



[4055] – 204

Second Year B.Pharmacy Examination, 2011
2.4 : PHARMACEUTICAL ORGANIC CHEMISTRY – II
(2008 Course)

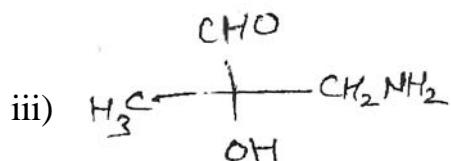
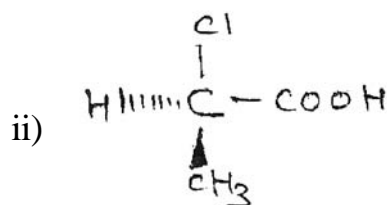
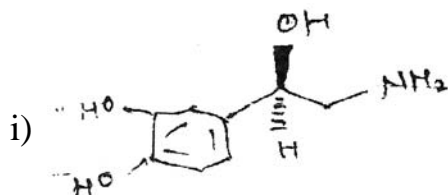
Time : 3 Hours

Max. Marks : 80

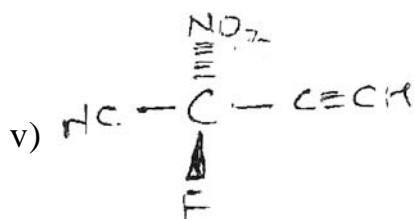
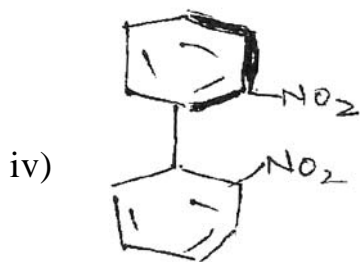
- Instructions :** 1) Answers to the **two** Sections should be written in **separate** books.
2) Black figures to the **right** indicate **full** marks.
3) **All** questions are **compulsory**.

SECTION – I

1. a) What is racemic modification ? Explain different types of racemic modifications. Enlist different methods of resolution of racemic modifications. 5
- b) Draw the Newman projection formulae for Cis and Trans Decalins and comment on their conformational stabilities. 5
- OR
1. a) Assign R & S configuration for following : 5



P.T.O.



b) What is configuration and conformation ? Explain with suitable examples.
Write in brief about Atropisomerism. 5

2. Answer the following (**any 5**) : 15

- What is mutarotation ? Explain with suitable example.
- Give any three reactions of glucose.
- Trans 1, 2 dimethyl cyclohexane is more stable than its cis isomer. Give reason.
- What is isoelectric point ? Explain its significance.
- Explain lengthening and shortening the chain of aldoses with respective examples.
- Define epimers with examples.
- Explain stereospecific and stereo selective reactions with suitable examples.

3. Write short notes on (**any three**) : 15

- Conformational analysis in n-butane.
- Solid supported synthesis.
- Protein structure.
- Stereochemistry of epoxide ring opening.
- Strecker and Gabriel phthalimide synthesis of amino acids.

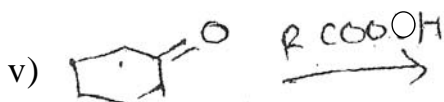
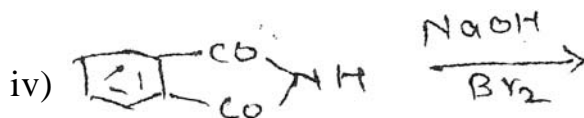
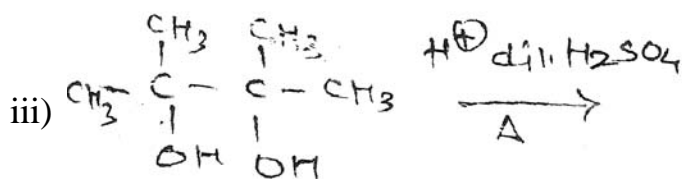
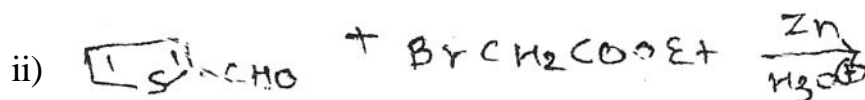
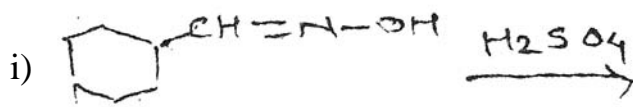


SECTION – II

4. a) Give the structure and numbering of following : 5
- i) Furan
 - ii) Oxazole
 - iii) Coumarin
 - iv) Benzimidazole
 - v) Isoquinoline.
- b) Give the synthesis and reactions of pyridine. 5

OR

4. a) Predict the product for the following reactions : 5



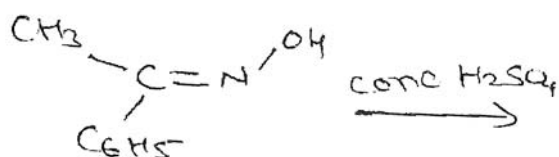
- b) Give the mechanism of Favorski rearrangement with suitable example. 5



5. Answer the following (**any five**) :

15

- Write a short note on retrosynthesis of inuprofen.
- Give the methods of synthesis of Thiophene.
- Complete the following reaction with mechanism.



- What is molecular rearrangement ? Enlist molecular rearrangements involving isocyanides.
- Why thiophene is more stable and more aromatic than pyrrole and furan ?
- Explain mechanism and stereochemistry of Bayer-Villiger reaction.
- Why pyridine undergoes electrophilic substitution at β -position ?

6. Write a short note on (**any three**) :

15

- Benzylic acid rearrangement
- Pinacol pinacolone rearrangement
- Curtius rearrangement
- Wittig rearrangement
- Wolf rearrangement.



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Second Year B.Pharmacy Examination, 2011
2.5 : PHARMACEUTICAL ANALYSIS – I
(2008 Pattern)

Time : 3 Hours

Max. Marks : 80

- Instructions:* 1) *All questions are compulsory.*
2) *Neat diagrams must be drawn wherever necessary.*
3) *Black figures to the right indicate full marks.*

SECTION – I

1. Attempt **any one** : **10**

Explain Instrumentation, principle and applications of high frequency titration.

OR

How will you prepare and standardise 0.1 M sodium nitrite solution. Give principle, procedure and reactions involved in assay of sulphanilamide.

2. Attempt **any five** : **(3×5=15)**

- 1) Explain titration curve for acid-base titration.
- 2) Explain electron balance method in brief.
- 3) Discuss on creometric titration.
- 4) Write a note on circular dichroism (CD)
- 5) Give advantages, limitation and indicators used in non-aqueous titration.
- 6) How will you prepare and standardize 0.1 N perchloric acid.

3. Attempt **any three** : **(5×3=15)**

Write short note on :

- 1) Specific and molecular rotation and optical activity.
- 2) Buffer solution
- 3) Various type of conductometric titration.
- 4) Pharmaceutical Application of redox titration.

P.T.O.



SECTION – II

4. Attempt **any one** : 10

Explain various statistical test of significance in detail and give its applications.

OR

Discuss on nitrogen determination by Kjeldah's method and give principle and procedure of organically bound iodine.

5. Attempt **any five** : (3×5=15)

- i) Explain complexation and chelation.
- ii) How standardization of pH meter is done ?
- iii) Give mechanism of metallochromatic indicators.
- iv) Give methods for detection of end point in precipitation titration with examples.
- v) Define SD, percentage CV and median.
- vi) Discuss on organic and inorganic precipitants.

6. Attempt **any three** : (5×3=15)

Write short notes on :

- i) Potentiometric titration
 - ii) Kjeldah's method
 - iii) Stability constant and factors affecting it
 - iv) Various techniques used in Gravimetric Analysis.
-



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Second Year B. Pharmacy Examination, 2011
2.7 : PHARMACOLOGY – I (Including Pathophysiology)
(2008 Pattern)

Time : 3 Hours

Max. Marks : 80

- Note :*
- 1) *All questions are compulsory.*
 - 2) *Answers to the two Sections should be written in separate answer books.*
 - 3) *Neat labeled diagrams must be drawn wherever necessary.*
 - 4) *Black figures to the right indicate full marks.*

SECTION – I

1. Discuss in detail various processes of drug transport across the biological membrane. 10

OR

1. Define and classify hypolipidimics. Write the pharmacological actions, therapeutic uses and adverse drug reaction of statins.
2. Solve **any five** of the following : 15
- i) Discuss about nuclear receptors.
 - ii) Discuss about intolerance.
 - iii) Discuss the drug treatment of pediatrics.
 - iv) Explain the psychological factor affecting drug action.
 - v) Explain the terms half-life and bioequivalence.
 - vi) Discuss about redistribution of drugs.
 - vii) Discuss the combined effect of drugs.
3. Write a note on the following (**any three**) : 15
- i) Teratogenicity and mutagenicity.
 - ii) Pharmacology of ergot alkaloids.
 - iii) Structure and functions of biological membrane.
 - iv) Leukotrienes.
 - v) Viral vectors of gene transfer.



SECTION – II

4. What is an ischemic heart disease ? Discuss the pathophysiology of myocardial infarction. 10

OR

4. What is Alzheimer's disease ? Discuss in detail pathophysiology of Alzheimer's disease.
5. Solve **any five** of the following : 15
- i) Discuss about physical carcinogens and radiation carcinogenesis.
 - ii) Discuss the etiopathogenesis and clinical features of acute renal failure.
 - iii) Classify the types of leprosy and discuss the reactions in it.
 - iv) Discuss the clinical features of acute Hepatitis.
 - v) Discuss the clinical manifestations of tuberculosis.
 - vi) Discuss the etiology and complications of chronic peptic ulcer.
 - vii) Define hypersensitivity reactions and discuss its types.
6. Write a note on the following (**any three**) : 15
- i) Pathophysiology of sexually transmitted diseases.
 - ii) Acute metabolic complications of diabetes mellitus.
 - iii) Pathophysiology of heart failure.
 - iv) Pathophysiology of bacterial pneumonia.
 - v) Various routes of metastasis.



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Third Year B.Pharmacy Examination, 2011
3.2 : PHARMACEUTICAL BIOTECHNOLOGY (2008 Course)

Time : 3 Hours

Max. Marks : 80

SECTION – I

1. A) Explain basic steps involved in genetic engineering. **5**
B) Write scope and application of biotechnology. **5**

OR

1. What is genetic engineering ? Draw various steps involved in genetic engineering and elaborate applications of biotechnology to pharmacy. **10**
2. Attempt **any five** : **15**
- a) What is vector ? Enlist different types of vectors.
 - b) Write function of restriction enzyme with examples.
 - c) Elaborate role of alkaline phosphatase.
 - d) What is role of terminal transferase and DNA ligase ?
 - e) Elaborate expression vector.
 - f) What are linkers and adaptors ?
 - g) Give an account of host system in genetic engineering.
3. Write short notes (**any three**) : **15**
- a) DNA hybridization
 - b) Complementary DNA
 - c) PCR
 - d) Gel electrophoresis
 - e) Gene therapy.

P.T.O.



SECTION – II

4. What is plant tissue culture ? What are different types of PTC ? Write applications of PTC. 10

OR

4. Give an account of gene transfer in plants. 10

5. Attempt **any five** : 15

- a) Enlist different types of vaccines.
- b) What is DNE vaccine ?
- c) Elaborate suspension culture.
- d) Write in short different methods of sterilization.
- e) Write in short about Animal culture.
- f) Write short account of culture media for PTC.
- g) Elaborate enzyme immobilization.

6. Write short notes (**any three**) : 15

- a) Radio immunoassay
 - b) Monoclonal antibodies
 - c) Transgenic animals
 - d) Synthesis of HUMAN INSULIN
 - e) Growth hormone synthesis by rDNA technology.
-



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Third Year B.Pharmacy Examination, 2011

3.5 : PHARMACOLOGY – II

(2008 Pattern)

Time : 3 Hours

Max. Marks: 80

Instructions : 1) Answers to the two Sections should be written in separate books.

2) Neat diagrams must be drawn wherever necessary.

3) Black figures to the right indicate full marks.

4) All questions are compulsory.

SECTION – I

1. What is the mechanism of action, the pharmacological actions, adverse effects and therapeutic uses of Adrenaline ? 10

OR

Explain the mechanism of action, the pharmacological actions adverse effects and therapeutic uses of Diazepam. 10

2. Answer **any five** :
- a) What is the mechanism of action of NSAID's ? 3
 - b) Classify muscarinic receptor antagonists. 3
 - c) Classify neuro muscular blockers. 3
 - d) What are the therapeutic uses of atropine ? 3
 - e) What are the signs, symptoms and treatment of barbiturate poisoning ? 3
 - f) What are SSRI ? Explain in brief. 3
 - g) What are the therapeutic uses of α adrenergic blockers ? 3
3. Write short notes on **any three** :
- a) Pre anesthetic medication. 5
 - b) MAO inhibitors. 5
 - c) Belladonna poisoning. 5
 - d) Drug dependence. 5
 - e) Opioid antagonists. 5

P.T.O.



SECTION – II

4. Explain the mechanism of action, the pharmacological actions adverse effects and therapeutic uses of glucocorticoids. **10**

OR

Explain the drug therapy in diarrhoea. **10**

5. Answer **any five** :

a) Classify local anesthetics. **3**

b) What are the therapeutic uses of thyroid hormones ? **3**

c) What are anabolic steroids ? Explain in brief. **3**

d) Classify laxatives. **3**

e) Classify drugs used in the treatment of gout. **3**

f) What are the different insulin preparations ? **3**

g) What are Proton pump inhibitors ? Explain in brief. **3**

6. Write short notes on **any three** :

a) Oxytocics **5**

b) Expectorants **5**

c) Drugs regulating Ca homeostasis **5**

d) Bronchodilators **5**

e) Antiemetics. **5**



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Third Year B.Pharmacy Examination, 2011
PHARMACOGNOSY – II
(2004 Course)

Time : 3 Hours

Max. Marks : 80

- Note :*
- 1) Question No. 1 and 5 are **compulsory**.
 - 2) Out of the remaining attempt **any two** questions from Section I and **any two** questions from Section II.
 - 3) Answers to the **two** Sections should be written in **separate** books.
 - 4) Figures to **right** indicate **full** marks.

SECTION – I

- | | |
|----------------------------------------------------------------------------------------------|-----------|
| I. a) Differentiate between the following : | 6 |
| 1) Cardenolides and Buffadenolides | |
| 2) Indian Podophyllum and American Podophyllum. | |
| b) Describe the Keller Killani test and give its significance. | 4 |
| II. a) Define and classify Volatile oils and explain the methods of obtaining volatile oils. | 8 |
| b) Give the Pharmacognostic account on Eucalyptus. | 7 |
| III. a) What are Lipids ? And explain the methods of obtaining Lipids. | 8 |
| b) Define and classify Resins and explain Physiological and Pathological resins. | 7 |
| IV. Write short notes (any three) : | 15 |
| i) Silk | |
| ii) Bentonite | |
| iii) Serratiopeptidase | |
| iv) T.S. of Kalmegh. | |

P.T.O.



SECTION – II

- V. a) Define and classify Glycosides in detail and describe the method of extraction of glycosides. **6**
- b) Explain modified Borntrager's test and give its significance. **4**
- VI. a) Give the Pharmacognostic account on digitallis. **6**
- b) Give the methods of preparation of the following : **9**
- 1) Pale Catechu
 - 2) Jute
 - 3) Asafoetida.
- VII. a) Give the synonym, biological source, chemical constituents and uses of : **9**
- 1) Indian gooseberry
 - 2) Indian saffron
 - 3) Scented bdellium.
- b) Define and classify Tannins. **6**
- VIII. Write short notes (**any three**) : **15**
- a) Tracer techniques and their applications
 - b) Natural Pesticides
 - c) Rhubarb
 - d) T.S. of Shatavari.
-



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Third Year B. Pharmacy Examination, 2011
PHARMACEUTICAL MARKETING AND MANAGEMENT (2004 Pattern)

Time : 3 Hours

Total Marks : 80

- Instructions :* 1) *Q. No. 1 and Q. No. 5 are compulsory.*
2) *Solve any two questions from Section I and Section II respectively.*
3) *Figures at right indicate full marks.*

SECTION – I

1. A) Fixed cost Rs. 80,000, Variable cost per unit Rs. 220, Selling price Rs. 300 per unit Actual units produced and sold 2000 units. Calculate **6**
 - a) BEP in units
 - b) BEP in sales
 - c) PV ratio
 - d) MOS
- B) Give detail account on ABC analysis. **4**
2. A) Define and enlist functions of Management. Explain in detail Taylor's principle of Management. **8**
- B) Explain in detail various methods of sales forecasting. **7**
3. A) Give a brief account on Industrial Dispute Act 1947. **8**
- B) Define Planning. Explain in detail steps involved in Planning. **7**
4. Write short notes on (**any three**) : **15**
 - a) Basic principles of organisation
 - b) Patent
 - c) Drug Discovery Process
 - d) PERT and CPM
 - e) GATT.

P.T.O.



SECTION – II

5. A) From the following information prepare Profit and Loss account as on March 2010. 6

Salaries	2,500
Gross Profit	6,400
Carriage Outward	400
Interest Paid	200
Rent Paid	100
Discount Received	250
Travelling Expense	500
Printing	300

- B) Explain various factors affecting price. 4
6. A) Define and explain the functions of Leadership. Explain different leadership styles. 8
- B) What is Product Management ? Explain in detail Product Life Cycle. 7
7. A) Define Sales Promotion and give different techniques of Sales Promotion. 8
- B) Explain in detail about various channels of distribution. 7
8. Write short notes on (**any three**) : 15
- Role of Medical Representative
 - Interview Technique
 - Advertising
 - Communication Process
 - Marketing Research.



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Fourth Year B.Pharm. Examination, 2011
PHARMACEUTICAL CHEMISTRY – V
(Medicinal) (2004 Course)

Time : 3 Hours

Max. Marks : 80

Instructions: 1) Q.No. 1 and Q.No. 5 are compulsory. Solve any two from remaining questions from each Section.
2) Draw correct structures wherever necessary.
3) Figures on right indicate full marks.

SECTION – I

1. Classify antipsychotic agents. Write SAR, MOA and uses of phenothiazines.
Draw synthesis of chlorpromazine. **10**
2. a) Classify anxiolytics. Write SAR, MOA and uses of benzodiazepines. **8**
b) Describe general structural features of anticonvulsant drugs and add a note on hydantoins. **7**
3. a) What are general anesthetics ? Classify them and add a note on barbiturates. **5**
b) Write SAR and uses of muscarinic antagonists. **5**
c) Classify adrenergic agonists. Add a note on β_2 agonists. **5**
4. Write notes on (**any three**) : **15**
 - a) Drug receptor interactions
 - b) β_1 blockers
 - c) Phase I reactions
 - d) MAO inhibitors.

P.T.O.



SECTION – II

5. Classify diuretics giving structure of one drug for each class. Write SAR, MOA and uses of thiazide diuretics. **10**
6. a) Classify antihypertensives. Explain β blockers as anti hypertensives. Draw synthesis of propranolol. **8**
b) Classify antihistaminics in detail. Explain SAR and uses of H1 blockers. **7**
7. a) What are COX-2 selective inhibitors ? Explain any two drugs. **5**
b) Explain narcotic antagonists using suitable examples. **5**
c) Write a note on proton pump inhibitors. **5**
8. Write notes on (**any three**) : **15**
a) Calcium Channel Blockers
b) Nitrovasodilators
c) Estrogens and derivatives
d) Ester based local anesthetics.
-



[4055] – 101

First Year B. Pharmacy Examination, 2011
1.1 : PHARMACEUTICS – I
(2008 Pattern)

Time : 3 Hours

Max. Marks : 80

- Instructions :** 1) Answers to the **two** Sections should be written in **separate** books.
2) **Neat** diagrams must be drawn **wherever** necessary.
3) **Black** figures to the **right** indicate **full** marks.
4) **All** questions are **compulsory**.

SECTION – I

1. Attempt **any one** :

Discuss in detail concept of preformulation. **10**

OR

What are clinical trials ? Describe various phases of clinical trials.

2. Attempt **any five** (3 marks **each**) : **15**

- a) Define 'Drug' and 'New Drug' as per D and C Act 1940.
- b) Discuss concept of drug excretion.
- c) Explain the principle of Ayurvedic system of medicine.
- d) Discuss various applications of radiopharmaceuticals.
- e) Define and distinguish sustained and targeted delivery.
- f) Describe role of antioxidants used in formulation.
- g) Explain mechanism of drug absorption.

3. Write short notes (**any three**) : **15**

- a) Material for packaging.
- b) Quality control of radiopharmaceuticals.
- c) Drug efficiency and dose response concept.
- d) Good manufacturing practices.
- e) Pharmaceutical Industry in India.

P.T.O.



SECTION – II

4. Solve **any one** : **10**

Discuss the formulation and manufacturing of syrup and aromatic water.

OR

Discuss mechanism of powder mixing and factors affecting mixing. Explain construction and working of planetary mixer.

5. Solve **any five** (3 marks **each**) : **15**

- a) What do you mean by viscosity ? Discuss various units in which viscosity is measured.
- b) Write a note on theory of filtration.
- c) Discuss techniques for size separation.
- d) Explain factors affecting size reduction.
- e) Explain construction and working of Propeller mixer.
- f) Explain in detail different methods used for granulation of effervescent granules.
- g) Explain construction, working and application of filter leaf.

6. Solve **any three** : **15**

- a) Discuss the importance of size reduction in pharmacy. Explain principle and working of Edge and End runner mill.
- b) Write notes :
 - i) Fluid energy mill.
 - ii) Double cone tumbler.
- c) Discuss formulation and evaluation of dry syrup.
- d) What are different patterns of movement of Ball mill ? Write formula to calculate critical speed of ball mill.
- e) Explain in detail factors affecting rate of solution.



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First Year B.Pharmacy Examination, 2011
1.2 : MODERN DISPENSING PRACTICES
(2008 Pattern)

Time : 3 Hours

Max. Marks : 80

- Instructions :**
- 1) *All questions are compulsory.*
 - 2) *Answers to the two Sections should be written in separate books.*
 - 3) *Black figures to the right indicate full marks.*

SECTION – I

1. Define posology. Explain various factors affecting dose of drug. **10**
OR
1. Explain formulation of emulsions. Describe creaming and cracking of emulsion. How will you stabilize emulsions ? **10**
2. Solve **any five** : **15**
 - a) Explain in brief prescription filling.
 - b) Describe steps involved in patient counseling.
 - c) Explain formulation of linctuses.
 - d) Explain quality control of sutures and ligatures.
 - e) Explain additives used in suspensions.
 - f) Explain in brief activities in dispensing of medication.
 - g) Differentiate between liniments and lotions.
3. Write a short notes on (solve **any three**) : **15**
 - A) Types of suspensions.
 - B) Code of Pharmaceutical Ethics.
 - C) Responding to prescription.
 - D) Patient counseling in prescription drugs.
 - E) ENT preparations.

P.T.O.



SECTION – II

4. Describe ointment bases. Explain the factors involved in selection of ointment base for ointments. **10**

OR

4. Explain the organizations and structure of retail drug store. Give the legal requirements for establishment and maintenance of drug store. **10**

5. Solve **any five** of the following : **15**

- a) Define sutures and ligatures, give its types.
- b) Explain displacement value in suppositories.
- c) Explain compounding aspects of creams.
- d) Describe methods of preparation of granules.
- e) Explain role of pharmacists in patient counselling of ointments.
- f) Define incompatibility. Explain physical incompatibility.
- g) Define pastiles and lozenges. Give its advantages.

6. Write a short notes on (**any three**) : **15**

- a) Rational drug use.
- b) Bulk powders.
- c) Therapeutic incompatibilities in prescriptions.
- d) Compounding and dispensing aspects of insulin injections.
- e) Sutures and ligatures.



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First Year B. Pharmacy Examination, 2011
Paper – 1.3 : PHARMACEUTICAL INORGANIC CHEMISTRY
(2008 Pattern)

Time : 3 Hours

Max. Marks : 80

- Instructions:* 1) **All** questions are **compulsory**.
2) Answers to the **two** Sections should be written in **separate** answer books.
3) Figures to the **right** indicate **full** marks.

SECTION – I

1. Describe various sources of impurities in pharmaceutical substances with suitable examples. 10

OR

1. Enlist different pharmaceutical aids and necessities. Discuss antioxidants and preservatives in detail. 10
2. Attempt **any five** of the following : 15
- a) Discuss the principle involved in the limit test for IRON as per I.P.
 - b) What are buffers ? Describe phosphate and borate buffers.
 - c) Give the brief history of Indian Pharmacopoeia.
 - d) Discuss the assay of Boric acid as per I.P.
 - e) Give the storage and labelling conditions for following inorganic gases :
 - i) Oxygen ii) Carbon Dioxide iii) Nitrous Oxide
 - f) What are radioisotopes ? Describe in brief the diagnostic application of radioisotopes.
 - g) What do you mean by hard water ? Enlist various official waters.

P.T.O.



3. Write note on **any three** of the following : **15**
- a) Theory behind buffer action.
 - b) Gutzeit's test apparatus.
 - c) Various methods of water softening.
 - d) Iodine-131 and phosphorous-32 containing radiopharmaceuticals.
 - e) Limit test for chloride as per I.P.

SECTION – II

4. Enlist inorganic antimicrobial agents. Explain the mechanism of action of antimicrobials. Describe properties, uses and assay of hydrogen peroxide and potassium permanganate. **10**

OR

4. a) What are electrolytes ? Explain the role of sodium, potassium and calcium in body. **5**
- b) What is electrolyte replacement therapy ? Discuss the sodium chloride preparations used in sodium replacement. **5**
5. Attempt **any five** of the following : **15**
- a) What are anticaries agents ? Describe any one agent in detail.
 - b) Explain the physiological role of Iron.
 - c) What are gastrointestinal protectives and adsorbents ?
 - d) Classify antidotes with examples. Describe any one agent in detail.
 - e) Give the mode of action of following compounds :
 - i) Ammonium chloride
 - ii) Potassium iodide
 - iii) Antimony potassium tartarate.



- f) Enlist the official compounds of Iron, Copper and Zinc.
- g) What are antacids ? Give the advantages and disadvantages of sodium, calcium and magnesium containing antacids.
6. Write note on **any three** of the following : **15**
- a) Physiological acid – base balance
 - b) Astringents
 - c) Inorganic expectorants and emetics
 - d) Dentifrices
 - e) Saline cathartics.
-



[4055] – 104

First Year B.Pharmacy Examination, 2011
1.4 : PHARMACEUTICAL ORGANIC CHEMISTRY – I
(2008 Pattern)

Time : 3 Hours

Total Marks : 80

- Instructions :** 1) *All questions are compulsory.*
2) *Answers to the two Sections should be written in separate books.*
3) *Black figures to the right indicate full marks.*

SECTION – I

1. What is SN^1 and SN^2 reaction mechanism ? Discuss factors affecting on SN^1 and SN^2 reaction mechanism. (10)

OR

Explain in brief about factors affecting electron availability with suitable examples.

2. Answer the following (**any five**) : (15)
- 1) Define and illustrate hyperconjugation.
 - 2) Explain enantiomerism with suitable example.
 - 3) Phenols are acidic in nature ? Explain.
 - 4) Write in short about tautomerism.
 - 5) Draw as much resonance structure as you can for following :
a) formic acid b) Nitrobenzene
 - 6) Aniline is more reactive than acetanilide for electrophilic substitution reaction. Give reason.
 - 7) Write the IUPAC name of following compounds
 - a) 2, 5-Hexanedione
 - b) 3-Methylbutanamide
 - c) Ethanenitrile.

P.T.O.



3. Answer the following (**any three**) : (15)

- 1) How will you synthesis following compounds from benzene ?
 - a) 4-Nitroacetanalide.
 - b) Phenol.
- 2) What is reaction intermediates ? Enlist the types of reaction intermediates and discuss any one in brief.
- 3) What is Hybridization ? Explain the types with suitable example.
- 4) Write a note on electrophilic substitution in naphthalene.
- 5) Explain Nitro group is meta directing, while amino group is ortho and , para-directing in monosubstituted benzene.

SECTION – II

4. A) What are elimination reactions ? Discuss E_1 , E_2 mechanism. (10)

OR

A) What is electrophilic addition to olefins ? Discuss addition reactions to olefins like hydrogenation, halogenation and ozonolysis.

5. Answer the following (**any five**) : (15)

- 1) Describe how primary, secondary and tertiary amines can be distinguished from one another.
- 2) Alkynes are less reactive than alkenes for electrophilic addition reaction. Give reason.
- 3) How will you prepare methyl benzoate ?



- 4) Explain why ketones are less reactive than aldehydes.
- 5) Phenol is more acidic than alcohol. Explain.
- 6) Compare and explain the basicities of ethanalamine and aniline.
- 7) What is Saytzeff rule ?

6. Write note on (**any 3**) :

(15)

- 1) Aldol condensation.
- 2) Elimination verses substitution.
- 3) Preparation of amines.
- 4) Reformatski reaction.
- 5) Preparation of carboxylic acids.



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First Year B. Pharmacy Examination, 2011
1.5 : HUMAN ANATOMY & PHYSIOLOGY
(2008 Pattern)

Time : 3 Hours

Max. Marks : 80

- Instructions:** 1) Answers to the *two* Sections should be written in *separate* books.
2) *Neat* diagrams must be drawn *wherever* necessary.
3) *Black figures* to the *right* indicate *full* marks.
4) *All* questions are *compulsory*.

SECTION – I

1. Explain functions of blood and discuss in detail blood clotting. 10

OR

1. Draw a neat labelled diagram of interior of heart and explain in detail cardiac cycle. 10

2. Solve **any five** : 15

1) Draw a neat labelled diagram of cell. 3

2) Write a short note on blood group. 3

3) Explain structure and function of spleen. 3

4) Enlist various organs involved in digestive system along with their functions. 3

5) Explain mechanism of respiration. 3

6) Explain platelet plug formation. 3

7) Draw a neat labelled diagram of respiratory system. 3

3. Solve **any three** : 15

1) Explain transport of O₂ and CO₂ during respiration. 5

2) Enlist conducting elements of heart and discuss conduction system in heart. 5

P.T.O.



- 3) Explain structure and function of liver. 5
- 4) Explain structure and function of nervous tissue. 5
- 5) Explain role of different enzymes in digestion. 5

SECTION – II

- 4. Draw a neat labelled diagram of nephron and explain in detail mechanism of urine formation. 10

OR

- 4. Explain physiology of muscle contraction. 10
- 5. Solve **any five** : 15
 - 1) Explain functions of skin. 3
 - 2) Explain hypothalamic hormones. 3
 - 3) Explain structure of sperm with a neat labelled diagram. 3
 - 4) Draw a neat labelled diagram of spinal cord. 3
 - 5) Distinguish between sympathetic and parasympathetic system. 3
 - 6) Enlist various hormones secreted by various endocrine glands with their functions. 3
 - 7) Explain neurotransmission. 3
- 6. Solve **any three** : 15
 - 1) Explain menstrual cycle. 5
 - 2) Explain structure and function of ear. 5
 - 3) Explain synthesis, storage and release of thyroid hormones. 5
 - 4) Explain renin-angiotensin aldosterone system. 5
 - 5) Enlist various parts of brain and give their functions. 5



[4055] – 106

First Year B.Pharmacy Examination, 2011
1.6 : PHARMACEUTICAL ENGINEERING
(2008 Pattern)

Time : 3 Hours

Max. Marks : 80

Instructions: 1) All questions are compulsory.

2) Answer to the two Sections should be written in separate books.

3) Neat diagrams must be drawn wherever necessary.

4) Black figures to the right indicate full marks.

SECTION – I

1. Give various modes of heat transfer and discuss heat transfer by radiation. **10**

OR

Define evaporation. Discuss theory of evaporation. Discuss economy and capacity of evaporator. Enlist different types of evaporators.

2. Answer the following (any five) : **15**

a) Pool Boiling

b) Scaling in heat exchangers

c) Mechanical steam traps

d) Pan evaporator

e) Horizontal tube evaporator

f) Dehumidification

g) Dew point.

3. Write short notes on (any three) : **15**

a) Caking of crystals

b) Crystal forms

c) Swenson-Walker crystallizer

d) Use of humidity chart

e) Forced circulation evaporator.

P.T.O.



SECTION – II

4. Discuss flow of fluid through bed of solid. Discuss both Poiseulli's and Kozeny's approaches. 10

OR

Define corrosion. Give different types of corrosion.

5. Answer the following (**any five**) : 15

- a) Tray Dryer
- b) Azeotropic distillation
- c) Cathodic and anodic protection
- d) Drum Dryer
- e) Rotameter
- f) Rotocel extractor
- g) Simple distillation.

6. Write short notes on (**any three**) : 15

- a) Inter phase mass transfer
- b) Use of triangular diagram in extraction
- c) Orifice meter
- d) Spray dryer
- e) Molecular distillation.



First Year B.Pharmacy Examination, 2011
1.7 : COMPUTER APPLICATION AND BIO-STATISTICS
(2008 Pattern)

Time : 3 Hours

Max. Marks : 80

- Instructions :** 1) All questions are **compulsory**.
2) Answers to the **two** Sections should be written in **separate** answer books.
3) Figures to the **right** indicate **full** marks.

SECTION – I

1. A) What are the types of variables ? How data is collected in statistics ? 2
B) From the following data calculate the median. 4

Classes	0-25	25-40	40-55	55-70	70-85	85-100
No. of students	6	50	44	26	3	1

- C) Prepare a statistical frequency table from the following data taking the class width as 7 by inclusive method. 4
24, 13, 27, 16, 7, 28, 18, 3, 5, 18, 26, 14, 36, 20, 12, 32, 29, 9, 10, 17, 37, 31, 15, 3, 23, 5, 32, 21, 8, 21, 1, 6, 27, 1, 29, 7, 4, 33, 6, 22, 9, 2, 4, 4, 15, 11, 9, 8, 9, 17, 15, 18, 12, 2, 28.

OR

1. A) The ranks obtained by 10 individuals before and after the training of some course are given below, Compute Spearman's correlation coefficients. 4

Individual	1	2	3	4	5	6	7	8	9	10
Rank before training	1	6	3	9	5	7	10	8	2	4
Ranks after training	6	8	3	7	2	1	5	9	4	10



- B) Find equations of two lines of regression if $\bar{x} = 50$, $\bar{y} = 20$, $6x = 5$ and $6y = 4$, coefficient of correlation is 0.8. 4
- C) What are methods of studying correlation ? 2

2. A) Calculate standard deviation and coefficient of variation for frequency distribution of marks of 100 candidates given below. 6

Marks	0-20	20-40	40-60	60-80	80-100
Frequency	5	12	32	40	11

- B) Find mean and mode. 5

Classes	10-25	25-40	40-55	55-70	70-85	85-100
No. Of students	6	50	44	26	3	1

- C) What are the characteristics of measures of central tendency ? 4
3. A) Four coins are tossed simultaneously, what is the probability of getting at least two heads ? 4
- B) Explain experimental designs. 5
- C) Compute correlation coefficient between supply and price of commodity using following data. 6

Supply	152	158	169	182	160	166	182
Price	198	178	167	152	180	170	162

SECTION – II

4. a) Give two symptoms of a computer being affected by virus. Explain any three precautions to keep a computer virus free. (2+3=5)
- b) Explain the terms (**any two**) : 3
- i) RAM
 - ii) Application software
 - iii) Windows operating system
 - iv) Dot matrix printer.
- c) Give the difference between star network and Bus network. 2

OR



4. a) Explain any one secondary storage device used in computer system. **5**
b) Explain the different computer languages. **5**
5. a) Convert the following : **3**
i) $(101011)_{\text{Binary}}$ to decimal
ii) (67) Decimal to Binary
5. b) Explain any six important features of windows operating system. **6**
c) Explain any one output device used in computer system. **6**
6. a) Differentiate between hard disk drive (HDD) and floppy disk drive (FDD). **5**
b) Write short notes on : **10**
i) Drum printer
ii) Mouse.



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First Year B.Pharmacy Examination, 2011
PHARMACOGNOSY – I
(2004 Pattern)

Time : 3 Hours

Max. Marks : 80

- Instructions :** 1) Question Nos. 1 and 5 are **compulsory**. Out of **remaining**, attempt 2 questions from Section – I and 2 questions from Section – II.
- 2) Answers to the **two** Sections should be written in **separate** books.
- 3) **Neat** diagrams must be drawn **wherever** necessary.
- 4) **Black** figures to the **right** indicate **full** marks.

SECTION – I

1. Comment on following (**any five**) : **10**
- a) Describe Papyrus Ebers and Pen-t-Sao.
 - b) Trikatu is added in all Asava and Arista formulations.
 - c) Plant is a chemical laboratory.
 - d) Fundamental Tissue System of Plant.
 - e) Panchmahabhuta theory of Ayurveda.
 - f) Non endospermic or exalbuminous seed.
2. A) Define Crude drugs. Explain in detail various systems of classification of crude drugs. **7**
- B) Describe in detail theory or basic principles of Unani system. Explain in detail Diagnosis, Treatment and Medicines according to Unani System. **8**
3. A) Define Arista and Asava. Give general method of preparation of Arista and characteristic and preservation of Arista with example. **7**
- B) Discuss in detail with suitable examples about collection of crude drug. Give a comment on processing, storage condition and preservation of crude drugs. **8**

P.T.O.



4. Write a note on (**any three**) : **15**
- a) Bentham and Hooker system of classification
 - b) Anatomy of Fruits
 - c) Secretory Tissues
 - d) Subterranean Organs.

SECTION – II

5. State the significance of following in evaluation of crude drugs. **10**
- a) Toluene Distillation
 - b) Stomatal number and stomatal index
 - c) Ash values
 - d) Extractive values.
6. A) Explain in detail evaluation of biological properties of crude drug and its significance. **7**
- B) Define carbohydrate. Explain general chemistry and Biosynthesis of carbohydrate. **8**
7. A) Describe in detail Biological source, method of collection and characteristics of Acacia. **7**
- B) Describe in detail Biological source, method of preparation and characteristics of maize starch. **8**
8. Write a note on (**any three**) : **15**
- a) Dextran as sweetner
 - b) Wood cellulose
 - c) Mucilage
 - d) Alginates and Alginic acid.
-



[4055] – 201

Second Year B.Pharmacy Examination, 2011
2.1 : PHYSICAL PHARMACY
(2008 Pattern)

Time : 3 Hours

Total Marks : 80

- Instructions :** 1) Answers to the *two* Sections should be written in *separate* books.
2) *Neat* diagrams must be drawn *wherever* necessary.
3) *Black figures* to the **right** indicate **full** marks.
4) *All* questions are **compulsory**.

SECTION – I

1. Attempt **any one** : **10**
Explain kinetic theory of real and ideal gases. Add a note on principle and mechanism of working of aerosols. What are two phase systems ?
OR
State the Raoult's law of lowering of vapour pressure. Explain deviation from Raoult's law. Add note on Ebullioscopic method.
2. Attempt **any five (3 marks each)** : **15**
i) Explain the term colloids. Mention two applications of colloids.
ii) What is Claude's process of liquefaction of gases ?
iii) Explain polymorphism.
iv) Write a note on effect of temperature on ternary system.
v) Describe osmotic pressure as a colligative property.
vi) What is the difference between equivalent and specific conductance ?
vii) What is meant by protective colloids ? Mention one example for the same.
3. Write short notes on **any three (5 marks each)** : **15**
i) Faraday - Tyndal effect
ii) DLVO Theory
iii) Gibbs phase rule
iv) Three Component System
v) Solubility Parameter and BCS Classification.

P.T.O.



SECTION – II

4. Attempt **any one** : **10**

What is specific surface of particle ? How is surface area of a powder sample determined ? What are its applications ?

OR

Explain Non-Newtonian type of flow with rheograms, mechanisms and suitable examples.

5. Attempt **any five (3 marks each)** : **15**

- i) List the four methods to improve the flow properties of granules and powder.
- ii) Differentiate between shelf life and half life for a first order reaction.
- iii) Explain the shear thinning and shear thickening systems. Give one example for each type of material.
- iv) Describe the effect of temperature on the surface tension of liquids.
- v) Explain the concept of dissolution and give its importance.
- vi) Define molecularity and order of reaction with a suitable example.
- vii) Explain why suspensions mostly follow zero order.

6. Write short notes on **any three (5 marks each)** : **15**

- i) Cup and Bob Viscometer
 - ii) Adsorption Isotherm
 - iii) Debye Huckel theory
 - iv) Zeta potential and Nerst Potential
 - v) Viscoelasticity.
-



[4055] – 202

Second Year B.Pharmacy Examination, 2011
2.2 : PHARMACEUTICAL MICROBIOLOGY AND IMMUNOLOGY
(2008 Pattern)

Time: 3 Hours

Max. Marks: 80

- Instructions :** 1) Answers to the **two** Sections should be written in **separate** books.
2) **Neat** diagrams must be drawn **wherever** necessary.
3) Black figures to the **right** indicate **full** marks.
4) **All** questions are **compulsory**.

SECTION – I

1. Explain in detail different methods used for measurement of bacterial growth. **10**

OR

What is 'microbial limit test'? How will you perform microbial limit test for Escherichia coli and Pseudomonas aeruginosa ? **10**

2. Answer the following (**any five**) : **15**

- a) Differentiate between Rickettsia and viruses.
- b) Draw and explain one step growth curve of bacteriophage.
- c) Write the significance of bacterial capsule.
- d) What is Germ tube ? Write the characteristics of candida albicans.
- e) Explain the scope of microbiology in Pharmaceuticals.
- f) Write the classification of bacteria on the basis of arrangement of flagella.
- g) Comment 'Cedar wood oil increases resolution power of microscope'.

3. Write a note on (**any three**) : **15**

- a) Importance of actinomycetes.
- b) Cultivation of Human viruses.
- c) Preservation of microbial cultures.
- d) Fluorescence microscopy
- e) Preservative efficacy test.

P.T.O.



SECTION – II

4. What are different methods of sterilization ? Explain in detail sterilization by filtration and give its applications. **10**

OR

Describe in detail different types of antigen-antibody reactions. **10**

5. Answer the following (**any five**) : **15**

- a) Differentiate between T-cell and B-cell.
- b) What is microbial flora of human ? Explain.
- c) Explain in brief Type – II hypersensitivity.
- d) What is secretory component ? Explain in short IgA.
- e) Explain in short factors affecting on selection of disinfectants.
- f) What is the criteria for selection of test microorganisms used for antibiotic assays ? Enlist test microorganisms.
- g) What is interferon ? Explain.

6. Write a note on (**any three**) : **15**

- a) Microbial assay of Vit B₁₂.
- b) Quality control of vaccines.
- c) Antigen.
- d) Sources of contamination in Aseptic area.
- e) Moist heat sterilization.



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Second Year B.Pharmacy Examination, 2011
2.3 : PHARMACEUTICAL BIOCHEMISTRY (Including Clinical
Biochemistry)
(2008 Pattern)

Time : 3 Hours

Max. Marks : 80

- Instructions :** 1) *All questions are compulsory.*
2) *Draw well labelled diagram wherever necessary.*
3) *Answers to the two Sections should be written in separate books.*
4) *Figures to right indicates full marks.*

SECTION – I

- I. a) Describe reaction and energetics of TCA cycle. **10**
OR
a) Classify enzymes and explain factors affecting enzyme action in detail.
- II. Solve **any five** from the following : **15**
a) Na/K ATPase.
b) Transamination.
c) Give the relation of lipids and coronary heart diseases. (CHD)
d) Draw a neat labelled diagram of Eukaryotic cell.
e) Write a note on Golgi bodies.
f) Secondary structure of protein.
- III. Solve **any three** from the following : **15**
a) Biomembranes.
b) Essential fatty acids and their biochemical functions.
c) Beta-oxidation of fatty acid.
d) Biosynthesis of Cholesterol.

P.T.O.



SECTION – II

IV. a) Define and classify vitamins. Write structure and biochemical functions of any two fat soluble vitamins. **10**

OR

b) Explain DNA recombination technique with its application.

V. Solve **any five** from the following : **15**

a) Explain Radio immuno assay.

b) Marker Enzymes.

c) Genetic code and Gene expression.

d) Note on BMR and role of crude fiber in diet.

e) Terms used to express clinical values of PH, Protien, Enzyme, Hormones and Minerals.

f) Collection and preservation of samples in pathology laboratory.

VI. Solve **any three** from the following : **15**

a) Explain DNA fingerprinting.

b) Glycogen storage disease.

c) Genetic disorders of nucleic acid metabolism.

d) Kidney function test.



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Second Year B. Pharmacy Examination, 2011

2.6 : PHARMACOGNOSY – I

(2008 Course)

Time : 3 Hours

Max. Marks : 80

Instructions. : 1) Answers to the **two** Sections should be written in **separate** books.

2) **Neat** diagrams must be drawn **wherever** necessary

3) Black figures to the **right** indicate **full** marks.

4) **All** questions are **compulsory**.

SECTION – I

1. Explain in detail Botanical System of classification with detail account of Banthum and Hooker system of classification. **10**

OR

Describe in detail morphological and microscopical characterization of Bark with suitable example. **10**

2. Answer the following (**any five**): **15**

- a) Enlist various plant growth regulation and their application in commercial production of natural products.
- b) Write in brief about Galen and his contribution.
- c) What is papynes Ebers and Pen-t-Sao ?
- d) Explain in brief about plant cell wall and its composition.
- e) Define Adulteration substitution and deterioration.
- f) Explain the importance of foreign organic matter for assessment of quality of crude drug.
- g) Explain in brief various methods of drying of crude drugs and their merits and demerits.

P.T.O.



3. Write short note on (**any three**): **15**
- a) Karl Fischer Method.
 - b) Leaf constants.
 - c) Extractive values.
 - d) Stomata and its classification.
 - e) Ergastic cell contents.

SECTION – II

4. Describe in detail biological source, method of preparation, characteristics and uses of Maize starch. **10**

OR

Describe in detail biological source, method of preparation, characteristics and uses of Agar. **10**

5. Answer the following (**any five**): **15**
- a) Explain in brief Stevia as a natural sweetener.
 - b) Explain various properties of primary metabolites and secondary metabolites.
 - c) Explain in brief fenugreek as a herbal dietary supplement.
 - d) Explain method of preparation and uses of inulin.
 - e) Write biological source, chemical composition and uses of tragacanth.
 - f) Write biological source, chemical composition and uses of pectin.
 - g) Explain in brief modified starch.

6. Write short note on (**any three**) : **15**
- a) Conventional methods of extraction.
 - b) Silk as a natural fiber.
 - c) Mucilage.
 - d) Amacha as a natural sweetener.
 - e) Alginates and Alginic acid.



[4055] – 208

Second Year B.Pharmacy Examination, 2011
PHARMACEUTICAL ENGINEERING
(2004 Course)

Time : 3 Hours

Max. Marks : 80

- Instructions :** 1) *Q.No.1 and 5 are compulsory, out of the remaining attempt 2 questions from Section – I and 2 questions from Section – II.*
2) *Answer to the two Sections should be written in separate books .*
3) *Neat diagrams must be drawn wherever necessary.*
4) *Black figures to the right indicate full marks.*

SECTION – I

1. Give the classification of boilers; explain any one type of boiler with accessories and mountings. **10**
2. a) Explain the single and double pass heat exchanger. **5**
b) Give the construction and working of horizontal evaporator. **5**
c) Explain the Fourier's law of heat transfer. **5**
3. a) Explain the crystallization by adiabatic evaporation ; also explain the factors responsible for caking of crystals. **10**
b) Explain the heat and material balance for single effect evaporator. **5**
4. Write short notes on (**any three**) : **15**
 - a) Swenson walker crystallizer
 - b) Thermostatic steam trap
 - c) Water purification by Reverse osmosis
 - d) Thermostatic steam trap
 - e) Central air conditioning.

P.T.O.



SECTION – II

5. Explain the principle of fractionation ; how plate efficiency is calculated ? **10**
6. a) Explain the different Variable area flow meters. **5**
b) Explain the Reynolds experiment, also write the significance of Reynolds number. **5**
c) Explain the theory of Liquid – liquid extraction. **5**
7. a) Explain the different types of corrosion and methods of combating corrosion. **5**
b) Explain the different factors affecting drying of solids **5**
c) Explain the principle and working of freeze dryer. **5**
8. Write short notes on (**any three**) : **15**
a) Rotocel extractor
b) Construction and working of spray dryer
c) Mass transfer in laminar flow
d) Non-metals as pharmaceutical material.
-



[4055] – 301

Third Year B.Pharmacy Examination, 2011
3.1 : PHARMACEUTICS – II
(2008 Pattern)

Time : 3 Hours

Max. Marks : 80

SECTION – I

1. Attempt **any one** : **(10)**

Describe the composition of hard gelatin capsule shell. What is shell hardness ratio and its uses. Discuss the standards for gelatin used in manufacture of hard gelatin capsule shell.

OR

Give classification of tablets and give critical account of various granulation equipment used in tableting.

2. Attempt **any five (3 marks each)** : **(15)**

- a) Give parameters for evaluation of granules.
- b) Explain how properties of tablet core affect coating operation.
- c) Describe hygroscopicity and its evaluation as preformulation study.
- d) Define and describe slugging.
- e) Describe factors affecting tablet hardness.
- f) Describe spray application systems in tablet coating.
- g) Describe base adsorption in relation to soft gelatin capsules.

3. Attempt **any three (5 marks each)** : **(15)**

- a) Give an account of excipients used in tablet formulations.
- b) Write a note on interaction of containers and closures with dosage forms.
- c) Give an account of polymorphism as important bulk characterization tool.

P.T.O.



- d) Define compression, consolidation and mechanisms involved therein in tablet manufacture.
- e) Describe the official evaluation tests for tablet.
- f) Give an account of defects in film coating operations of tablet.

SECTION – II

4. Attempt **any one** : **(10)**

Describe importance of stokes law and controlled flocculation in manufacture of suspension.

OR

Explain the stability of dispersed systems with help of DLVO system.

5. Attempt **any five (3 marks each)** : **(15)**

- a) Give an account of retinoids.
- b) Explain the phenomenon of Ostwald ripening.
- c) What are structured vehicles ?
- d) Define and differentiate between flocculated and deflocculated suspensions.
- e) Enumerate the components of nail lacquer and add a note on solvents used.
- f) Give mechanisms of sunscreen effect.
- g) Write about rheology of suspensions.

6. Attempt **any three (5 marks each)** : **(15)**

- a) Preservation of semisolids.
- b) Give evaluation tests for shampoos.
- c) Discuss composition of lipsticks.
- d) Describe methods for evaluation of suspension stability.
- e) Give an account of equipment used in manufacture of emulsions.



[4055] – 303

Third Year B.Pharmacy Examination, 2011
3.3 : MEDICINAL CHEMISTRY – I (2008 Course)

Time : 3 Hours

Max. Marks : 80

- Note: 1) All questions are compulsory.*
2) Answers to the **two** Sections should be written in *separate* answer books.
3) Figures to the **right** indicate **full** marks.
4) Correct structure and **neat** diagrams must be drawn **wherever** necessary.

SECTION – I

1. Solve **any one** :

- I) Give the classification of Adrenergic drugs with suitable example. Describe the chemistry of any one Adrenergic agonist. **10**
- II) Classify CNS depressants and add a note on SAR, MOA of Phenothiazines. **10**

2. Attempt **any five** of the following : **15**

- a) Classify anticonvulsants with two example from each class.
- b) Explain the SAR of ACE inhibitors.
- c) Draw synthesis of Phenobarbitone.
- d) Explain general SAR of Antihistaminics.
- e) Give MOA, SAR of any one class of Hypoglycemic agents.
- f) Elaborate in detail the competitive neuromuscular blockers with suitable examples.
- g) Draw Synthesis of Trimethadon.

P.T.O.



3. Write notes on **(any three)** : **15**
- a) Diagnostic agents.
 - b) Classify antipsychotics.
 - c) Prodrug concept.
 - d) Drugs used in Alzheimer disease.
 - e) Proton pump inhibitors.

SECTION – II

4. Give an account of non Barbiturates used as sedative and hypnotics. **10**

OR

4. a) Classify antianginal agents. Add a note on Calcium channel Blocker. **6**
- b) Classify diuretics. Write in detail about loop diuretics. **4**

5. Attempt **any five** of the following : **15**

- a) Outline synthesis of Phenobarbitone.
- b) Classify antispasmodic drugs with suitable example from each class.
- c) Discuss in detail the SAR studies of tricyclic antidepressant agents.
- d) Draw Synthesis of Imipramine.
- e) Discuss MOA and SAR of Local anaesthetics.
- f) Discuss in detail MOA and SAR anxiolytic agents.
- g) Explain different physicochemical properties affecting drug action.

6. Write notes on **(any three)** : **15**

- a) Cholinergic agonists.
- b) Antilipidemic agents.
- c) Respiratory stimulants.
- d) Antimuscarinic agents.
- e) SAR of Parasympathomimetics and Synthesis of Isoproterenol.



[4055] – 304

Third Year B. Pharmacy Examination, 2011
3.4 : PHARMACEUTICAL ANALYSIS – II
(2008 Course)

Time : 3 Hours

Max. Marks : 80

- Instructions :** 1) Answers to the **two** Sections should be written in **separate** books.
2) **Neat** diagram must be drawn **wherever** necessary.
3) **Black** figures to the **right** indicate **full** marks.

SECTION – I

1. Write the theory of UV-Vis spectroscopy. Discuss in brief about filters and monochromators used in UV-Vis spectroscopy. 10

OR

Explain the principle of flame photometry. Draw a neat labelled diagram of flame photometer. Explain the functioning of each part. 10

2. Attempt **any five** questions : 15
- Draw a neat diagram of DME and explain its functioning.
 - What is singlet state, triplet state and quenching ?
 - What is EMR ? Explain the wave properties of it.
 - What is chromatography ? Classify the various chromatographic techniques.
 - Discuss in brief about various methods of color comparison.
 - State the Ilkovic equation and explain the factors affecting it.
 - Explain the principle and methodology of paper chromatography.

P.T.O.



3. Write a note on **any three** : **15**
- a) Advantages and limitations of Amperometric titrations.
 - b) Potentiostatic Coulometry.
 - c) Radiation sources in UV-Vis spectrophotometry.
 - d) Measurement of angle of refraction.
 - e) Qualitative and Quantitative applications of polarography.

SECTION – II

4. Explain the difference between Nephelometry and Turbidometry. Give the instrumentation and applications of turbidometric analysis. **10**

OR

Explain the principle and methodology of TLC. Discuss the various development techniques used in TLC. **10**

5. Attempt **any five** questions : **15**
- a) Explain the factors affecting thermogravimetric results.
 - b) What is monochromator ? What are the different parts of monochromator ?
 - c) Explain linear scan polarography.
 - d) What is quenching of fluorescence ? Explain the different types of quenching.
 - e) Explain the following terms :
 - 1) Molar absorptivity
 - 2) EMR
 - 3) Wavelength.
 - f) Explain the construction and working of hollow cathode lamp.
 - g) Write the merits and demerits of instrumental analysis.

6. Write a note on **any three** : **15**
- a) Interferences in flame photometry.
 - b) Two dimensional paper chromatography.
 - c) Electrophoresis.
 - d) Applications of AES.
 - e) Types of development in electrophoresis.



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Third Year B. Pharmacy Examination, 2011
3.6 : PHARMACOGNOSY – II
(2008 Pattern)

Time : 3 Hours

Max. Marks : 80

- Instructions :**
- 1) *All questions are compulsory.*
 - 2) *Answers to the two Sections should be written in separate books.*
 - 3) *Neat diagrams must be drawn wherever necessary.*
 - 4) *Black figures to the right indicate full marks.*

SECTION – I

1. Solve **any one** : **10**

What are saponin glycosides ? Discuss in detail pharmacognostical study of crude drug containing triterpenoidal saponin glycoside.

OR

Explain in detail various techniques used in determination of biosynthetic pathways.

2. Solve **any five** : **15**

- i) Differentiate between cinnamon bark and cassia bark.
- ii) Explain ecuelle and enfleurage methods.
- iii) How will you identify shark liver oil by chemical test ?
- iv) How bees wax is prepared ?
- v) Draw a well labeled diagram of T.S. of shatavari root.
- vi) Give chemical tests for the identification of aloes.
- vii) Give biological source and uses of bitter glycosides.

3. Write notes on (**any three**) : **15**

- i) Adultrants of *Syzygium aromaticum*.
- ii) Umbelliferae family.
- iii) Flavonoid glycoside.
- iv) Cod liver oil.
- v) Soya oil.

P.T.O.



SECTION – II

1. Solve **any one** : **10**

Explain the properties, chemical nature, general method of isolation and uses of tannins.

OR

Discuss in detail pharmacognostically the crude drug - podophyllum.

2. Solve **any five** : **15**

- i) State the chemical constituents of neem.
- ii) State the principle of SFE.
- iii) Differentiate between Sumatra benzoin and siam benzoin.
- iv) Draw a well labelled diagram of T.S. of capsicum fruit.
- v) Give biological source, chemical constituents and uses of colophony.
- vi) Describe micropropagation.
- vii) Explain Droplet counter current extraction.

3. Write notes on (**any three**) : **15**

- i) Plant cell immobilization
- ii) Evaluation of herbal extract
- iii) Derris root
- iv) Fullers earth
- v) Papain.



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Third Year B.Pharmacy Examination, 2011
3.7 : PHARMACEUTICAL MARKETING MANAGEMENT
(2008 Course)

Time : 3 Hours

Max. Marks : 80

Note : 1) Q. No. 1 and 4 are compulsory.
*2) Figures at **right** indicate **full** marks.*

SECTION – I

1. Solve the following : **10**

Give history, development and current scenario of Pharmaceutical industry in India.

OR

Explain the process of New Drug discovery and development. **10**

2. Solve the following (**any five**) : **15**

A) Define the Term management scientifically and also explain management is art, profession or science.

B) Explain the process of decision making.

C) Describe about Demand forecasting.

D) BEA.

E) Master budget.

F) Decision making.

G) Managerial roles.

3. Write short note on (**any three**) : **15**

A) MBO

B) Fundamental principles of organizing

C) Thoughts of Scientific Management

D) Trade Unions Act.

P.T.O.



SECTION – II

4. Explain in detail the classification of theories of motivation. **10**

OR

What is communication ? Give process and barrier of communication. **10**

5. Solve the following (**any five**) : **15**

A) Styles of Leadership

B) Managerial Grid

C) Marketing research

D) Advertising

E) Types of prices

F) Regulatory authorities

G) PLC.

6. Write short note (**any three**) : **15**

A) GD and PI

B) Pharmaceutical export

C) Theory X and Y

D) Sales promotion.



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Third Year B.Pharmacy Examination, 2011
PHARMACEUTICS – III
(2004 Course)

Time : 3 Hours

Max. Marks : 80

- Instructions: 1) Q.No. 1 and Q.No. 5 are **compulsory**. Out of the remaining attempt **two** questions from Section – I and **two** questions from Section – II.*
- 2) Answers to the **two** Sections should be written in **separate** books.*
- 3) **Neat** diagrams must be drawn **wherever** necessary.*
- 4) Black figures to the **right** indicate **full** marks.*

SECTION – I

1. What is need of granulation ? Enlist different advanced granulation techniques. Write in detail about extrusion spheronization. **10**
2. A) Explain in detail formulation and manufacturing of chewable tablets. **8**
B) What is enteric coating ? Explain in detail polymers used for enteric coating. **7**
3. A) Explain in detail coating pan variables in the process of film coating. **8**
B) Write in detail about biopharmaceutical and therapeutic aspects in design of dosage form. **7**
4. Write short notes on (**any three**) : **15**
- 1) In process quality control for soft gelatin capsule.
- 2) Superdisintegrants.
- 3) Fluidised bed granulation.
- 4) Stability analysis.

P.T.O.



SECTION – II

5. Explain in detail various instabilities in emulsions with their reasons and various approaches for stabilization. **10**
6. A) Differentiate between flocculated and deflocculated suspensions. What is role of flocculating agents in stability of suspension ? **8**
- B) Explain role of emulsifying agents in emulsion with respect to its choice and HCB value. **7**
7. A) What are ointments ? Elaborate different ointment bases with their advantages and disadvantages. **8**
- B) What are manicure preparations ? Explain formulation aspects for it. **7**
8. Write short notes on (**any three**) : **15**
- 1) Gelling agents.
 - 2) Evaluation of emulsions.
 - 3) Eye mascara.
 - 4) Pastes.



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Third Year B. Pharmacy Examination, 2011
PHARMACEUTICAL BIOTECHNOLOGY
(2004 Course)

Time : 3 Hours

Max. Marks : 80

- Instructions :** 1) Question No. 1 and 5 are **compulsory**. Out of the remaining attempt 2 questions from Section I and 2 questions from Section II.
- 2) Answers to the **two** Sections should be written in **separate** books.
- 3) **Neat** diagrams must be drawn **wherever** necessary.
- 4) **Black figures** to the **right** indicate **full** marks.

SECTION – I

1. Enlist various methods of selection of recombinants. Describe any three screening methods out of these. **10**
2. What is animal cell culture ? How is an established cell line prepared from primary cell line ? Give an account of serum free animal culture media. **15**
3. Write various DNA sequencing techniques. Elaborate on any one technique. Give principle of DNA fingerprinting with applications. **15**
4. Write notes on **any three** : **15**
 - a) Restriction endonucleases and ligases
 - b) Chick embryo culture
 - c) Protoplast culture
 - d) Transgenic plants.

SECTION – II

5. Classify different types of fermentors based on modes of agitation. Enumerate the various downstream processing techniques in brief. **10**
6. What is BOD and COD ? Give the various techniques of fermentation waste management. Elaborate on any one. **15**

P.T.O.



7. Give various methods and applications of In vitro fertilization. **10**
- Importance of HAT media in hybridoma technology. **5**
8. Write notes on **any three** : **15**
- a) Applications of immobilization
 - b) Various chromatographic techniques in DSP
 - c) ELISA
 - d) Support materials for enzyme immobilization.



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Third Year B.Pharmacy Examination, 2011
PHARMACEUTICAL CHEMISTRY –IV (Medicinal)
(2004 Course)

Time : 3 Hours

Max. Marks : 80

- Instructions :* 1) Question no. 1 and 5 are **compulsory**. Out of the remaining attempt **two** questions from Section I and **two** from Section – II.
- 2) **Answer** to the two Sections should be written in **separate** books.
- 3) Figures to the **right** indicate **full** marks.

SECTION – I

1. Write structure, IUPAC name, and mechanism of action of the following **any three** :
- 1) Ketoconazole
 - 2) Melphalan
 - 3) Metronidazole
 - 4) Trimethoprim. 12
2. A) What are antibiotics ? Explain with examples the development of acid and enzyme resistant penicillines. 7
- B) Write the mode of action and synthetic steps for Clotrimazole. 7
3. A) What is cancer ? Classify anticancer agents with examples. 7
- B) Discuss the chemistry of alkylating agents with mode of action. 7
4. A) What is fungal infection ? Add a note on imidazole antifungals. 7
- B) Explain the chemistry of Tetracyclines. 7

P.T.O.



SECTION – II

5. A) What is viral infection ? Classify antiviral drugs with examples. **6**
B) Write a note on the development of reverse transcriptase inhibitors. **6**
6. A) What are antimetabolites ? Classify the chemotherapeutic agents acting as antimetabolites with examples. **7**
B) Write the synthesis for Pyrimethamine. **7**
7. A) What are sulphonamides ? Discuss the physicochemical properties and SAR for sulphonamides. **7**
B) What is synergism ? Explain synergism of Sulphonamides with DHFR inhibitors. **7**
8. Write note on **any two** : **14**
- 1) Mode of action of quinolone antibacterials
 - 2) HIV protease inhibitors.
 - 3) Sources of lead structures in drug design.



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Third Year B.Pharmacy Examination, 2011
PHARMACEUTICAL ANALYSIS – II
(2004 Course)

Time : 3 Hours

Max. Marks : 80

- Note :*
- 1) *Q.No. 1 and Q.No. 5 are compulsory.*
 - 2) *Out of remaining attempt any two questions from Section – I and two questions from Section – II.*
 - 3) *Draw a neat diagram whenever necessary.*

SECTION – I

1. A) Explain the following terms : 4
 - a) Circular Dichroism
 - b) Column efficiency.
 - c) Phosphorescence.
 - d) Specific refraction.
- B) What is chromatography ? Explain different development modes of paper chromatography. 6
2. A) Explain Indicator and reference electrodes with examples. Give construction and working of Glass electrode with it's merits and demerits. 8
- B) Explain conductometric titrations. What is cell constant ? What is its significance ? 7
3. A) With the help of neat diagram explain construction and working of fluorimeter. 8
- B) What is linear scale polarography ? Describe various factors affecting limiting current in Polarography. 7
4. Write a short note on **any three** : 15
 - a) Van Deemter equation.
 - b) Abbe's refractometer.
 - c) ORD and CD.
 - d) Column chromatography

P.T.O.



SECTION – II

5. A) Explain chromophore and auxochrome with suitable examples. What are different electronic transitions occur in molecule due to absorption of UV-VIS light. **6**
- B) Explain working of photomultiplier tube. **4**
6. A) Classify thermal methods based on parameters measured. Explain TGA in detail. **8**
- B) Explain amperometric titrations of reducible and non reducible ions. **7**
7. A) Draw a neat diagram and explain double beam UV-VIS spectroscope. **8**
- B) Explain principle and working of Nephelometry and turbidometry. **7**
8. Write a short note on **any three** : **15**
- 1) Coulometry.
 - 2) Radio immuno assays.
 - 3) DTA curve.
 - 4) Deviations of Beer-Lambert's law.



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Third Year B.Pharmacy Examination, 2011

PHARMACOLOGY – II

(2004 Course)

Time: 3 Hours

Max. Marks : 80

*Instructions : 1) Question Number 1 and 5 are **compulsory**. Out of the remaining attempt **any 2** questions from Section I and 2 questions from Section II.*

*2) Answers to the **two** Sections should be written in **separate** book.*

*3) Figures to the **right** indicate **full** marks.*

SECTION – I

1. Classify cholinergic agents with examples. Discuss the pharmacology of cholinesterase inhibitors. **10**
2. Give the classification of antithyroid agents. Add a note on nodular goiter. **15**
3. Write the classification of oral hypoglycemic agents. Add a note on pharmacology of acarbose. **15**
4. Write a notes on **any three** : **15**
 - A) Ganglionic stimulants
 - B) Belladonna poisoning
 - C) Pharmacotherapy of cough
 - D) Parathyroid hormones.

P.T.O.



SECTION – II

5. Explain the stages of general anaesthesia. Add note on pharmacology of Halothane. 10
6. Discuss the socio-economical implications of depression and explain pharmacology of tricyclic antidepressants. 15
7. Give the pharmacological account of barbiturates. 15
8. Write a notes on **any three** : 15
- A) Pharmacotherapy of Alzheimer's disease.
 - B) Antimaniac drugs.
 - C) Physiology of sleep.
 - D) Pharmacotherapy of alcoholism.



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Fourth Year B.Pharm. Examination, 2011
PHARMACOGNOSY – III (Industrial)
(2004 Course)

Time : 3 Hours

Max. Marks : 80

Note : i) *Q. No. 1 and 5 are compulsory. Attempt any two questions from the remaining for Section I and Section II each.*
ii) *Figures to the right indicate full marks.*
iii) *Answers for two Sections should be written in two separate answersheets.*

SECTION – I

1. Answer the following questions in brief. (10)
 - 1) What is stratified cork ? Which plant of alkaloidal class exhibits this character ?
 - 2) What is Cinchona Red ?
 - 3) Which is the water soluble pair of Ergot alkaloids ? State its pharmacological use.
 - 4) Describe in details cortex of Ephedra.
 - 5) Which alkaloidal plant has potential in horticulture ? Why ?
2. A) Define Alkaloids. Explain. How solubility behavior of alkaloids can be used for extraction of alkaloids ? (8)
B) Elaborate on applications of tissue culture technics in phytomedicine with special reference to clonal propagation and hybridization. (7)
3. A) Draw a neat labeled diagram of T.S. of Ephedra. Enlist differentiating microscopical features for the four varieties of Ephedra. (8)
B) Give an account of anticancer drugs of marine source. (7)

P.T.O.



4. Write notes on **any three** of the following : (15)
- a) Plant Allergens.
 - b) Brahmi and Shankhapushpi.
 - c) Chemistry of Ipecac Alkaloids.
 - d) Transgenic plants.

SECTION – II

5. What is phytochemical investigation of a crude drug ? Explain with special reference to preliminary phytochemical screening. (10)
6. A) Explain how instrumental techniques can be applied in elucidating the structure of phytoconstituents. Illustrate with reference to Digoxin or Morphine. Also discuss their clinical importance.. (8)
- B) Describe in details method of extraction, isolation, characterization of caffeine. (7)
7. A) Write an elaborate account on plant based industries. Mention their contribution in global economy. (8)
- B) Enlist various parameters for evaluation of herbal drugs as per WHO guidelines. Write principle and procedure for estimation of bitterness value. (7)
8. Write note on the following (**any three**) : (15)
- i) Herbal cosmetics
 - ii) Pesticide residue
 - iii) Droplet counter current extraction
 - iv) Analytical profile of atropine.



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Fourth Year B.Pharm. Examination, 2011
PHARMACOLOGY – III (Including Clinical)
(2004 Course)

Time : 3 Hours

Max. Marks : 80

- Instructions :* 1) Question No. 1 and 5 are **compulsory**. Out of the **remaining** attempt any **two** questions from Section I and **two** questions from Section II.
- 2) Answer to the **two** Sections should be written in **separate** book.
- 3) Figures to the **right** indicate **full** marks.

SECTION – I

1. Classify anti-arrhythmic drugs. Explain the pharmacology of beta adrenergic blockers. **10**
2. a) Explain the antimicrobial spectrum, mechanism of action, adverse effects and therapeutic uses of tetracyclines. **8**
b) Classify sulphonamides. Explain the antimicrobial spectrum, mechanism of action, adverse effects and therapeutic uses of sulphonamides. **7**
3. a) Classify the drugs used in the treatment of tuberculosis. Explain the pharmacology of rifampicin. **8**
b) Classify anti-cancer drugs. Explain the pharmacology of methotrexate. **7**
4. Write short notes on (**any three**): **15**
 - a) Immunomodulators.
 - b) Pharmacotherapy of leprosy.
 - c) Antacids.
 - d) Laxatives.

P.T.O.



SECTION – II

5. Classify poisons according to the mode of action. Explain the general treatment of poisoning. **10**
6. a) Define Bioassay. Explain the indications and principles of bioassay. **7**
b) Explain the methods for bioassay of acetylcholine and tetanus anti toxin. **8**
7. a) Explain in detail the various phases of clinical trials. **9**
b) Explain the ethical and regulatory issues in clinical trials. **6**
8. Write short notes on (**any three**): **15**
- a) Bioassay of insulin.
 - b) Drug-food interactions.
 - c) Pharmacovigilance.
 - d) Organo phosphorus compound poisoning.
-



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Fourth Year B. Pharmacy Examination, 2011
PHARMACEUTICS – IV
(2004 Course)

Time : 3 Hours

Max. Marks : 80

*Instructions: 1) Question No. 1 and 5 are **compulsory**. Out of the remaining attempt 2 question from Section I and 2 questions from Section II.*

*2) Answers to the **two** sections should be written in **separate** answer books.*

*3) **Neat** diagrams must be drawn **wherever** necessary.*

*4) Black figures to the **right** indicate **full** marks.*

SECTION – I

1. What are the different additives used in SVPs and LVPs ? Discuss the formulation aspect of LVPs. **10**
2. Enlist the importance of environmental and personal control in production of parenteral. **15**
3. Explain the concept and significance of Validation Master Plan (VMP) with suitable pharmaceutical example. **15**
4. Write short notes on (**any three**) : **15**
 - a) Plastics as packaging material for parenterals.
 - b) Quality control tests for parenterals.
 - c) Contact lens and lens care products.
 - d) Parenteral proteins and peptides.
 - e) Significance of optimization techniques in pharmaceuticals.

P.T.O.



SECTION – II

5. What techniques are used for filling of aerosols in container ? Explain different types of aerosol systems. 10
6. Explain methods used for preparation of microencapsules. Explain conservation phase separation method in detail. Discuss applications and evaluation tests for microencapsules. 15
7. How controlled release system differs from sustained release system ? What is the rationale for selection of drop candidates for controlled release system ? Discuss parenteral controlled release system. 15
8. Write short notes on (**any three**) : 15
- a) Mucosal drug delivery system.
 - b) Osmotic drug delivery system.
 - c) Probiotics and prebiotics
 - d) Iontophoretic drug delivery system.
 - e) Human plasma protein fraction.



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Fourth Year B. Pharm. Examination, 2011
BIOPHARMACEUTICS AND PHARMACOKINETICS
(2004 Course)

Time : 3 Hours

Max. Marks : 80

*Instructions: 1) Question No. 1 and 5 are **compulsory**. Out of the remaining attempt 2 questions from Section I and 2 questions from Section II.*

*2) Answers to the **two** Sections should be written in **separate** books.*

*3) **Neat** diagrams must be drawn **wherever** necessary.*

*4) **Black** figures to the **right** indicate **full** marks.*

SECTION – I

1. Discuss formulation and dosage form related factors affecting oral bioavailability. 10
2. Discuss perfusion and permeability limitations of drug distribution. Support your answer with suitable examples. 15
3. Discuss in detail the different mechanisms of drug transport. 15
4. Write short notes on **(any 02)** : 15
 - a) Modified pH-partition theory.
 - b) Drug protein binding.
 - c) Transdermal delivery of drugs.
 - d) Clinical applications of clearance.

SECTION – II

5. Discuss the methods of estimation of bioavailability parameters. 10
6. Explain one compartment model of a drug and mathematical treatment upon IV bolus dosing. 15

P.T.O.



7. a) Discuss the terms : **4**
- i) Utility curve and therapeutic window
 - ii) Accumulation index.
- b) Explain the factors affecting dosage regimens. **11**
8. Write short notes on **(any 2)** : **15**
- a) Plasma concentration and therapeutic response.
 - b) Drugs requiring individualization of dosage regimens.
 - c) Central and peripheral compartments.
-



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Fourth Year B.Pharm. Examination, 2011
PHARMACEUTICAL JURISPRUDENCE AND REGULATORY AFFAIRS
(2004 Course)

Time : 3 Hours

Max. Marks: 80

Instructions : 1) Q. 1 and Q. 5 are compulsory. Out of the remaining attempt 2 questions from Section I and 2 questions from Section II.

2) Answers to the two Sections should be written in separate books.

3) Figures to the right indicate full marks.

SECTION – I

1. Discuss in detail qualification, powers, duties of drug Inspector, add a note on procedure of Inspection. [10]
2. A) Discuss the objectives and salient features of Consumer Protection Act. [9]
B) Define Drug. Give the classes of prohibited advertisement. [6]
3. A) Differentiate between bonded and non bonded manufactory. Add a note on 'obtaining the rectified spirit-duty paid. [7]
B) Discuss in detail Constitution and functions of PCI. [8]
4. Write short notes on (**any three**) : [15]
 - 1) Cyber Law
 - 2) Food Inspector
 - 3) Retail Price of Formulation
 - 4) Industrial Safety and Health.

P.T.O.



SECTION – II

5. Discuss in detail 'WHO Guidelines'. [10]
6. A) The orange book. [5]
- B) VS-FDA. [5]
- C) EMEA. [5]
7. A) Discuss in brief about [8]
- a) Investigation New Drug application.
- b) Ministry of Health and Welfare.
- B) Discuss the salient features of Indian Patent Act 1970, with special reference to term of patent and exclusive marketing rights. [7]
- 8) Write short notes on (**any three**) : [15]
- a) NDA
- b) Patent Certification
- c) Drug Master File
- d) TGA.



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Fourth Year B.Pharm. Examination, 2011
PHARMACEUTICAL ANALYSIS – III
(2004 Pattern)

Time : 3 Hours

Max. Marks : 80

- Instructions :** 1) Question No. 1 and 5 are **compulsory**.
2) Out of **remaining**, attempt **two** questions from Section – I and **two** questions from Section – II.
3) Answers to the **two** Sections should be written in **separate** answer books.
4) Figures to the **right** indicate **marks**.
5) Draw well labeled diagrams **wherever** necessary.

SECTION – I

1. a) Explain different types of interference and their corrections in atomic absorption spectroscopy. 6
b) Explain various factors affecting vibrational frequency. 4
2. a) What are chemical equivalence and magnetic equivalence in NMR? 6
b) Explain the factors affecting chemical shift. 9
3. a) Give the principle of Flame Photometry. 5
b) Explain 'Electron-impact Ionisation in Mass spectrometry. 5
c) Describe Instrumentation of ESR. 5
4. Write short notes (**any three**) : 15
 - i) Hollow Cathode Tube
 - ii) ICP Torch
 - iii) X-ray diffraction techniques
 - iv) Analytical Method Validation

P.T.O.



SECTION – II

5. a) Explain quantitation techniques in Gas Chromatography. **6**
b) Explain the terms :Adsorption and Partition. **4**
6. a) Describe the principle and instrumentation of simulated moving bed technology. **8**
b) Explain the principle of Electrophoresis and add a note on different modes of Electrophoresis Technique. **7**
7. a) Describe Electron Capture Detector in Gas Chromatography. **7**
b) Give applications of HPTLC and add a note on ‘Automated Multiple Development’. **8**
8. Write short notes (**any three**) : **15**
i) Super Critical Fluid Extraction
ii) Columns used in Gas Chromatography
iii) Measurement of Radioactivity
iv) HPLC Pumps.
-