Answer all of the following :

a) State the use of gang condensor in AM receiver. **[1]**

b) What is the bandwidth of FM broadcast channel? **[1]**

c) State the role of artificial satellite in dish TV communication. **[1]**

d) State the use of LASER diode in ACD player. **[1]**

e) What could be the fault, if there is noisy output from tape player? **[2]**

f) State the advantages of PA system. **[2]**

g) State the important sections of audio music system. **[2]**

h) What is 'MP3' file? **[2]**

Q2) Answer <u>any two</u> of the following :

a) Explain the alignment procedure for AM radio receiver. **[4]**

b) Discuss the procedure for locating faults in an audio tape recorder. **[4]**

c) Write down the common faults and their remedies in dish TV system. **[4]**

P.T.O.

Q3) Answer any two of the following :

a) Explain with neat diagram the working principle of audio compact disk. **[4]**

b) What are the common faults and their remedies in a PA system? **[4]**

c) Explain the setup for aligning IF stages of a TV receiver. **[4]**

Q4) Answer the following :

a) Explain the steps in fault diagnosis of a B/W TV. **[6]**

b) Discuss the various faults and their causes in colour TV system. **[6]**

OR

Answer the following :

a) Write down the procedure for trouble shooting of LASER printer. **[4]**

b) What are the common faults in VDU monitor? **[4]**

c) Discuss the procedure of fault-finding in mobile telephones. **[4]**

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Total No. of Questions : 4]

SEAT No. : ____

P166

[Total No. of Pages : 2

[4217] - 248

S.Y. B.Sc. (Vocational)

COMPUTER HARDWARE & NETWORK ADMINISTRATION

Computer System Management - II

(Semester - II) (Paper - II) (2008 Pattern)

Time : 2 Hours] ***[Max. Marks : 40***

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***

Q1) a) Attempt the following : **[4 × 1 = 4]**

i) What is a System Software?

ii) What is a PDA?

iii) State any one Role of a Database Administrator.

iv) Give one Application of a Pendrive.

b) Attempt the following : **[4 × 2 = 8]**

i) What is a Peer to Peer Network?

ii) List any two Utility Softwares.

iii) List any two Desktop Operating System.

iv) Difference between Freeware and Shareware Software.

Q2) Attempt <u>any two</u> of the following : **[2 × 4 = 8]**

a) What is a Device Driver? Explain its importance.

b) Explain the importance of Maintenance Control.

c) What are the various controls applied in Local Area Network Operations?

P.T.O.

Q3) Attempt any two of the following : **[2 × 4 = 8]**

a) Why Segregation of Duties play a vital Role in Access Control?

b) Give one application of Each : Router, Modem, Switch and Cat(x) Cable.

c) Explain the importance of Protection of Storage Media.

Q4) Attempt any two of the following : **[2 × 6 = 12]**

a) List the Components required to Assemble a Diskless Node. Give its uses.

b) Give Steps to Install a Printer in WinXP and Share it in a Network.

c) What are the various controls applied in Wide Area Network Operations?

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Total No. of Questions : 4]

SEAT No. : ____

P167

[Total No. of Pages : 2

[4217] - 249
S.Y. B.Sc. (Vocational)
SEED TECHNOLOGY
Seed Quality Control
(Semester - II) (Paper - II)

Time : 2 Hours] ***[Max. Marks : 40***

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Draw neat and labelled diagrams wherever necessary.***

Q1) Attempt the following :

a) What do you mean by seed quality? **[10 × 1 = 10]**

b) Define a breeders seed.

c) Give any two objectives of seed certification agency.

d) What is field inspection?

e) What is roguing?

f) Enlist any two powers of seed inspector.

g) Where is state seed testing laboratory located?

h) Sketch any two walking patterns in field inspection.

i) Central seed committee is constituted with how many members.

j) Define seed legislation.

Q2) Attempt <u>any two</u> of the following : **[2 × 5 = 10]**

a) What are the principles of field inspection?

b) Explain in brief the classes of seed.

c) Write about the International organizations for seed certification.

P.T.O.

Q3) Write notes on (any two) : **[2 × 5 = 10]**

a) Appellate authority.

b) General seed certification standards.

c) Central seed testing laboratory.

Q4) Explain in detail the method of field inspection with suitable example.**[10]**

OR

Describe in brief technique of field inspection for seed production plots of hybrid varieties in cotton.

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Total No. of Questions : 4]

SEAT No. : ____

P168

[Total No. of Pages : 2

[4217] - 250

S.Y. B.Sc. (Vocational)

INDUSTRIAL MICROBIOLOGY

VOC-IND-MIC-222 : Quality Assurance in Industrial Products

(Semester - II) (Paper - II) (Theory) (2008 Pattern)

Time : 2 Hours] ***[Max. Marks : 40***

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***All questions carry equal marks.***
3) ***Figures to the right indicate full marks.***
4) ***Draw neat labelled diagrams wherever necessary.***
5) ***Use of tables calculator is allowed.***

Q1) Answer the following : **[10]**

a) Define “Allergen”.

b) State whether the following statement is TRUE/FALSE. All sterile injectables are pyrogen free.

c) Differentiate between Ames' test and Modified Ames' test.

d) What is ISO?

e) Name the pathogenic bacteria that may be present in drinking water.

f) Name the organism used for microbiological assay of Vit B_{12}.

g) Name the medium used for testing sterility of product.

h) Write an objective of doing sham test?

i) What is MIC?

j) Fill in the blanks :

_____ cells from horse shoe crab are used in LAL test.

P.T.O.

Q2) Answer any two of the following : **[10]**

a) What is FDA? Explain its role in quality assurance of industrial products.

b) What are carcinogens? Explain the procedure of Ames' test.

c) Enlist the quality assurance tests carried out for mineral water. Describe any one test in detail.

Q3) Answer any two of the following : **[10]**

a) Enlist the physical & chemical methods used for assay of fermentation product & explain titration & gravimetric analysis method.

b) Describe the test for ‘undue toxicity’.

c) Justify ‘Tooth paste do not require testing for presence of allergen.

Q4) Answer any one of the following : **[10]**

a) Describe the procedure of checking the presence of pyrogen in an injectible using an in vivo test.

b) Enlist the types of agar diffusion assays & discuss the factors affecting agar diffusion.

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Total No. of Questions : 5]

SEAT No. :

P308

[Total No. of Pages : 3

[4217]-13

F.Y. B.Sc.

STATISTICS / STATISTICAL TECHNIQUES

Descriptive Statistics

(Paper - I) (2008 Pattern) (42110)

Time :3 Hours] *[Max. Marks :80*

Instructions to the candidates :

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Use of statistical tables and calculator is allowed.***
4) ***Symbols have their usual meanings.***

Q1) a) Choose correct alternative for the following : **[4 × 1 = 4]**

i) The measurements on height and weight are made on

A) Nominal scale B) Orinal scale
C) Interval scale D) Ratio scale

ii) A variable taking values 1, 2, 3, ...,17 has median.

A) 9 B) 10
C) 8 D) 11

iii) If Corr $(x, y) = 0.8$, then Corr $(2x, -3y)$ is

A) 0.8 B) – 0.8
C) 0.4 D) – 0.6

iv) The following is not capable of further mathematical treatment.

A) Arithmetic mean B) Variance
C) Mode D) Geometric mean.

b) State whether the following statements are true or false: **[4 × 1 = 4]**

i) Standard deviation is dependent on change of origin and not scale.

ii) The following data are consistent :
N = 80, (A) = 60, (B) = 50 (AB) = 55

iii) Laspeyre's price index number uses base year quantity as weight.

iv) If correlation coefficient is negative, then the corresponding regression coefficients are also negative.

P.T.O.

c) Define Spearman's rank correlation coefficient and state its formula. **[2]**

d) State two merits of harmonic mean. **[2]**

e) The first 4 central moments of a frequency distribution are $\mu_1 = 0$, $\mu_2 = 16$, $\mu_3 = -64$, $\mu_4 = 312$. Compute coefficient of skewness. **[2]**

f) Define trimmed arithmetic mean. **[2]**

Q2) Attempt <u>any four</u> of the following : **[4 × 4 = 16]**

a) State characteristics of a good statistical average.

b) Draw Histogram for the following data and hence obtain its mode.

Marks	40-50	50-60	60-70	70-80	80-90
Frequency	8	12	18	7	5

c) Height in cms of 25 school children are given below, prepare stem and leaf chart.
95, 98, 102, 111, 99, 92, 84, 85, 92, 105, 108, 87, 86, 90, 88, 89, 91, 96, 113, 112, 109, 93, 100, 104, 101.

d) A sample of *n* observations on X and Y shows that the variables are uncorrelated and their variances are 4 and 9 respectively. Show that U = 3X + 4Y and V = 3X – Y are uncorrelated.

e) Describe the scope of statistics in,
i) Medical Sciences
ii) Management Sciences.

f) Test whether the attributes A and B are independent or not based on the following data :
N = 100, (A) = 60, (B) = 50, $(\alpha\beta) = 20$.

Q3) Attempt <u>any four</u> of the following : **[4 × 4 = 16]**

a) The mean monthly salary of all the employees in a firm is Rs. 3800. The mean salaries of male and female employees are Rs. 4,000 and Rs. 3500 respectively. Find the percentage of male employees in the firm.

b) Define Bowley's coefficient of skewness and prove that it lies between –1 and +1.

c) The arithmetic mean of weight of 98 students as calculated from a frequency distribution is 50 kg. It was later found that the frequency of the class (30-40) was wrongly taken as 8 instead of 10. Calculate the correct arithmetic mean.

d) The first 3 moments of a distribution about 2 are 1, 22 and 10 respectively. Find its standard deviation.

e) Derive the expression for the acute angle between the two regression lines.

f) Given that $(AB) = 13, (A\beta) = 20, (\alpha B) = 15, (\alpha\beta) = 25$. Find the remaining frequencies.

Q4) Attempt any two of the following : **[2 × 8 = 16]**

a) Given a sample of '*n*' pairs of observations on the variables X and Y, using the method of least squares. Obtain the equation of line of regression of Y on X.

b) i) State two merits and two demerits of median.
ii) Represent the following data using box plot technique: 12, 13, 18, 21, 11, 14, 17, 15, 28, 16, 20, 19, 25, 30, 26.

c) i) Show that Fisher's index number lies between Laspeyre's and Paasche's index numbers.
ii) Define raw and central moments. Also write expressions for first 4 central moments in terms of raw moments.

d) Compute standard deviation of first 'n' natural numbers. Hence find the value of S.D. of 1, 2,.....16.

Q5) Attempt any two of the following : **[2 × 8 = 16]**

a) i) Explain stratified random sampling.
ii) The following data represent wheat yield for 20 plots:
11, 16, 15, 18, 21, 22, 23, 19, 20, 28, 32, 33, 38, 40, 41, 48, 10, 25, 24, 50. Obtain a systematic sample of size 5, starting with third observation. Also find arithmetic mean of the sample.

b) Derive the expression for mode of a frequency distribution with the help of Histogram.

c) State the expression for Yule's coefficient of association and mention its use. Also prove that it lies between –1 and +1.

d) i) Explain the procedure of fitting the curve $y = ab^x$.
ii) The regression equations are $3x - y - 5 = 0$ and $4x - 3y = 0$. Obtain the arithmetic means of X and Y. Also find the correlation coefficient between X and Y.

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Total No. of Questions : 5] **SEAT No. :**

P309 **[Total No. of Pages : 4**

[4217]-14
F.Y. B.Sc.
STATISTICS / STATISTICAL TECHNIQUES
Discrete Probability and Probability Distributions
(Paper - II) (42120)

Time :3 Hours] ***[Max. Marks :80***

Instructions to the candidates :

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Use of statistical tables and calculator is allowed.***
4) ***Symbols have their usual meanings.***

Q1) a) Choose correct alternative for the following : **[4 × 1 = 4]**

i) For a sample space $\Omega = \{w_1, w_2, w_3, w_4\}$, $P(w_1) = P(w_2) = \frac{1}{8}$, $P(w_3) = k$, $P(w_4) = \frac{3}{8}$. For what value of k will this be a probability model?

(A) 0 (B) $\frac{1}{8}$

(C) –1 (D) $\frac{3}{8}$

ii) Let $X \rightarrow P(m)$. If $P(x = 2) = P(x = 1)$ then value of the parameter m is

(A) 2 (B) 1

(C) 3 (D) 0

iii) If A and B are independent events with P(A) = 0.4, P(B) = 0.5, then $P(A' \cap B)$ is equal to

(A) 0.03 (B) 0.3

(C) 0.1 (D) 0.9

iv) For the following probability distribution of r.v.X

X	1	2	3	4
P(X = x)	1/10	2/10	3/10	4/10

What is the value of median of X?

(A) 1 (B) 2

(C) 3 (D) 4

b) State whether following statements are true or false: **[4 × 1 = 4]**

i) A discrete sample space contain a finite number of elements.

ii) The first raw moment of a variable is always zero.

iii) Conditional probability satisfies axioms of probability.

iv) A discrete random variable can not take negative values.

P.T.O.

c) State Baye's theorem. **[2]**

d) Define pairwise independence of three events. **[2]**

e) Define countably infinite sample space and give one example of it. **[2]**

f) Determine C such that the following function is a probability mass function (p.m.f.)

$$P(X = x) = C\binom{5}{x}; \; x = 0, 1, 2$$ **[2]**

Q2) Attempt any <u>four</u> of the following : **[4 × 4 = 16]**

a) Explain the following terms :

i) Mutually exclusive events.

ii) Independent of two events.

b) State axioms of probability. Also show that if $A \subset B$, then $P(A) \leq P(B)$ where A and B are two events defined on Ω.

c) It is given that $P(A \cup B) = \frac{5}{6}$, $P(A \cap B) = \frac{2}{6}$ and $P(A) = \frac{1}{2}$

Find :

i) P(B)

ii) $P(A \cap B')$

iii) $P(A' \cup B')$

d) If A and B are any two events defined on Ω, then show that

$P(A'/B) = 1 - P(A/B), \; P(B) > 0.$

e) The probability distribution of a discrete random variable X is as follows:

X	0	1	2
P(X = *x*)	0.25	0.50	0.25

Find :

i) $P(X \geq 0)$

ii) $P(X > 1/X > 0)$

iii) E(X)

f) Let A, B and C be three events defined on Ω, such that A and B are mutually exclusive, A and C are independent, B and C are independent.

If $P(A) = \frac{1}{4}$, $P(B) = \frac{1}{3}$, $P(C) = \frac{1}{6}$ then

Find :

i) $P(A \cup B \cup C)$

ii) $P(A \cap B \cap C)$

Q3) Attempt any four of the following : **[4 × 4 = 16]**

a) Joint p.m.f. of (X, Y) is

$$P(x, y) = \frac{xy}{36}, \quad x = 1,2,3 \quad y = 1,2,3$$
$$= 0, \text{ otherwise}$$

Obtain:

i) P(X + Y > 5)

ii) Conditional probability distribution of Y given X = 2.

b) State and prove additive property of binomial distribution.

c) A box contain 7 white, 5 red and 6 blue balls, two balls are drawn at random from the box without replacement. Find the probability that

i) both are red.

ii) both are of different colours.

d) Define Bernoulli distribution with parameter P and find its mean and variance.

e) A husband and wife appear for two vacancies of the same post. The probability of husband's selection is 1/7 and that of wife's selection is 1/5. What is the probability that

i) both of them will be selected?

ii) none of them will be selected?

iii) only one of them will be selected?

f) If X and Y are two discrete random variable's, then prove that
E(X + Y) = E(X) + E(Y)

Q4) Attempt any two of the following : **[2 × 8 = 16]**

a) i) State and prove addition theorem of probability for two events.

ii) Let $X \to B(n = 8, p = \frac{1}{4})$

Obtain: I) P(X = 3) II) P(X < 3)

b) i) Let A and B be two events defined on Ω, such that $P(A) = \frac{3}{4}$ and $P(B) = \frac{5}{8}$, show that $\frac{3}{8} \le P(A \cap B) \le \frac{5}{8}$

ii) Two fruits are to be selected at random from 4 mangoes, 2 oranges and 3 apples. Let X and Y denote respectively number of mangoes and oranges selected in the sample. Obtain the joint probability distribution of (X, Y).

c) i) Obtain mean and variance of discrete uniform distribution taking values 1, 2, 3, 4, ...*n*.

ii) Define Hypergeometric distribution and find its mean.

d) i) A parcel of 12 books contains 4 books with loose binding. What is probability that a random selection of 6 books (without replacement) will contain 3 books with loose binding?

ii) Define poisson distribution with parameter m. State mean, variance and additive property of poisson distribution.

Q5) Attempt any <u>two</u> of the following : **[2 × 8 = 16]**

a) For the following joint probability distribution of (X, Y)

X\Y	1	2	3
1	5/27	1/27	3/27
2	4/27	3/27	4/27
3	2/27	3/27	2/27

Find :

i) E (X/Y = 2)

ii) Var (Y/X = 3)

iii) Are X and Y independent? Justify.

b) The p.m.f. of random variable X is $P(x)=\frac{2x}{n(n+1)}$, $x=1,2,3,.....n$

Find :

i) E (X)

ii) E (X^2)

iii) Var (X)

iv) Var (2X – 3)

c) i) Let $X \to B(n, p)$ then prove that

$$P(X=x+1)=\frac{n-x}{x+1}.p/q.\ P(X=x)$$

ii) State the expressions for first four central moments in terms of raw moments.

d) i) Define :

I) Joint p.m.f. of (X, Y)

II) Conditional p.m.f. of X given Y = *y*

ii) Suppose X and Y are two discrete random variables, then prove that $Var(aX+bY)=a^2Var(X)+b^2Var(Y)+2ab\,Cov(X,Y)$ where a,b are constant.

Total No. of Questions : 4]

SEAT No. :

P310

[Total No. of Pages : 2

[4217]-111
S.Y. B.Sc. (Semester - I)
GEOLOGY
GL-211: Mineralogy
(2008 Pattern) (Paper - I)

Time :2 Hours] *[Max. Marks :40*

Instructions to the candidates :

1) ***All questions are compulsory.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***

Q1) Answer the following questions : **[10]**

a) Define Sorosilicate structure.

b) Give the alteration products of Olivine.

c) Name any two feldspars belonging to Plagioclase series.

d) Give three basic attributes of gemstones.

e) Name the fibrous variety of amphibole.

f) Name two isotropic gemstones.

g) What is foreign overgrowth?

h) Define twinning in crystals.

i) Define ordinary ray of light.

j) What is Anisotropism?

Q2) Write notes on (any two) : **[10]**

a) Silicate structure and chemical composition of pyroxene mineral group.

b) Crystalline and non-crystalline minerals.

c) Twinning in Orthorhombic system.

P.T.O.

Q3) Explain the following (any two) : **[10]**

a) Extinction position in minerals.

b) Optical properties of topaz.

c) Various types of internal imperfections in crystals.

Q4) Describe the structure, mineral composition, physical & optical properties and paragenesis of the Mica group of minerals. **[10]**

OR

Give the crystallographic axes, Elements of symmetry and forms present with indices of cubic system (Types-Pyrite and Tetrahedrite).

Total No. of Questions : 4]

SEAT No. :

P311

[Total No. of Pages : 2

[4217]-112
S.Y. B.Sc. (Semester - I)
GEOLOGY
GL-212: Structural Geology
(2008 Pattern) (Paper - II)

Time :2 Hours] *[Max. Marks :40*

Instructions to the candidates :

1) ***All questions are compulsory.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***

Q1) Answer the following questions : **[10]**

a) What is an Inlier?

b) Define Apparent width of outcrop of a bed.

c) What are Salient and Recess?

d) Define rake of a linear feature.

e) Define Joint.

f) Enumerate any two geological criteria for recognition of faults in the field.

g) Define Strike and Dip of bedding.

h) Define 'Foot Wall' of a fault.

i) What is disconformity.

j) Define Refolding.

Q2) Write notes on (Any two) : **[10]**

a) Depth of folding.

b) Translational and Rotational movement along fault.

c) Classification of faults based on Rake of the net slip.

P.T.O.

Q3) Explain the following (Any two) : **[10]**

a) Symmetrical and Asymmetrical fold.

b) Thrust fault and Reverse fault.

c) Strike and Dip joints.

Q4) Define fold. Explain with suitable example, recognition of folds by plotting attitude of beds on map. **[10]**

OR

What are primary structures? Describe how Ripple marks help in determining top of bed.

Total No. of Questions : 4]

SEAT No. :

P316

[Total No. of Pages : 2

[4217] - 127
S.Y. B.Sc. (Semester - I)
DEFENCE AND STRATEGIC STUDIES
DS - 103 : Geopolitics
(Paper - III) (2008 Pattern)

Time : 2 Hours] *[Max. Marks : 40*

Instructions to the candidates :

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***

Q1) Answer in 2 or 4 sentences each : **[16]**

a) Define geopolitics.

b) State the meaning of strategic minerals.

c) Write any two factors of geopolitics.

d) What do you mean by state?

e) State the meaning of Buffer State.

f) Write the types of boundaries.

g) State the limits of "territorial sea" for sovereign state.

h) Why the demarcation of boundary is necessary?

Q2) Answer in 8 or 10 sentences (any two) : **[8]**

a) Explain in brief "energy resources".

b) Write in brief concept of landlocked state.

c) Write in short "Maritime Boundaries".

Q3) Write short notes on (any two) : **[8]**

a) Exclusive Economic Zone.

b) Geostrategic importance of Andaman and Nicobar Islands.

c) Concept of geopolitics.

P.T.O.

Q4) Answer in 16 to 20 sentences (any one) : **[8]**

a) Explain in detail the basic elements for creation of state.

b) Explain the various uses of strategic minerals and resources with examples.

Total No. of Questions : 4]

SEAT No. :

P317

[Total No. of Pages : 2

[4217] - 137

S.Y. B.Sc. (Vocational) (Semester - I)

BIOTECHNOLOGY - I

VOC - Biotech - 211 : Cell and Molecular Biology

(2008 Pattern) (Paper - I)

Time : 2 Hours] *[Max. Marks : 40*

Instructions to the candidates :

1) ***All questions are compulsory.***
2) ***All questions carry equal marks.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***

Q1) Answer each of the following in 1-2 lines : **[10]**

a) Define : Gene.

b) What is the role of mitochondria in a cell?

c) Enlist any two cell signaling molecules.

d) Give the function of promoter in transcription process.

e) What is the anticodon loop in tRNA?

f) Give the role of collagen in ECM of the cell.

g) What is central dogma of molecular biology?

h) Name the first amino acid which will get added during protein synthesis in prokaryotes.

i) Enlist the types of lipids present in cell membrane.

j) What are RNA polymerase enzymes?

Q2) Write short notes on any two of the following : **[10]**

a) Fluid mosaic model.

b) Plasmodesmata.

c) Eukaryotic genome structure.

P.T.O.

Q3) Attempt <u>any two</u> of the following : **[10]**

a) Describe the photo repair mechanism in E.coli.

b) Give the properties of genetic code.

c) What is cell differentiation? Explain the mechanism.

Q4) Explain in detail the prokaryotic DNA replication process. **[10]**

OR

Give in detail the structure and function of endoplasmic reticulum.

Total No. of Questions : 4]

SEAT No. :

P318

[Total No. of Pages : 2

[4217] - 144

S.Y. B.Sc. (Semester - I)

BIOTECHNOLOGY - II

VOC - Biotech - 212 : Recombinant DNA Technology and Bioinformatics

(2008 Pattern) (Paper - II) (Vocational)

Time : 2 Hours] *[Max. Marks : 40*

Instructions to the candidates :

1) ***All questions are compulsory.***
2) ***All questions carry equal marks.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***

Q1) Answer each of the following in 1-2 lines : **[10]**

a) What are plasmids?

b) Give two examples of restriction enzymes.

c) What is southern hybridization?

d) What is site directed mutagenesis?

e) What is proteomics?

f) Give two applications of DNA sequencing.

g) Give the function of Taq Polymerase.

h) What is transfection?

i) What is BAC?

j) What are sticky ends?

Q2) Write short notes on <u>any two</u> of the following : **[10]**

a) PCR.

b) YAC.

c) DNA sequencing.

P.T.O.

Q3) Attempt any two of the following : **[10]**

a) Give applications of r DNA technology.

b) Describe non radioactive detection procedure for screening of transformants.

c) What are restriction endonucleases? Describe properties of type II restriction endonucleases.

Q4) What is genomics? Describe various types of genomics and add a note on their applications.

OR

What is recombinant DNA technology? Explain in brief any two methods for introducing r DNA into host cells. **[10]**

Total No. of Questions : 5]

SEAT No. : ____

P320

[Total No. of Pages : 2

[4217] - 31

F.Y. B.Sc. (Vocational)

PHOTOGRAPHY AND AUDIO-VISUAL PRODUCTION

Basic Photography and Appreciation of Media

(Paper - I) (2008 Pattern)

Time : 3 Hours] ***[Max. Marks : 80***

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Draw neat and labeled diagrams wherever necessary.***

Q1) Answer the following : **[16]**

a) What does ISO mean?

b) Write down two equivalent exposures for f 11 @ 1/125 sec.

c) What information is provided by the viewfinder of a DSLR camera?

d) Why do you need the mirror in the DSLR camera?

e) Explain what do you mean by a blurred image.

f) What is the function of the focusing screen in a DSLR camera?

g) What is the difference between refraction and diffraction of light?

h) Draw a diagram and explain the concept of total internal reflection of light.

Q2) Answer <u>any four</u> of the following : **[16]**

a) Explain the term ‘amateur photographer’.

b) Compare the focal plane shutter and the leaf shutter.

c) Draw a diagram and explain the concept of magnification of an image.

d) Draw a diagram and explain the chromatic aberration. How is it reduced?

e) How is a photographic image analyzed technically?

P.T.O.

Q3) Answer any four of the following : **[16]**

a) Draw a diagram and show the working of a focal plane shutter at slow shutter speeds.

b) Draw a diagram and explain what do you mean by the 'distortions' produced by a simple lens. How are the distortions reduced?

c) What do you mean by f number? Write down the f number scale. What is a full stop, half stop and intermediate stop?

d) Give suitable examples and differentiate between a 'news' and a 'photo news'.

e) Give suitable examples and differentiate between a 'public place' and a 'private place' as understood by a photographer.

Q4) Answer the following : **[16]**

a) How important is photography in various walks of life?

OR

a) How would you analyze photography and as a medium of mass communication?

b) Discuss the role of a photographic image in the print media.

OR

b) Compare photography and painting as medium of expression.

Q5) Answer any one of the following : **[16]**

a) Discuss any four elements of composition. Draw suitable sketches for supporting your discussion.

b) Draw a neat and labeled diagram and describe the construction and working of a DSLR camera.

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Total No. of Questions : 5]

SEAT No. : ____

P321

[Total No. of Pages : 2

[4217] - 38

F.Y. B.Sc. (Vocational)

PHOTOGRAPHY AND AUDIO-VISUAL PRODUCTION

Introduction to Mass Communication and Media Scene in India

(Paper - II) (2008 Pattern)

Time : 3 Hours] ***[Max. Marks : 80***

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Give suitable examples wherever necessary.***

Q1) Attempt any two of the following : **[16]**

a) Illustrate the different barriers in communication.

b) Explain the salient features of mass communication.

c) You are asked to interview the Katrina Kaif on the release of her new film. What questions would you ask her?

Q2) Attempt any four of the following : **[16]**

a) Explain the role of censorship in media.

b) Write a short note on Aristotle's model of communication.

c) Explain the importance of language in communication.

d) Write a short note on the impact of films on the audience.

e) Illustrate the three stages in interpersonal communication.

Q3) Attempt any four of the following : **[16]**

a) Explain with suitable examples the definition of 'communication'.

b) Explain the meaning of 'inverted pyramid' in the context of news writing.

c) Differentiate between one-to-one and many-to-one communication.

d) Explain what are fiction and non-fiction serials in television with examples.

e) Write a short note on the growth of radio in recent times.

P.T.O.

Q4) Attempt any two of the following : **[16]**

a) Draw the block diagram of the Shannon and Weaver model. Explain the function of each of blocks.

b) Write a news report of about 100 words on a series of blast occurred on JM Road, Pune.

c) What are the merits and demerits of television as a medium of mass communication?

Q5) Attempt any two of the following : **[16]**

a) With examples state the impact of communication on audience.

b) Write short notes on :

i) News

ii) Reality shows on television

c) How would you make a layout of the following news items -

i) Rains in Pune delayed,

ii) CM to visit drought-hit areas,

iii) Accident on e-way kills 5,

iv) Sitar maestro critically ill,

v) Clerk caught in the anti-corruption net,

vi) City Mayor to visit France.

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Total No. of Questions : 4]

SEAT No. :

P323

[Total No. of Pages : 2

[4217] - 138

S.Y. B.Sc. (Vocational) (Semester - I)

PHOTOGRAPHY AND AUDIO-VISUAL PRODUCTION

Still Photography, Processing And Printing

(Paper - I) (2008 Pattern)

Time : 2 Hours] *[Max. Marks : 40*

Instructions to the candidates :

1) ***All questions are compulsory.***
2) ***Draw neat and labeled diagrams wherever necessary.***
3) ***Figures to the right indicate full marks.***

Q1) Answer the following in short : **[16]**

a) What is depth of field? How is it related to the size of the aperture of a camera lens?

b) Compare the center weighted and the matrix metering pattern of a DSLR camera.

c) Explain the concept of complementary colours. Mention suitable examples.

d) Mention two points of comparison between of artificial light and natural light sources.

e) What is life size magnification? How is it useful in photography?

f) What is a 'fast' lens? State is advantages.

g) What is a 'diopter' of a lens?

h) Mention one use each of fast and slow shutter speed.

Q2) Attempt <u>any Two</u> of the following : **[8]**

a) Explain the concept of circle of confusion and the circle of least confusion. How does the circle of least confusion affect the depth of field and the depth of focus?

b) Discuss the use of polarizing filter in photography.

c) Discuss the effect of over and under exposure on a photographic image.

P.T.O.

Q3) Attempt <u>any two</u> of the following : **[8]**

a) Give suitable examples and compare the hard and the soft light sources.

b) Discuss in details why white balance is a very important control in a DSLR camera.

c) A wide angle lens is generally a slow lens. Explain.

Q4) Attempt <u>any one</u> of the following : **[8]**

a) Discuss the points of comparison between a telephoto lens and a wide angle lens.

b) Draw a diagram and show the construction of an electronic flash. Explain the function of each component.

Total No. of Questions : 4]

SEAT No. : ____

P324

[Total No. of Pages : 2

[4217] - 145

S.Y. B.Sc. (Vocational) (Semester - I)

PHOTOGRAPHY AND AUDIO-VISUAL PRODUCTION

Principles of Acoustics and Sound for Media

(Paper - II) (2008 Pattern)

Time : 2 Hours] ***[Max. Marks : 40***

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Draw neat and labeled diagrams wherever necessary.***
3) ***Figures to the right indicate full marks.***

Q1) Answer the following in brief : **[10]**

a) Give the Sabine's and Eyring's formula.

b) Give the principle of working of magnetic sound recording system.

c) Define : Decibel and Reverberation time.

d) Draw a neat labelled diagram of a moving coil loudspeaker.

e) Give any two characteristics each of loudspeaker and microphone.

f) Give any four requirements of an auditorium.

g) Show that doubling the pressure gives an increase of 3dB of sound.

h) Explain the Hi-Fi system.

i) Calculate the SPL for sound waves having effective pressure of 1.5 N/m^2 and the reference pressure $10^{(-2)} N/m^2$.

j) Explain the term: Anechoic chamber.

Q2) Answer <u>any two</u> of the following : **[10]**

a) Draw the cross-over network and explain its objective with the help of the characteristic curves.

b) Draw a neat labelled block diagram to explain the construction and the working of a magnetic sound reproduction system.

c) Explain : i) Synthetic reverberation ii) An anechoic chamber.

P.T.O.

Q3) Answer any two of the following : **[10]**

a) Explain with the help of a neat block diagram the construction and working of a ribbon microphone.

b) Calculate the reverberation time of an auditorium of 1000 cubic meter, having total absorption to 230 sabine unit.

c) Explain with the help of a neat block diagram the construction and the working of a direct radiator loudspeaker.

Q4) Answer any two of the following : **[10]**

a) Explain with the help of a neat block diagram the working PA system.

b) Find the reverberation of an office which has a volume of 1600 m^3 and total absorption of 80 metric sabine. What is the sound absorption required for an optimum reverberation time of 1.2 sec.

c) Draw a neat labelled block diagram to explain the construction and the working of a disc recording system.

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Total No. of Questions : 4]

SEAT No. : ____

P325

[Total No. of Pages : 2

[4217] - 239

S.Y. B.Sc. (Vocational) (Semester - II)

PHOTOGRAPHY AND AUDIO-VISUAL PRODUCTION

Colour Photography

(Paper - I) (2008 Pattern)

Time : 2 Hours] ***[Max. Marks : 40***

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Draw neat and labeled diagrams wherever necessary.***
3) ***Figures to the right indicate full marks.***

Q1) Answer in short : **[16]**

a) Draw a black body radiation curve. Mention what information it provides.

b) Why is it necessary to set appropriate white balance?

c) Colour temperature of overcast sky is 8000 Kelvin. Convert it to mired.

d) What is the effect of sky light on a photographic image?

e) Give examples and explain the difference between primary and secondary colours.

f) Colour temperature of daylight is 5500 K. What does it mean?

g) Why do you need filters in photography?

h) Draw a diagram and explain the difference between reflection from a glossy and a matte surface.

Q2) Attempt any two of the following : **[8]**

a) Explain how polarizing filter is useful in photography.

b) Discuss the reasons for using filters in a colour enlarger.

c) Discuss the importance of ‘histogram’ in digital photography.

P.T.O.

Q3) Write short notes on <u>any two</u> of the following : **[8]**

a) Primary and secondary colours.

b) Colour vision.

c) Hard and soft light sources.

Q4) Attempt <u>any one</u> of the following : **[8]**

a) You are asked to shoot a portrait. Draw a sketch and show the lighting plan you will use. Clearly mention the type and the purpose of various lights you will be using.

b) Draw a suitable sketch and explain the concept of photographic composition. Which elements of composition do you think are important in your sketch? Why are they important?

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Total No. of Questions : 4]

SEAT No. : ____

P326

[Total No. of Pages : 2

[4217] - 246

S.Y. B.Sc. (Vocational) (Semester - II)

PHOTOGRAPHY AND AUDIO-VISUAL PRODUCTION

Principles & Applications of Analog and Digital Communications

(Paper - II) (2008 Pattern)

Time : 2 Hours] ***[Max. Marks : 40***

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Draw neat and labeled diagrams wherever necessary.***
3) ***Figures to the right indicate full marks.***

Q1) Attempt the following questions :

a) State whether the following statements are TRUE or FALSE **[2]**

i) Timing error is reduced due to synchronization.

ii) Serial transmission is faster transmission.

b) Comment on the following statements **[4]**

i) SSB generation is preferred over DSB.

ii) FSK is normally used in MODEM.

c) Attempt the following **[6]**

i) For a binary PCM system, the number of bits per transmitted word is 8 and the sampling frequency fs = 8khz. Calculate the

1) bit rate and 2) baud rate

ii) Six message signals each of BW 5 kHz are Time Division Multiplexed and transmitted. Calculate

1) signaling rate

2) minimum channel BW of the PAM/TDM Channel.

P.T.O.

Q2) Explain any two of the following : **[8]**

a) Explain TDM system with the help of diagram.

b) What is the need of Modulation? Describe its advantages?

c) Calculate the maximum bit rate for a channel having Band Width 300 Hz and S/N ration is 40db.

Q3) Explain any two of the following : **[8]**

a) Explain the Shanon's theorem on the Channel Capacity. What is the importance of Channel Bandwidth?

b) Compare the FM and AM Systems.

c) What is PAM? Explain the Generation of PAM with diagram.

Q4) Solve any two of the following numericals : **[12]**

a) A calculate the carrier swing, frequency deviation and modulation Index of FM signal which reaches a maximum frequency of 99.05 MHz and minimum frequency of 99.03 MHz. The frequency of modulating signal is 6 kHz.

b) The rms antenna current from an AM transmitter measures by 15% over its unmodulated value when sinusoidal modulation is applied, Determines the m.

c) A FM wave is represented by the following equation,
$V = 10\sin [5 \times 10^8 t + 41250t]$
Find : i) Carrier and modulating frequencies.
ii) Modulation index and maximum deviation.
iii) The power dissipated by this FM wave in 5 ohm resistor.

OR

Attempt any two of the following

a) Explain natural PAM sampling and flat topped sampling

b) Explain Bell 103 and Bell 212 modems.

c) Explain the working of super heterodyne AM receiver with a neat block diagram.

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Total No. of Questions : 4]

SEAT No. :

P330

[Total No. of Pages : 2

[4217]-136

S.Y. B.Sc. (Vocational) (Semester - I)

INDUSTRIAL CHEMISTRY - I

VOC-211: Utilities, Unit Operations & Process Instrumentation

(2008 Pattern) (Paper - I)

Time :2 Hours] *[Max. Marks :40*

Instructions to the candidates :

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Draw neat diagrams wherever necessary.***

Q1) Answer the following : **[16]**

a) Define permanent hardness of water.

b) List the basic requirement for separation of components by distillation.

c) Convert 15000 kg m^{-3} into CGS units.

d) Convert 137ºC into ºF temperature.

e) Explain what is fundamental interval in temperature scale

f) Give four industrial uses of steam.

g) Sketch schematically the relationship among absolute, gauge, barometric and vacuum pressure.

h) What are the requirements for the classification of centrifuges?

Q2) Attempt any two of the following : **[8]**

a) Sketch & explain the principle and working of a thermionic ionization gauge.

b) Explain with a diagram the principle and working of a ultrasonic flow meter.

c) Discuss how evaporation is useful in industrial processes.

P.T.O.

Q3) Attempt any two of the following : **[8]**

a) Distinguish between filter media and filter aids.

b) Explain the use of thermocouples in temperature measurement.

Q4) Sketch & explain the various types of vacuum pressure devices. **[8]**

OR

Discuss the principle of fractional distillation with a diagram.

Total No. of Questions : 4]

SEAT No. :

P331

[Total No. of Pages : 2

[4217]-140

S.Y. B.Sc. (Vocational) (Semester - I)

COMPUTER HARDWARE & NETWORK ADMINISTRATION

(2008 Pattern) (Paper - I)

Time :2 Hours] *[Max. Marks :40*

Instructions to the candidates :

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***

Q1) a) Attempt the following : **[4 × 1 = 4]**

i) Give any one source of an EMI?

ii) List one use of a Serial Port in a PC?

iii) ROM is a Secondary Storage Memory. State True or False.

iv) Give one example of Access Control.

b) Attempt the following : **[4 × 2 = 8]**

i) What is a BCP?

ii) List any two HDD Utility Softwares.

iii) What are repair generated failures?

iv) Give any two environmental factors that contribute to display problem in a PC.

Q2) Attempt any Two of the following : **[2 × 4 = 8]**

a) What Safety Precautions Should one take during PC Trouble Shooting?

b) What are different types of Secondary storage devices?

c) Explain the importance of Backup Procedures.

P.T.O.

Q3) Attempt any Two of the following : **[2 × 4 = 8]**

a) What are different types of RUN Problems?

b) Explain Need of Preventive Maintenance Schedules.

c) What are the different causes for Printer Failure?

Q4) Attempt any Two of the following : **[2 × 6 = 12]**

a) How will you Trouble Shoot Problems with: 1 Display 2. Virus?

b) Why Disaster Recovery Plan is necessary?

c) How will you do a Preventive Maintenance of : 1. HDD 2. SMPS 3. Keyboard.

Total No. of Questions : 4]

SEAT No. :

P345

[Total No. of Pages : 3

[4217] - 222
S.Y. B.Sc. (Semester - II)
STATISTICAL TECHNIQUES
STT - 221 : Statistical Techniques - III
(Paper - I) (2008 Pattern)

Time : 2 Hours] *[Max. Marks : 40*

Instructions to the candidates :

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Use of calculator and statistical tables is allowed.***
4) ***Symbols and abbreviations have their usual meanings.***

Q1) Attempt each of the following :

a) Choose the correct alternative in each of the following : **[1 each]**

i) Standard Error (S.E.) of a statistic T is given by

(A) $E\sqrt{(T-E(T))^2}$ (B) $\sqrt{E[T-E(T)]^2}$

(C) $E(T^2) - E(T)$ (D) $E\sqrt{T^2-T}$

ii) If X follows Chi-square distribution with variance 6 then mean of the distribution is

(A) 4 (B) 12

(C) 2 (D) 3

iii) If a random variable X follows F-distribution with (6, n) d.f. with mean 2 then the value of n is

(A) 2 (B) 3

(C) 6 (D) 4

b) State whether the given statement is true or false in each of the following : **[1 each]**

i) Critical region is a region of rejection for H_0.

ii) In one way classification with N observations and K treatments, the d.f. for error is N-K.

iii) Hypothesis is a statement of possible errors about H_0.

c) Define the term : null hypothesis. **[1]**

d) Define the term : level of significance. **[1]**

P.T.O.

e) Define sampling distribution of a statistic. **[1]**

f) State the relationship between t and F distribution. **[1]**

Q2) Attempt <u>any two</u> of the following : **[5 each]**

a) Describe the test procedure for testing the independence of two attributes.

b) Describe large sample test for testing $H_0 : \mu = \mu_0$ against the alternative

i) $H_1 : \mu > \mu_0$ ii) $H_1 : \mu < \mu_0$ iii) $H_1 : \mu \neq \mu_0$

when a random sample of size n is drawn from the normal population with mean μ and known variance σ^2.

c) If T follows student's t - distribution with 15 d.f. find

i) C such that $P(-C \leq T \leq C) = 0.8$

ii) K such that $P(T^2 \geq K) = 0.05$

iii) a such that $P(T \leq a) = 0.1$

Q3) Attempt <u>any two</u> of the following : **[5 each]**

a) Describe the procedure of paired t test.

b) Explain the test procedure for testing $H_0 : \sigma_1^2 = \sigma_2^2$ against $H_1 : \sigma_1^2 \neq \sigma_2^2$.

c) A certain factory runs in two shifts. A sample of 1000 items selected from production of day shift, gave 52 defective articles. However a sample of 700 items selected from production of night shift gave 45 defective articles. Can we conclude that proportion of defective articles in the day shift is less than that of night shift?

Q4) Attempt <u>any one</u> of the following : **[5]**

a) i) Define Chi-square with n d.f. State its mean and variance. Also state additive property of Chi-square distribution.

ii) Fill in the blanks of the following ANOVA table marked "-" : **[5]**

Source of variation	Degrees of freedom	Sum of squares	Mean sum of squares	Variance Ratio
Between Machines	5	–	212.25	–
Between workers	3	–	56	–
Error	–	–	10	
Total	–	–		

b) i) The information about the samples drawn from two independent normal populations are given below :

$n_1 = 18$, $\Sigma X = 322$, $\Sigma X^2 = 6512$

$n_2 = 16$, $\Sigma Y = 256$, $\Sigma Y^2 = 4346$

Test whether the population variances are equal at 2% level of significance. **[7]**

ii) State the mathematical model used in analysis of variance in a two-way classification. Also state the hypothesis to be used. **[3]**

Total No. of Questions : 4]

SEAT No. :

P346

[Total No. of Pages : 3

[4217]-223
S.Y. B.Sc. (Semester - II)
STATISTICAL TECHNIQUES
STT-222: Statistical Techniques - IV
(2008 Pattern) (Paper - II)

Time :2 Hours] *[Max. Marks :40*

Instructions to the candidates :

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Use of calculator and statistical tables is allowed.***
4) ***Symbols and abbreviations have their usual meanings.***

Q1) Attempt each of the following :

a) Choose the correct alternative in each of the following : **[1 each]**

i) Process spread in a production process can be studied by using

A) $\overline{X}$ chart B) C chart
C) P chart D) R chart

ii) In SQC, one always draws

A) $\overline{X}$ chart first and then R chart

B) R chart first and then $\overline{X}$ chart

C) both $\overline{X}$ chart and R chart simultaneously

D) any one of the $\overline{X}$ chart and R chart.

iii) The path set of the three component series system is

A) {1, 2, 3} B) {2, 3}
C) {1, 3} D) {1, 2}

b) State whether the given statement is true or false in each of the following: **[1 each]**

i) Reliability of series system is always less than or equal to reliability of its components.

ii) Spread of the process is 6σ.

iii) A run of seven consecutive sample points cannot be treated as a signal for a process out of control.

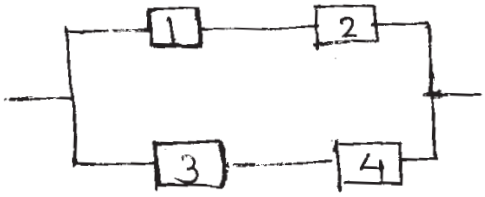
P.T.O.

c) State any two uses of Statistical Quality Control (SQC). **[1]**

d) Give interpretation of 'low spots' on p-chart. **[1]**

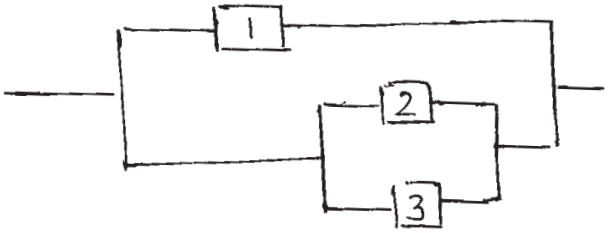
e) Compute LCL if CL and UCL on $\overline{X}$ - chart, are '*a*' and '*b*', when standards are not given. **[1]**

f) Obtain structure function of the system with following reliability block diagram. **[1]**



Q2) Attempt any <u>two</u> of the following : **[5 each]**

a) Find the reliability of the system with following reliability block diagram if components 1, 2, 3 are independent and have reliabilities 0.9, 0.8, 0.7 respectively.



b) Following information is available for a certain manufacturing process :

Number of subgroups = 25

Size of subgroup = 5

$\Sigma\overline{X} = 8000,\ \Sigma R = 200$

Obtain control limits of R-chart and $\overline{X}$ - chart.

c) i) Distinguish between a defect and defective.

ii) Discuss the criteria for detecting that the process is governed by assignable causes.

Q3) Attempt any <u>two</u> of the following : **[5 each]**

a) Distinguish between chance causes and assignable causes of variation.

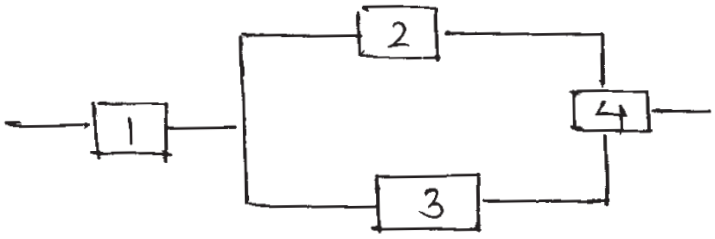
b) Explain the construction and interpretation of R-chart when standards μ and σ are unknown. Explain the method of revision of such R-chart if a point falls above UCL.

c) Redraw the reliability block diagram shown below as :

i) parallel arrangement of series subsystems.

ii) series system of parallel subsystems.

Also write structure function based on these representations.



Q4) Attempt any <u>one</u> of the following :

a) i) Explain in detail the construction of P-chart. **[7]**

ii) Draw the reliability block diagram for the system with structure function.

$$\phi(\underline{X}) = X_1X_2[1-(1-X_3)(1-X_4)]$$ **[3]**

b) i) A factory produces seat belts to be used in cars. The following table gives the results of daily inspection for five consecutive days:

Day	:	1	2	3	4	5
No. of belts inspected	:	361	400	420	500	350
No. of defective belts	:	20	24	30	45	25

Construct P-chart using stabilized control limits. Comment on state of process control. **[7]**

ii) Ten pieces of cloth selected at random, contained the following number of defects.

3, 4, 4, 9, 0, 6, 0, 5, 3, 1

Obtain control limits for C-chart. **[3]**

Total No. of Questions : 5]

SEAT No. :

P53

[Total No. of Pages : 3

[4217]-2
F.Y. B.Sc.
MATHEMATICS
Calculus
(2008 Pattern) (Paper - II) (Theory)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates :

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***

Q1) Attempt each of the following : **[16]**

a) Find the *l.u.b.* and *g.l.b.* for the set S = {–1, 0, 1, –1, 0, 1, –1, 0, 1, ---}.

b) Evaluate $\lim_{x\to 0} \frac{|x|}{x}$, if it exists.

c) Find the rational number between $\sqrt{2}$ and $\sqrt{3}$.

d) Find the least positive integer No such that $\left|\frac{2n}{n+3}-2\right|<\frac{1}{2}; \forall\, n \geq \text{No}$.

e) Evaluate $\lim_{x\to 0} x^x$.

f) Discuss the continuity of the function $f(x)$ at $x = 3$, where

$$f(x) = \frac{|x-3|}{x-3}, \text{ if } x \neq 3$$
$$= 0, \quad \text{if } x = 3$$

g) Test for convergence the series $\sum_{n=1}^{\infty} \frac{2n}{3n+5}$.

h) State Taylor's theorem with lagrange's form of remainder.

Q2) Attempt <u>any four</u> of the following : **[16]**

a) Prove that limit of a sequence, if it exists, is unique.

b) Find all $x \in$ R that satisfy $|x - 1| > |x + 1|$.

P.T.O.

c) Show that the sequence $\{x_n\}_{n=1}^{\infty}$ is convergent. Where

$x_n = \frac{1}{n+1}+\frac{1}{n+2}+------+\frac{1}{n+n}$.

d) For any $x, y \in$ R, prove that $|x + y| \leq |x| + |y|$.

e) Show that the series $1 + \frac{1}{2!}+\frac{1}{4!}+\frac{1}{6!}+-----$ is convergent.

f) Using $\in$-δ definition of limit show that $\lim_{x\to 2}(x + 2) = 4$.

Q3) Attempt <u>any two</u> of the following : **[16]**

a) i) Examine for convergence the series $\sum_{n=1}^{\infty}\frac{\sqrt[3]{n}}{(n+1)\sqrt{n}}$.

ii) Using definition show that the sequence $\left\{\frac{1}{n}\right\}_{n=1}^{\infty}$ is a Cauchy sequence.

b) Show that the sequence $\{x_n\}_{n=1}^{\infty}$ defined by $x_1 = 1$ and $x_{n+1} = \sqrt{2+x_n}, \forall\, n \geq 1$ is convergent. Also find its limit.

c) i) Show that for $a, b \in$ R with $a \neq$ b, $\sqrt{ab} < \frac{1}{2}(a+b)$.

ii) Show that $\sum_{n=1}^{\infty}\frac{1}{n^p}$ is convergent for p > 1.

d) i) If $x_1 > 0, x_{n+1} = \frac{1}{5+x_n}$, for n $\geq$ 1 then show that $\{x_n\}_{n=1}^{\infty}$ is contractive sequence.

ii) Find $\lim_{x\to 0}\frac{xe^{1/x}}{1+e^{1/x}}$, if exists.

Q4) Attempt <u>any four</u> of the following : **[16]**

a) State and prove Lagrange's mean value theorem.

b) Verify Rolle's theorem for the function $f(x) = 2x^3 + x^2 - 4x - 2$ on $\left[-\sqrt{2}, \sqrt{2}\right]$.

c) Evaluate $\lim_{x\to 0}\left(\frac{1}{x}-\frac{1}{e^x-1}\right)$.

d) Using Maclaurin's theorem, show that

$\forall\ x \in [-1, 1)\ \log(1-x) = -x - \frac{x^2}{2} - \frac{x^3}{3} - \frac{x^4}{4} - \frac{x^5}{5}$ --------.

e) Discuss the continuity of the function $f(x)$, where

$f(x) = \sqrt{\frac{x+1}{x-4}}\ \forall\ x \in R\ ; x \neq 4.$

f) Obtain Taylor series expansion of $f(x) = \sin x$ about $x = \frac{\pi}{2}$.

Q5) Attempt <u>any two</u> of the following : **[16]**

a) i) If $y = e^{ax} \cos(bx + c)$ then show that $y_n = r^n e^{ax} \cos(bx + c + n\theta)$ where $\theta = \tan^{-1} b/a$, $r = \sqrt{a^2+b^2}$.

ii) Find the n^{th} derivative of the function, if $y = \frac{1}{x^2-5x+6}$.

b) i) Evaluate $\lim_{x\to 0} \frac{\log \sin x}{\cot x}$.

ii) If $a < b < 1$ then prove that $\frac{b-a}{\sqrt{1-a^2}} < \sin^{-1} b - \sin^{-1} a < \frac{b-a}{\sqrt{1-b^2}}$.

c) i) If $y = a \cos(\log x) + b \sin(\log x)$, show that $x^2 y_{n+2} + (2n + 1)\, x y_{n+1} + (n^2 + 1)\, y_n = 0$.

ii) Find y_n, if $y = \sin^2 x$.

d) i) Prove that every continuous function defined on closed and bounded interval is bounded.

ii) Show that $f(x) = x \sin \frac{1}{x}$, if $x \neq 0$

$= 0$, if $x = 0$

is continuous at $x = 0$.

Total No. of Questions : 5]

SEAT No. :

P54

[Total No. of Pages : 3

[4217] - 3
F.Y. B.Sc.
PHYSICS - I
Mechanics, Heat and Thermodynamics
(2008 Pattern) (Paper - I)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates :

1) ***All questions are compulsory.***
2) ***Figures to the right indicates full marks.***
3) ***Use of log table and calculator is allowed.***
4) ***Neat diagram must be drawn wherever necessary.***

Q1) Attempt all of the following :

a) What is difference between mass and weight? **[2]**

b) A body of mass 4kg at rest is subjected to a force of 16N. What is the acceleration of the body? **[2]**

c) Give any two applications of surface tension. **[2]**

d) State Archimede's principle. **[2]**

e) Give any two statements of second law of thermodynamics. **[2]**

f) Calculate the coefficient of performance of carnot's refrigerator working between the temperatures 127ºC and 27ºC. **[2]**

g) State the principle of gas filled thermometers. **[2]**

h) What are isobaric and isochoric changes? **[2]**

Q2) Attempt <u>any four</u> of the following :

a) Describe capillary tube experiment to determine surface tension of a liquid. **[4]**

b) What is average acceleration? Interpreat average acceleration using velocity-time graph in one dimensional motion. **[4]**

c) State Newton's second law of motion. Using the law, establish relation between the force and acceleration. **[4]**

d) What force is required to accelerate 2000kg car from 10m/s to 40m/s in time of 10 sec? **[4]**

e) Calculate the work done in blowing a soap bubble of 1.3cm radius, if the surface tension of soap solution is 0.030N/m. **[4]**

f) A metal cube of side 6cm and relative density 8kg/m^3 is suspended by a string so as to be completely immersed in a liquid of density 1.2×10^3 kg/m^3. Find the tension in the string. **[4]**

P.T.O.

Q3) Attempt <u>any four</u> of the following :

a) Prove that slope of adiabatic curve through a point in P-V diagram is γ times the slope of the isothermal curve through the same point. **[4]**

b) What is the principle of refrigeration? Give the schematic representation of refrigerator. **[4]**

c) What is Boyle's temp? Obtain the relation between Boyle's temperature and critical temperature. **[4]**

d) Find the temperature of Fahrenheit scale corresponding to 30ºC and – 40ºC. **[4]**

e) The expansion ratio and compression ratio are 6 and 12 respectively. If the value of γ is 1.4 for the working substance in a Diesel engine. Find it's efficiency. **[4]**

f) Calculate the change in entropy when 8gm of ice at 0ºC is converted into water at the same temperature. (Latent heat of ice = 80 cal/gm). **[4]**

Q4) Attempt <u>any two</u> of the following :

a) State the principle of Bernoulli's theorem. Derive the equation $\frac{p}{\rho g}+\frac{v^2}{2g}+h = \text{constant}$ for steady, incompressible, non-viscous and stream line flow of liquid. **[8]**

b) i) A position of particle along the x-axis with time is given by $x(t) = 7 + 5t + 8t^2$ where x in meter.

1) Find the average velocity between $t = 0$ and $t = 1$ sec.

2) Find the value of acceleration at $t = 0.5$ and $t = 1$ sec. **[4]**

ii) State the principle of conservation of energy and show that the total mechanical energy remain constant. **[4]**

c) i) A bullet of mass 30gm was moving with a speed 300m/s. After passing a solid substance, it is continued to move at the rate of 100m/s. How much work the bullet had to do in passing through a solid substance? **[4]**

ii) What is meant by free fall? Write down kinematical equations for freely falling bodies. **[4]**

Q5) Attempt <u>any two</u> of the following :

a) Describe the Carnot's engine obtain an expression for its efficiency. **[8]**

b) i) The temperature of 5gm of air is raised from 0ºC to 1ºC at constant volume. Calculate the increase in it's internal energy. Specific heat of air at constant volume is 0.172 cal g^{-1} $ºC^{-1}$ and J = 4.18 J/cal. **[4]**

ii) Explain the four thermodynamic potentials - U, H, F and G. **[4]**

c) i) Calculate the van-der-waal's constant 'a' and 'b' for dry air, given that T_c = 132ºK, P_c = 37.2 atmp. and R = 82.07cm^3 atmp/ºK. **[4]**

ii) Explain construction and working of liquid filled thermometer. **[4]**

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Total No. of Questions : 5]

SEAT No. :

P55

[Total No. of Pages : 2

[4217] - 4
F.Y. B.Sc.
PHYSICS - II
Emerging Physics and Electricity and Magnetism
(2008 Pattern) (Paper - II)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates :

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Use of log tables and calculator is allowed.***
4) ***Draw neat diagrams and sketches wherever necessary.***

Q1) Attempt all of the following :

a) What is population inversion in LASER? **[2]**

b) Which parameter decides the quality of transducer? **[2]**

c) Define bioelectricity **[2]**

d) Calculate band gap of 5 silicon atoms. If energy gap of silicon atom is 1.1 eV. **[2]**

e) State coulomb's law in electrostatics. **[2]**

f) Define the term electric dipole moment. **[2]**

g) State Biot-Savart law. **[2]**

h) A charged capacitor of capacitance 40μF is discharged through 60Ω resistor . Determine the time constant of the circuit. **[2]**

Q2) Attempt any four of the following :

a) Give contribution of C.V.Raman in physics. **[4]**

b) Explain the characteristics of LASER beam. **[4]**

c) Explain the construction and working of pyrometer. **[4]**

d) Find cardiac output of a patient whose heart rate is 60 beats/min, if the stroke volume is 50ml/beat. **[4]**

e) If a nano particle with drift velocity 2×10^3m/s experiences a scattering after 3 picosecond. What will be mean free path of that particle. **[4]**

f) A resistance of platinum wire is 6Ω at 0ºC and 7.2Ω at 100ºC. Calculate temperature coefficient of resistance α. **[4]**

P.T.O.

Q3) Attempt <u>any four</u> of the following :

a) Using Gauss's Theorem, obtain an expression for electric intensity at point out side the charged non-conducting sphere. **[4]**

b) Explain the effect of dielectric on capacitance of parallel plate capacitor. **[4]**

c) What is transient current? Discuss the growth of current in L-R circuit. **[4]**

d) The maximum value of permeability of some metal is 0.126 T-m/A. Find maximum relative permeability and succeptibility. **[4]**

e) An aluminium wire of diameter 0.4cm carries a current of 25A. Find the magnetic field at the surface of the wire. **[4]**

f) An electric dipole consisting of two opposite charges each of magnitude 1μC separated by a distance of 2.0cm. The dipole is placed in an uniform electric field of intensity 2×10^5N/C. Calculate the maximum torque on the dipole. **[4]**

Q4) Attempt <u>any two</u> of the following :

a) Explain Bottom-up approach for synthesis of nano particles. What are its advantages? **[8]**

b) i) What is neuron? State its function. **[4]**

ii) Determine the energy difference between the upper and lower levels for He-Ne laser which is capable of lasing 1.15μm wavelength. **[4]**

c) i) Give the contribution of Newton in physics. **[4]**

ii) The intracellular K^+ concentration of a group of cells averages 160×10^{-6} moles/cm^3. The extra cellular concentration of K^+ averages 6.5×10^{-6} moles/cm^3. Calculate Nernst potential. **[4]**

Q5) Attempt <u>any two</u> of the following :

a) State and prove Gauss's law in dielectrics. **[8]**

b) i) State the principle of superposition in electrostatics and obtain an expression for force on any one charge due to all other charges. **[4]**

ii) An ideal solenoid of a aluminium core has developed 0.23A/m magnetization and magnetic intensity 10,000A/m. Calculate magnetic field at centre. **[4]**

c) i) Explain the term magnetic field lines. Draw field lines produced by permanent magnet. **[4]**

ii) What resistance must be connected in series with an inductor of 6mH, so that the circuit has a time constant of 2×10^{-3} sec? **[4]**

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Total No. of Questions : 4] **SEAT No. :**

P90 **[Total No. of Pages : 2**

[4217]-101
S.Y. B.Sc. (Semester - I)
MATHEMATICS
MT-211: Calculus of Several Variables
(2008 Pattern) (Paper - I)

Time :2 Hours] ***[Max. Marks :40***

Instructions to the candidates :

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***

Q1) Answer the following questions (Any Five) : **[10]**

a) Using the definition show that $\lim_{(x,y)\to(0,0)} (x+y) = 0.$

b) If $u = (x^2 + y^2 + z^2)^{1/2}$, show that $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} + \frac{\partial^2 u}{\partial z^2} = \frac{2}{u}.$

c) If $f(x,y) = \tan^{-1}\left(\frac{y}{x}\right), x \neq 0,$ verify that $f_{xy}(x,y) = f_{yx}(x,y).$

d) Find the critical point of the function $f(x,y) = xy + \frac{a^3}{x} + \frac{a^3}{y}, x \neq 0, y \neq 0.$

e) Using differentials find approximate value of $(2.01^2 + 4.99)$.

f) Find Jacobian $\frac{\partial(u,v)}{\partial(x,y)}$, where $u = x - y, v = x + y.$

g) Evaluate $\iint xydydx$ over the rectangle bounded by $x = 2, x = 5, y = 1, y = 2.$

Q2) Answer any <u>two</u> of the following : **[10]**

a) Let $f(x, y)$ be continuous at (a, b). Then prove that $f(x, b)$ is continuous at $x = a$ and $f(a, y)$ is continuous at $y = b$, where $f(x, b)$ and $f(a, y)$ are functions of one variable each.

P.T.O.

b) Discuss the continuity of $f(x, y)$ at (0, 0), where

$$f(x,y) = \frac{x^3 + y^3}{x - y}, \text{ when } x \neq y$$
$$= 0 \quad , \text{when } x = y.$$

c) If $V = x \sin\left(\frac{y}{x}\right)$, prove that $x^2 \frac{\partial^2 v}{\partial x^2} + 2xy \frac{\partial^2 v}{\partial x \partial y} + y^2 \frac{\partial^2 v}{\partial y^2} = 0.$

Q3) Answer any <u>two</u> of the following : **[10]**

a) If $u = f(x, y)$ is a differentiable function of x and y and $x = \phi(t)$ and $y = \psi(t)$ are differentiable functions of t, then prove that the composite function $u = f(\phi(t), \psi(t))$ is a differentiable function of t and its total derivative is given by $\frac{du}{dt} = \frac{\partial u}{\partial x}\frac{dx}{dt} + \frac{\partial u}{\partial y}\frac{dy}{dt}$.

b) Find the maximum value of xyz subject to the condition $x + y + z = 1$.

c) Evaluate $\iint xy(x + y)\, dxdy$ over the area between $y = x^2$ and $y = x$.

Q4) Answer any <u>one</u> of the following : **[10]**

a) i) Change the order of integration of $\int_0^{2a} \int_{y^2/4a}^{3a-y} f(x, y)\, dxdy.$

ii) Evaluate $\int_1^3 \int_{1/x}^{1} \int_0^{\sqrt{xy}} xy\, dz dy dx.$

b) Show that the function $f(x, y)$, where

$$f(x,y) = \frac{xy}{\sqrt{x^2 + y^2}} \text{ if } x^2 + y^2 \neq 0,$$
$$f(0,0) = 0$$

is continuous, possesses both first order partial derivatives but is not differentiable at (0, 0).

Total No. of Questions : 4]

SEAT No. : ____

P91

[Total No. of Pages : 2

[4217]-102
S.Y. B.Sc. (Semester - I)
MATHEMATICS - II
MT-212 (A) and MT-212 (B)
MT-212 (A): Differential Equations
(2008 Pattern) (Paper - II (A))

Time :2 Hours] ***[Max. Marks :40***

Instructions to the candidates :

1) ***Candidates are advised to see the relevant question paper and solve the same.***
2) ***All questions are compulsory.***
3) ***Figures to the right indicate full marks.***
4) ***D stands for the differential operator.***

Q1) Attempt any five of the following : **[10]**

a) State the order and degree of the differential equation

$$\sqrt{\frac{d^3y}{dx^3}-\left(\frac{d^2y}{dx^2}\right)^3}=4\left(\frac{dy}{dx}\right)^{-3}.$$

b) Find integrating factor of the equation

$$(xy^3+y)dx+2(x^2y^2+x+y^4)dy=0.$$

c) Solve the differential equation.

$$\frac{dy}{dx}=e^{x+y}+x^2e^y.$$

d) Verify that $y = x$ is a solution of the equation

$$(1+x^2)\frac{d^2y}{dx^2}-2x\frac{dy}{dx}+2y=0.$$

e) Find the orthogonal trajectories of the family of curves $xy = c$.

f) Define exact differential equation.

g) Find particular integral of $(D^2 + 4)y = \cos 2x$.

P.T.O.

Q2) Attempt <u>any two</u> of the following : **[10]**

a) Explain the method of solving the linear differential equation

$$\frac{dx}{dy} + \mathrm{P}(y)x = \mathrm{Q}(y).$$

b) Solve $(3xy^2 - x^2)dx + (3x^2y - 6y^2 - 1)dy = 0.$

c) A body cools from 400ºC to 325ºC in the room temperature of 25º in 20 minutes. Find its temperature after one hour.

Q3) Attempt <u>any two</u> of the following : **[10]**

a) Prove that if $f(\mathrm{D})y = x\mathrm{V}$ then

$$\frac{1}{f(\mathrm{D})}(x\mathrm{V}) = x\frac{1}{f(\mathrm{D})}\mathrm{V} - \frac{1}{[f(\mathrm{D})]^2} f'(\mathrm{D})\mathrm{V},$$

where V is a function of x.

b) Solve $(\mathrm{D}^3 - 2\mathrm{D}^2 + 4\mathrm{D} - 8)Y = 0.$

c) Solve $\mathrm{D}^2(\mathrm{D} - 2)^3 y = 48e^{2x}.$

Q4) Attempt <u>any one</u> of the following : **[10]**

a) i) Explain the method of reduction of order to solve a second order linear differential equation

$$\frac{d^2y}{dx^2} + \mathrm{P}(x)\frac{dy}{dx} + \mathrm{Q}(x)y = \mathrm{R}(x).$$

ii) Solve the equation $(\mathrm{D}^2 + 3\mathrm{D} + 2)y = 12x$ by using the method of undetermined coefficients.

b) i) Solve $\frac{dy}{dx} = \frac{x + 2y + 1}{2x + 4y + 3}.$

ii) Find the value of a and b if xy is an integrating factor of differential equation $xy^2(4ydx + axdy) + x^2y(bydx - 3xdy) = 0$. Hence solve it.

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Total No. of Questions : 4] **[Total No. of Pages : 2**

P91

[4217]-102
S.Y. B.Sc. (Semester - I)
MATHEMATICS - II
MT-212 (B): Numerical Analysis
(2008 Pattern) (Paper - II (B))

Time :2 Hours] ***[Max. Marks :40***

Instructions to the candidates :

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Use of non programmable calculator is allowed.***

Q1) Attempt any five of the following : **[10]**

a) Find the relative error of the number 12.27 if both its digits are correct.

b) Show that the equation $x^6 - 2x^2 + 3x - 4 = 0$ has at least two imaginary roots.

c) Show that $\Delta \equiv E - 1$.

d) Use Newton-Raphson method to find the value of $\sqrt{10}$ correct to two decimal places.

e) Is it possible to solve the system of equations $3x + 2y = 5$, $7x - 5y = 8$ by Gauss-Seidel iterative method? Justify.

f) State the normal equations for fitting a second degree polynomial.

g) Evaluate $\left(\frac{\Delta^2}{E}\right)x^3$.

h) State Simpson's $\frac{3}{8}^{th}$ rule for numerical integration.

i) Use Euler's method, find $y(0.01)$, given that $\frac{dy}{dx} = -y$, $y(0) = 1$ and $h = 0.01$.

j) State Lagrange's interpolation formula for unequal intervals.

P.T.O.

Q2) Attempt any two of the following : **[10]**

a) Solve the following system of equations

$10x + 2y + z = 9$

$x + 10y - z = -22$

$-2x + 3y + 10z = 22$

by Gauss-Seidel iteration method (take two iterations).

b) Determine least squares polynomial of second degree to fit the following data.

x	0	1	2	3
y	1	6	17	34

c) Find a real root of the equation $f(x) = x^3 - 2x - 5 = 0$ lies between 2 and 3 by Regula falsi method.

Q3) Attempt any two of the following : **[10]**

a) Derive Newton-Gregory formula for forward interpolation.

b) Find the number of students who obtained less than 45 marks, from the following data.

Marks	30-40	40-50	50-60	60-70	70-80
No. of students	31	42	51	35	31

c) Express the function $\frac{x^3 + x - 3}{x^3 - 2x^2 - 2x + 2}$ as sums of partial fractions using Lagrange's interpolation formula.

Q4) Attempt any one of the following : **[10]**

a) State general Quadrature formula and hence derive Simpson's $\frac{1}{3}rd$ rule for numerical integration.

b) Use the Runge-Kutta fourth-order formula to determine $y(0.2)$, $y(0.4)$, given that $\frac{dy}{dx} = 1 + y^2$, where $y = 0$ when $x = 0$.

Total No. of Questions : 4] **SEAT No. :**

P92 **[Total No. of Pages : 2**

[4217]-103
S.Y. B.Sc. (Semester - I)
PHYSICS
PH-211: Mathematical Methods in Physics
(2008 Pattern) (Paper - I)

Time :2 Hours] ***[Max. Marks :40***

Instructions to the candidates :

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Use of calculator and log table is allowed.***
4) ***Neat diagrams must be drawn wherever necessary.***

Q1) Attempt all of the following :

a) Determine real and imaginary parts of complex number $Z = \frac{3+2i}{2i}$. **[1]**

b) Determine value of 'n' if $ln(n) = 2.079 + \pi i$. **[1]**

c) Define the term linearity of differential equation. **[1]**

d) If PV = RT, determine $\left(\frac{\partial p}{\partial v}\right)_T$. **[1]**

e) Obtain the unit vector of $\overline{A} = 2\hat{i} - \hat{j} + 2\hat{k}$. **[1]**

f) Simplify the equation $Z = 2i - i^3 + 3i^4 + i$. **[1]**

g) Define Surface integral of vector field. **[1]**

h) What is Lamellar vector field? **[1]**

i) State Gauss divergence theorem. **[1]**

j) Find $|\overline{A} - \overline{B}|$ if $\overline{A} = 3\hat{i} - \hat{j} + 2\hat{k}$ and $\overline{B} = 4\hat{i} + 2\hat{j} + 4\hat{k}$. **[1]**

Q2) Attempt any two of the following :

a) Show that the point $x = 0$ is non essential singularity of the differential equation $2x^2y'' + xy' + (x - 5)y = 0$. **[5]**

P.T.O.

b) The acceleration due to gravity can be found from the length 'l' and period 'T' of pendulum using formula $g = \frac{4\pi^2 l}{T^2}$. Find the percentage error in 'g' if error in 'l' is 5% and error in T is 2%. **[5]**

c) Show that $\overline{\nabla}.(\phi\overline{A}) = \overline{\nabla}\phi.\overline{A} + \phi(\overline{\nabla}.\overline{A})$. **[5]**

Q3) Attempt any <u>two</u> of the following :

a) If $F(x, y) = e^x \cos y$, verify **[5]**

i) $F_{xy} = F_{yx}$

ii) $F_{xx} + F_{yy} = 0$.

b) Determine different values of fifth root of $Z = \frac{1}{2} + i\frac{\sqrt{3}}{2}$. **[5]**

c) If $\overline{F} = 3xy\hat{i} - y^2x\hat{j}$, evaluate line integral $\int_c \overline{F}.\overline{dr}$ where 'C' is curve $y = x^3$ from (0, 0) to (1, 2). **[5]**

Q4) Attempt the following :

a) i) Determine the volume of parallelopiped defined by vectors $\overline{P} = 3\hat{i} - \hat{j} - \hat{k}$, $\overline{Q} = \hat{i} + 2\hat{j} - 3\hat{k}$ and $\overline{R} = 3\hat{i} - 3\hat{j} + 7\hat{k}$. **[4]**

ii) Find the position and nature of stationary points of function $F(x) = x^3 - 3x + 3$. **[4]**

OR

i) Prove the relations using exponential forms of $\sin\theta$ and $\cos\theta$. **[4]**

I) $\sin 2\theta = 2 \sin\theta \cos\theta$

II) $\sin^2\theta + \cos^2\theta = 1$

ii) If $\overline{A} = xz^3\hat{i} - 2x^2yz\hat{j} + 2yz^4\hat{k}$, **[4]**

Find $\overline{\nabla} \times \overline{A}$ at point (–1, 2, 1).

b) Attempt any <u>one</u> of the following :

i) If $Z = \sqrt{1 + \sqrt{8}i}$ find $Z\overline{Z}$. **[2]**

ii) Prove that the vector $\overline{A} = 3y^4z^2\hat{i} + 4x^3z^3\hat{j} - 3xy^3\hat{k}$ is Solenoidal. **[2]**

Total No. of Questions : 4]

SEAT No. : ____

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[Total No. of Pages : 2

[4217]-104
S.Y. B.Sc. (Semester - I)
PHYSICS
PH-212 (a) : Electronics
(2008 Pattern) (Paper - II)

Time :2 Hours] ***[Max. Marks :40***

Instructions to the candidates :

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Use of calculator and log table is allowed.***
4) ***Neat diagrams must be drawn wherever necessary.***
5) ***Symbols have their usual meaning.***

Q1) Attempt all of the following : **[10 × 1 = 10]**

a) State two types of energy losses in transformer.

b) Calculate the capacitive reactance for C = 2200 μf and f = 50Hz.

c) State maximum power transfer theorem.

d) Draw the symbols for NPN and PNP transistor.

e) Draw the neat labelled diagram for inverting operational amplifier.

f) State De Morgans theorem.

g) If load voltage changes from 5V to 4.8V, when line voltage changes from 127 to 103 Volt, calculate line regulation.

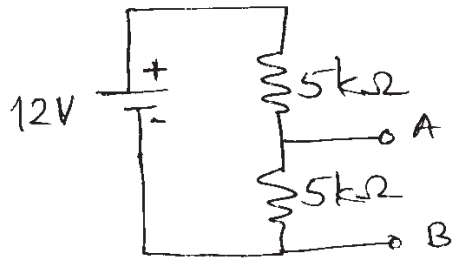
h) State two advantages of Bridge rectifier over full wave rectifier.

i) Define - ripple factor.

j) Write the truth table for NAND gate.

Q2) Attempt any two of the following :

a) State Norton's theorem. Find Norton's equivalent of the following circuit. **[5]**



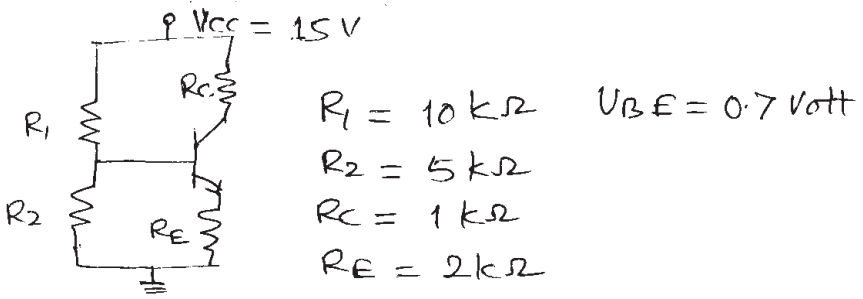
P.T.O.

b) Define alpha (α) and beta (β) of transistor. State the relations between them. Draw the circuit diagram for common-base configuration. Obtain an expression for its collector current. **[5]**

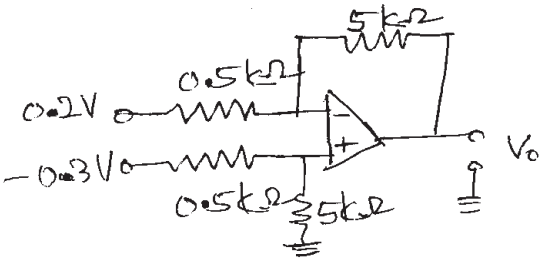
c) State Barkhausen criteria for an oscillator. Draw the circuit diagram for phase-shift oscillator using IC 741. Explain its working state the formula for frequency of oscillation. **[5]**

Q3) Attempt any <u>two</u> of the following :

a) Draw the dc load line and find operating point for the following circuit. **[5]**



b) What will be the output for the following circuit. **[5]**



c) Convert the number $(34.632)_{10}$ into binary equivalent and convert $(5C7)_{16}$ into decimal. **[5]**

Q4) a) Attempt (i) or (ii) of the following :

i) 1) Explain transistor as a switch. **[4]**

2) Explain the concept of virtual ground in Op-amp and state the characteristics of ideal Op-amp. **[4]**

ii) 1) With circuit diagram, explain the working of capacitor input filter. **[4]**

2) Prove the following Boolean expression and draw the logic diagram.

$AB + A(B + C) + B(B + C) = B + AC$. **[4]**

b) Attempt <u>any one</u> of the following :

i) State Thevenin's theorem. **[2]**

ii) Draw characteristic curve for UJT. **[2]**

Total No. of Questions : 4] **[Total No. of Pages : 2**

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[4217]-104
S.Y. B.Sc. (Semester - I)
PHYSICS
PH-212 (b) : Instrumentation
(2008 Pattern) (Paper - II)

Time :2 Hours] ***[Max. Marks :40***

Instructions to the candidates :

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Use of calculators and log tables are allowed.***
4) ***Neat diagrams must be drawn wherever necessary.***

Q1) Attempt all of the following :

a) Define precision of an instrument. **[1]**

b) Define Sound power level. **[1]**

c) What is MRI? **[1]**

d) What is linearity? **[1]**

e) Define Drift. **[1]**

f) What do you mean by cantilever beam? **[1]**

g) What is ferromagnetic substance? **[1]**

h) Define atmospheric pressure. **[1]**

i) What is Reynold's number? **[1]**

j) Calculate R-R distance of a normal man having 75 bpm recorded by ECG machine with chart speed 25 mm/sec. **[1]**

Q2) Attempt <u>any two</u> of the following :

a) Explain dynamic characteristics of an instrument using first order system. Write note on thermal element as a first order system. **[5]**

b) Explain how displacement is measured with variation in permeability in inductive transducer. **[5]**

c) Explain working of hair hygrometer. Give advantages. **[5]**

P.T.O.

Q3) Attempt <u>any two</u> of the following :

a) Water flowing in a horizontal pipe has a speed 20 cm/s at one end point and 15 cm/s at another point. Determine the pressure drop between two points. **[5]**

b) The dead zone in certain thermometer is 0.250 percent of span. The calibration is 800ºC to 1200ºC. What temperature change might occur before it is detected? **[5]**

c) The magnetising field of 1600 Am^{-1} produces a magnetic flux of 2.4×10^{-5} Weber in a bar of iron of cross-section 0.2 cm^2. Calculate relative permeability, and intensity of magnetisation of the bar. **[5]**

Q4) a) Attempt (i) or (ii) of the following :

i) 1) Write short note on pitot tube. **[4]**

2) Explain with block diagram functional elements of a typical measurement system. **[4]**

ii) 1) Explain variable resistance devices. **[4]**

2) Explain the principle and use of Ringlemann chart for smoke density measurement. **[4]**

b) Attempt <u>any one</u> of the following :

i) Define blood pressure. State the methods of its measurement. **[2]**

ii) A manufacturer calibrates a temperature gauge of 100ºC range with $\pm$ 0.5ºC. If it is used for temperature measurement of 60ºC, what will be the probable minimum and maximum value of temperature shown by gauge? **[2]**

Total No. of Questions : 4]

SEAT No. : ____

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[Total No. of Pages : 2

[4217]-105
S.Y. B.Sc. (Semester - I)
CHEMISTRY
CH-211: Physical Chemistry
(2008 Pattern) (Paper - I)

Time :2 Hours] ***[Max. Marks :40***

Instructions to the candidates :

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Use of logarithmic table and calculator is allowed.***
4) ***Neat diagrams must be drawn wherever necessary.***

Q1) Answer the following : **[10]**

a) 'Entropy is regarded as the measure of disorder of the system'. Justify.

b) Define Helmholtz free energy.

c) Thermodynamically what is ebullioscopic constant?

d) Boiling point of 0.1 M $BaCl_2$ is more than that of 0.1 M NaCl solution. Why?

e) Define partition coefficient.

f) What are conjugate solutions?

g) State Raults law.

h) Define standard free energy change of a chemical reaction.

i) What is criterion for equilibrium in terms of entropy change?

j) Define critical solution temperature.

Q2) a) Attempt any two of the following : **[6]**

i) Explain the applications of Clapeyron equation.
ii) State and explain the third law of thermodynamics.
iii) Explain the working of modern osmometer with the help of a diagram.

P.T.O.

b) Solve any one of the following : **[4]**

i) One litre of water under a pressure of one atmosphere dissolves 0.02g of N_2 at 20ºC. Calculate Henry's law constant.

ii) 53.94 gm of a substance of molecular weight 182 is dissolved in 1000 gm of water at 20ºC. At this temperature, vapour pressure of water is 17.5 mm Hg. Calculate vapour pressure of this solution.

Q3) a) Attempt any two of the following : **[6]**

i) Give the importance of –
   1) Steam distillation
   2) Fractionating column.

ii) State Nernst distribution law. Deduce its thermodynamic proof.

iii) Define the terms - Normality, Molarity and Molality.

b) Solve any one of the following : **[4]**

i) Calculate standard entropy change (ΔS°) for the following chemical reaction and comment on the result.

$$C_{(s)} + H_2O_{(l)} \rightarrow CO_{(g)} + H_{2(g)}.$$

Given : $S^\circ_{CO} = 213.64\ JK^{-1}\ mole^{-1}$, $S^\circ_{H_2} = 130.58\ JK^{-1}\ mol^{-1}$

$S^\circ_{C} = 5.69\ JK^{-1}\ mol^{-1}$, $S^\circ_{H_2O} = 69.96\ JK^{-1}\ mol^{-1}$.

ii) 48.0 g of oxygen is expanded isothermally from 0.01 dm^3 to 0.10 dm^3 at 27ºC. Calculate change in free energy.
(R = 8.314 $J\ K^{-1}\ mol^{-1}$, At. wt of oxygen = 16).

Q4) a) What is equilibrium constant? Derive Van't Hoff reaction isotherm. **[6]**

OR

Define freezing point. Prove that depression of freezing point of a solution is a colligative property.

b) Attempt any one of the following : **[4]**

i) Discuss schematically the effect of temperature on solubility of nicotine in water.

ii) Give the properties of equilibrium constant.

Total No. of Questions : 4] **SEAT No. :**

P95 **[Total No. of Pages : 2**

[4217]-106
S.Y. B.Sc. (Semester - I)
CHEMISTRY
CH-212: Organic Chemistry
(2008 Pattern) (Paper - II)

Time :2 Hours] ***[Max. Marks :40***

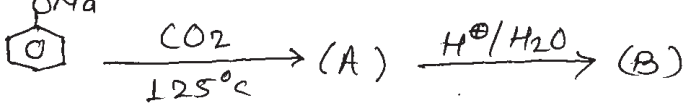
Instructions to the candidates :

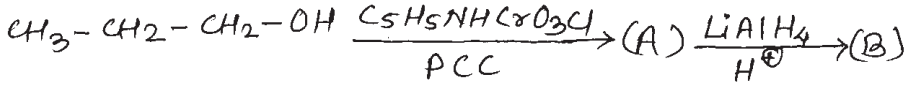
1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Draw structures and diagrams if necessary.***

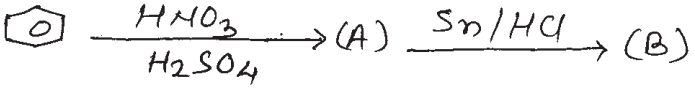
Q1) Answer the following : **[10]**

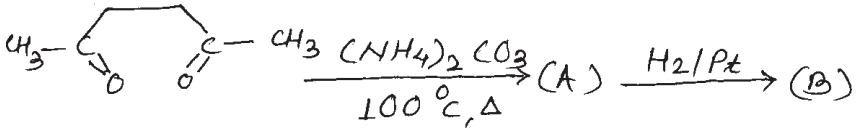
a) Explain the term Threo isomer with suitable example.
b) What is silver mirror test?
c) Explain, n-butyl alcohol boils at 118°C, while propanoic acid boils at 141°C.
d) Dimethylamine is a stronger base than methylamine, Explain.
e) What are homocyclic compounds?
f) Define, biochemistry.
g) Draw the structure of Maltose.
h) What are fatty acids?
i) Define, peptide bond.
j) Give specific use of $H_2N–OH$.

Q2) a) Assign the structure to (A) and (B) in the following reaction (any three). **[6]**

i) 

ii) 

iii) 

iv) 

P.T.O.

b) How will you bring about the following conversions (any two) : **[4]**

i) Chlorobenzene to phenol.
ii) Aniline to P-nitroaniline.
iii) Methylbromide to t-butyl alcohol.
iv) Benzene to aniline.

Q3) Attempt any two of the following : **[10]**

a) Draw Newman projection formula for axil and equatorial methylcyclohexane and comment on their stability.

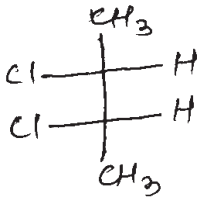
b) What are carbohydrates? How are they classified? What is the action of following on glucose?

i) Br_2 water
ii) dil. HNO_3

c) What are α-amino acids? Discuss the classification of α-amino acids, giving one example of each class.

Q4) a) Attempt any two of the following : **[6]**

i) What is absolute configuration? Assign 'R' and 'S' configuration of the following molecule.



ii) Explain, Aldol condensation with suitable example.
iii) What are nucleic acids? What are different types of nucleic acids? Discuss their chemical composition.

b) Answer the following : **[4]**

i) Give synthesis of pyridine. What is the action of following on pyridine
1) KNO_3/H_2SO_4
2) H_2/Pt at 25°C.

ii) Discuss the effect of temperature on enzyme catalysed reaction.

OR

i) Discuss Hell-Volhard-Zelinsky reaction with suitable example.
ii) What are lipids? How are lipids classified?

✷ ✷ ✷

Total No. of Questions : 4]

SEAT No. :

P96

[Total No. of Pages : 2

[4217]-107

S.Y. B.Sc. (Semester - I)

BOTANY

BO-211: Fundamentals of Plant Systematics and Plant Ecology

(2008 Pattern) (Paper - I)

Time :2 Hours] *[Max. Marks :40*

Instructions to the candidates :

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Draw neat labelled diagrams wherever necessary.***

Q1) Answer the following : **[10]**

a) Define Taxonomy.

b) Enlist phases of Taxonomy.

c) Enlist any two anatomical characters used as data source in Taxonomy.

d) What is ICBN?

e) Name the form of Corolla in Solanaceae.

f) What is Bio-geochemical cycle?

g) Define ecology.

h) What is ecosystem?

i) What are mesophytes?

j) What is nudation?

Q2) Answer any TWO of the following : **[10]**

a) Give the merits of Bentham & Hookers system of classification.

b) Give ranks and ending of taxa names.

c) What are ecological pyramids? Explain pyramid of numbers.

P.T.O.

Q3) Write short notes on any TWO of the following : **[10]**

a) External adaptive features in xerophytes.

b) Diagnostic features of family Rubiaceae.

c) Succession on Land.

Q4) Give the salient features, floral formula; floral diagram and economic importance of family Meliaceae. **[10]**

OR

Enlist biotic components of ecosystem and explain their role in an ecosystem.

Total No. of Questions : 4]

SEAT No. : ____

P97

[Total No. of Pages : 2

[4217]-108
S.Y. B.Sc. (Semester - I)
BOTANY
BO-212: Fundamentals of Plant Physiology
(2008 Pattern) (Paper - II)

Time :2 Hours] ***[Max. Marks :40***

Instructions to the candidates :

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Draw neat labelled diagrams wherever necessary.***

Q1) Attempt the following : **[10]**

a) Define photoperiodism.

b) What is grand period of growth?

c) Define plant physiology.

d) What is exudation?

e) Define root pressure.

f) What is vernalization?

g) Define molar solution.

h) What is D.P.D.?

i) Define ascent of sap.

j) What is water holding capacity of soil?

Q2) Answer any Two of the following : **[10]**

a) What is plant growth? Describe phases of growth.

b) Describe Long Day plants with suitable examples.

c) Mention site of synthesis and practical applications of Auxins.

P.T.O.

Q3) Write notes on any Two of the following : **[10]**

a) Types of transpirations.

b) Passive absorption of water.

c) Lundegardh's theory.

Q4) What is osmosis? Give an account of mechanism and types of osmosis. Add a note on its significance in plants. **[10]**

OR

What is mineral nutrition? Give criteria for essentiality of elements. Add a note on role and deficiency symptoms of Nitrogen (N).

Total No. of Questions : 4]

SEAT No. :

P98

[Total No. of Pages : 2

[4217]-109

S.Y. B.Sc. (Semester - I)

ZOOLOGY

ZY-211: General Zoology and Biological Techniques - I

(2008 Pattern) (Paper - I)

Time :2 Hours] *[Max. Marks :40*

Instructions to the candidates :

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Neat labelled diagrams must be drawn wherever necessary.***

Q1) Attempt the following : **[10]**

a) What is the function of dermal branchiae?

b) Define spermatogenesis.

c) What is coeloblastula?

d) What is electrophoresis?

e) What is dehydration?

f) What is the use of sphygmomanometer?

g) What do you mean by IVF?

h) Define holoblastic cleavage.

i) Define metamerism.

j) Define acoelomata.

Q2) Write short notes on (any two) : **[10]**

a) Harmful Protista.

b) Sterilization by filtration.

c) Amoeboid movement in Protista.

P.T.O.

Q3) Attempt the following (any two) : **[10]**

a) Principle and applications of Thin Layer chromatography.

b) Sketch and label-chewing and lapping mouth parts.

c) Describe spectrophotometer.

Q4) Describe the water vascular system of starfish. Add a note on it's locomotion. **[10]**

OR

Describe in detail various types of eggs with suitable examples.

Total No. of Questions : 4]

SEAT No. : ____

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[Total No. of Pages : 2

[4217]-110
S.Y. B.Sc. (Semester - I)
ZOOLOGY
ZY-212: Applied Zoology - I
(Fisheries and Agricultural Pests and their Control)
(2008 Pattern) (Paper - II)

Time :2 Hours] ***[Max. Marks :40***

Instructions to the candidates :

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Neat labelled diagrams must be drawn wherever necessary.***

Q1) Attempt the following : **[10]**

a) Write the biological name of mango stem borer.

b) What is marine water fishery?

c) Write any two damages caused by pulse beetle.

d) Define fishing craft.

e) Mention any two structural pests.

f) Mention any two uses of fish meal.

g) Define Pest.

h) Write the biological name of Bombay duck.

i) Define pheromone.

j) Define Pisciculture.

Q2) Write short notes on (any two) : **[10]**

a) Gill net.

b) Salting and freezing techniques in fish preservation.

c) Rats and squirrels as non-insect pests.

P.T.O.

Q3) Attempt the following (any two) : **[10]**

a) Describe harvesting methods of Mackerel.

b) Describe in brief Knapsack sprayer as a plant protection appliances.

c) Give a brief account of mechanical pest control method with suitable examples.

Q4) Describe the habit, habitat and culture methods of Labeo rohita and Cirrhinus mrigala. **[10]**

OR

Describe marks of identification, nature of damage and control measures of Red cotton bug and Brinjal fruit borer.