[Total No. of Questions: *12*] **[Total No. of Printed Pages:3]**

UNIVERSITY OF PUNE

[4364]-532

B. E. (*Electrical***) Examination - 2013**

Switchgear & Protection (2008 Course)

[Time: *3* **Hours]** **[Max. Marks: 100]**

Instructions:

1. *Answer 3 questions from Section I and 3 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.*
5. *Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.*
6. *Assume suitable data, if necessary.*

SECTION -I

Q.1	A	Explain following terms w.r.t CB. 1) Transient Recovery voltage 2) R.R.R.V. 3) recovery voltage	8
	B	Explain following are intemption theories in CB 1) recovery rate theory 2) Energy balance theory	8
		OR	
Q.2	A	A three phase50 Hz alternator has a inductance of 3 mH/phase and capacitance of 0.025uf/ph. The CB opens when rms current is 8000A. determine frequency of oscillations, RRRV, peak restring voltage, maximum value of RRRV	8
	B	Write short note on Resistance switching in circuit breaker	8
Q. 3	A	Explain various rating, of high voltage C.B	8
	B	Explain with neat diagram construction & working & Air blast circuit breaker	8

OR

Q. 4 A Explain various properties of SF_6 gas used in SF_6 CB 8

B Explain advantages, disadvantages & applications of vacuum circuit breaker 8

Q. 5 A With neat diagram explain principle of operation of 8
1) Distance relay
2) Differential relay

B Explain with neat diagram trip circuit of C.B 6

C Discuss the causes of faults & its effects in power system 4

OR

Q. 6 A With usual notations derive torque equation in case of induction relay 8

B Determine the time of operation of a relay having rating of 5A IDMT type & having setting of 125%, TSM=0.6 the relay is connected to a supply circuit through a CT of ratio 400/5. The fault current in system is 4000 amp. From IDMT curve 6

PSM	5	8	12
Operating time (sec)	4	3.15	2.8

C Write a note on 'zones of protection' 4

SECTION II

Q. 7 A Compare the state relay & electromechanical relays with respect to construction, working principle, advantages, limitations 8

B Draw & explain block diagram of Phasor Measurement Unit (PMU) 8

OR

Q. 8 A Write short note on: 1) sampling theorem 8
2) antialiasing filter

B Explain numerical relay with its block diagram list down its advantages 8

Q. 9 A Explain the effect of inrush magnetizing current on the protective system of transformer. Also explain the principle of harmonic restraint with the help of necessary schematic diagram. 9

B An 11 kv, 3 $phase$ alternator has full load current of 250 A. Reactance of armature winding is 15%. The differential protection system is set to operate on earth fault currents of more than 250A. find the neutral 8

		earthing resistance so as to give earth fault protection to 90% of stator winding	
		OR	
Q. 10	A	For a 10MVA, 132kv/6.6kv power transformer with delta star connections, obtain each CT ratio for the differential protection scheme to circulate a current of 5A in the pilot wires. Draw Schematic diagram for a given configuration	8
	B	Explain abnormal operating conditions like unbalance loading, overspeeding & loss prime mover in case of alternator	9
Q. 11	A	Explain the effects of arc resistance and power swing on the performance of distance relay.	9
	B	Explain distance relay using numerical relaying algorithm.	8
		OR	
Q. 12	A	Explain three step distance protection scheme for transmission line. Also draw the neat sketch for the same	9
	B	Discuss wide area measurement system	8

PUNE UNIVERSITY

[4364]-529

B. E. (Electrical Engineering)

Examination - 2013

Embedded System(Elective-II)

(2008 Course)

[Total No. of Questions : 12] **[Total No. of Printed Pages :2]**

[Time : 3 Hours] **[Max. Marks : 100]**

Instructions :

*(1) Answer **any three** questions from each section.*

(2) Answer 3 questions from section I and 3 questions from section II

*(3) Answers to the **two sections** should be written in **separate answer-books***

(4) Neat diagrams must be drawn wherever necessary.

(5) Black figures to the right indicate full marks.

SECTION-I

Q. 1. A) Explain the Embedded system with its components. (6)

B) What are application areas of embedded systems? (6)

C) Explain overview of embedded system Architecture with block diagram. (6)

OR

Q. 2. A) Explain software in embedded systems. (6)

B) What is digital signal processing processor, its application and Architecture of any DSP processor family with block diagram? (6)

C) What are the characteristics and features of ARM7 processor? (6)

Q. 3. A) Explain interfacing of 8×8 matrix keypad to microcontroller with Diagram. (8)

B) Explain Temperature sensors and their interfacing with Microcontroller through ADC. (8)

OR

Q. 4. A) Explain types of ADC, its microprocessor interfacing with diagram. (8)

B) Explain strain gauges with diagram. (8)

Q. 5. A) Define solenoids and relays. Explain microprocessor interfacing to (8)

Solenoids-Relay with diagram.

B) What are types of stepper motors? Explain bipolar versus unipolar Operation of stepper motors. (8)

OR

Q. 6. A) Explain stepper motor drive ICs (L62D1 & LM18200) (8)

B) Explain BLDC motor & its driving. (8)

SECTION II

Q. 7. A) Explain inter-process communication and synchronization of Process, tasks and threads. (6)

B) What is semaphores & explain different types of semaphores. (6)

C) What is device driver and explain device drivers for embedded devices. (6)

OR

Q. 8. A) Explain the following scheduling algorithms (10)

i. First in first out
ii. Round robin
iii. Round robin with priority
iv. Shortest job first
v. Non-preemptive multitasking
vi. Preemptive multitasking

B) Explain mailbox and message queues in detail with its application. (8)

Q. 9. A) Explain architecture of kernel in detail. (6)

B) Define RTOS. What is real time system? Name RTOS available? (6)

C) What is pipe and event register? (4)

OR

Q. 10. A) Explain the features of RT Linux. What are the application areas Where it is used? (8)

B) How does the task scheduler works? (4)

C) List the timer functions of RTOS. (4)

Q. 11. Explain case study of an embedded system for a smart card. (16)

OR

Q. 12. A) Explain Digital camera with functional block diagram. (8)

B) Design a control system for a flight simulation and control. (8)

[Total No. of Questions: *12***]** **[Total No. of Printed Pages:** *2***]**

UNIVERSITY OF PUNE

[4364]-539

B. E. (*Electrical Engineering***) Examination - 2013**

Renewable Energy System (Elective IV)(2008 Course)

[Time: *3* **Hours]** **[Max. Marks: 100]**

Instructions:

1 *Answers to the* ***two sections*** *should be written in* ***separate answer-books****.*

2 *Solve Q1 or Q2, Q3 or Q4, Q5 or Q6 from Section I and Q7 or Q8, Q9 or Q10, Q11 or Q12 from Section II*

3 *Figures to the right indicate full marks.*

4 *Neat diagrams must be drawn wherever necessary.*

5 *Assume suitable data, if necessary.*

SECTION -I

Q.1	A	Describe Concentrating Solar Power Technologies.	8
	B	Write a note on "Economics of Distributed Resources".	8
		OR	
Q.2	A	Write a note on, "Micro-Hydropower Systems".	8
	B	Write a note on, "Demand side Management".	8
Q. 3	A	Write a note on, Historical Development of wind power.	8
	B	Give simple estimates of wind turbine energy.	10
		OR	
Q. 4	A	Explain how variation in Tower Height varies the different parameters in wind energy system.	8
	B	Explain the specific wind turbine performance calculations.	10
Q. 5	A	Explain the concept, "Altitude Angle of the Sun at solar Noon".	8
	B	Write a note on, Solar Radiation Measurements.	8

OR

Q. 6	A	Explain the solar position at any time of the Day.	8
	B	Write a note on, direct and diffused radiation and its effect on power generation.	8

SECTION II

Q. 7	A	Explain from cells to a module and from module to arrays.	8
	B	List different types of Crystalline Silicon technologies and explain any one.	8

OR

Q. 8	A	How Shading impacts on I-V curves.	8
	B	Write a note on, Thin-Film Photovoltaic	8
Q. 9	A	Explain I-V curve for PV loads as Resistive load, and DC Motor.	10
	B	Write a note on, PV powered water pumping system.	8

OR

Q. 10	A	Explain Grid-connected systems and also DC and AC rated power.	10
	B	Write a note on, Grid autonomy.	8
Q. 11	A	Write a note on, Tidal energy conversion	8
	B	Explain, Impact of renewable energy sources.	8

OR

Q. 12	A	Write a note on, Clean coal power plants	8
	B	Write a note on, Ozone depletion.	8

UNIVERSITY OF PUNE

[4364]-526

B. E. (Electrical)

Illumination Engineering

(2008 Course)

Total No. of Questions : 12 **[Total No. of Printed Pages :2]**

[Time : 3 Hours] **[Max. Marks : 100]**

Instructions :

(1) Answer any 3 question from Section I and 3 question from Section II.

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

(3) Neat diagram must be drawn wherever necessary.

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

(5) Use of logarithmic tables, electronic pocket calculator is allowed.

(6) Assume suitable data, if necessary.

SECTION-I

Q1.

a) With suitable diagrams explain artificial lighting. [9]

b) How quantification of light is made? Elaborate your answer with suitable diagram [9]

OR

Q2.

a) Explain-Dependence of human activities on light [9]

b) Explain-Production of light and physics of generation of light [9]

Q3.

a) Explain construction and working of Mercury Vapour lamp with suitable diagram. [8]

b) Explain construction and working of LEDs state its characteristics [8]

OR

Q4.

a) Explain construction and working of Solid Sodium Argon Neon lamp with suitable diagram [8]

b) Explain construction and working of Optical fiber [8]

Q5.

a) Explain design consideration of electromagnetic ballast for HID lamps [8]

b) Explain types of lightning fixtures according to installation type [8]

OR

Q6.

a) Explain design consideration of Electronic ballast for TL lamps [8]

b) What are different types of lighting fixtures according to photometric usages? Explain each type in brief. [8]

SECTION-II

Q7.a)Explain-Zonal cavity method for general lighting design [9]

b)Elaborate the steps involved in design of illumination scheme for indoor installation- Educational institute [9]

OR

Q8.a)What are polar curves? Explain their types. What information can be obtained from polar curves? [9]

b)Elaborate the steps involved in design of illumination scheme for indoor installation- Theatre [9]

Q9.a)With suitable diagrams explain beam lumen method for designing of out door illumination scheme. [8]

b)With a suitable example explain – payback calculation, life cycle costing in case of energy efficient lighting. [8]

OR

Q10.a) State and explain the road classification as per BIS [8]

b)With a suitable example explain point by point method for outdoor illumination scheme design. [8]

Q11.a) Explain photovoltaic lighting with suitable diagrams [8]

b)Explain-Central system for emergency lighting [8]

OR

Q12.a) Explain-Stand alone system for emergency lighting [8]

b)What is meant by cold lighting? How it is achieved? State applications of cold lighting [8]

UNIVERSITY OF PUNE

[4364]-521

B. E. (Electrical) Examination - 2013

PLC AND SCADA APPLICATION

(2008 Pattern)

[Total No. of Questions:12] **[Total No. of Printed Pages :3]**

[Time : 3 Hours] **[Max. Marks : 100]**

Instructions to candidates

(1)Answer any one question from each pair of questions ***Q1 and Q2, Q3 and Q4, Q5 and Q6, Q7 and Q8, Q9 and Q10, Q11 and Q12****.*

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

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

(4)Neat diagrams must be drawn wherever necessary.

(5)Use of logarithmic tables, slide rule, Mollier charts, electronics pocket calculator is allowed.

(6) *Your answers will be valued as a whole.*

(7)Assume suitable data, if necessary.

SECTION-I

Q1 a) Define Programmable Logic Controller. [4]

b) Explain Output module in detail. [7]

c) State some applications of PLC. [6]

OR

Q2 a) Draw and explain the main block diagram of PLC. [9]

b) State and explain advantages and disadvantages of PLC in detail. [8]

Q3 a) Explain different types of switches. [9]

b) Draw the ladder diagram for the following function table. [8]

Inputs-I1, I2 **Outputs**-Q1, Q2

I1	I2	Q1	Q2
0	0	1	0
0	1	0	1
1	0	0	1
1	1	1	0

OR

Q4 a) Explain different types of timers. [8]

b) Explain Input ON/OFF and analog devices in detail. [9]

Q5 a) Explain of PID control using PLC. [8]

b) What is tuning of PID? Explain in detail. [8]

OR

Q6 a) Explain overload protection for AC motor. [8]

b) Explain speed control of DC motor with DC source. [8]

SECTION II

Q7 a) What are SCADA systems desirable properties [8]

b) Explain the various communication technologies used in SCADA systems.[9]

OR

Q8 a) Define and explain [8]

i) RTV

ii) HMI

b) Draw and explain SCADA server

Q9 a) Write short note on Intelligent Electronic Devices [8]

b) Explain automatic Substation Control through SCADA systems [9]

OR

Q10 a) Write short note on state estimation [8]

b) Explain Energy Management Systems for large interconnected power system [9]

Q11 a) Explain Ethernet/IP protocol [8]

b) Explain 7 layers of OSI Model & their functions. [8]

OR

Q12 a) Explain control and Information protocol [8]

b) Explain functions of transmission and control layers [8]

UNIVERSITY OF PUNE

[4364]-522

B. E.(Electrical)Examination - 2013

POWER SYSTEM OPERATION AND CONTROL(403142)

(2008 Pattern)

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

[Time : 3 Hours] **[Max. Marks : 100]**

Instructions :

*(1) Answer **any three** from each section.*

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

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

(4) Neat diagrams must be drawn wherever necessary.

(5) Use of electronics pocket calculator is allowed.

SECTION I

Q1 a) What do you mean by steady state stability limit. Obtain the conditions for steady state stability using string equation. [8]

b) A 4-pole, 50 Hz, turbogenerator rated 20 MVA, 13.2 kv, has inertia constant of 9 kw-sec/KVA calculate: i) $K_1 E_1$ stored in the rotor at a synchronous speed. ii) rotor acceleration if mech. input is suddenly increased to 18.375 MW for a electric load of 15 MW. iii) change in torque angle$_1$ if acceleration is maintained for 15 cycles iv) speed in r.p.m. at the end of this period. [8]

OR

Q2 a) Obtain the expression for critical clearing angle when two parallel lines supplying the power & short circuit takes place on one of the line at mid point. [8]

b) Bye the use of equal area criterian, find critical clearing angle for a [8]

generator operating at 50 Hz and delivers 1 pu to an infinite bus through a transmission circuit. A fault takes place reducing max power to 0.5 pu whereas, before the fault, it was 1.69 pu. And after clearance of fault, it is1.2 pu.

Q3 a) Why to control reactive power? How will you control the reactive Power during off peak hrs & peak hrs. [8]

b) What is synchronous condenser? State its advantages & disadvantages & compare it with equivalent capacitor & reactor shant compensation. [8]

OR

Q4 a) What are advantages of series compensation. Obtain the expression for degree of compensation. [8]

b) Draw the loading capability curve of synchronous generator & explain the reactive power generation limitations. [8]

Q5 a) State and explain the functions of SVC in EHV transmission. [8]

b) Explain the working principle of TCR & FC. Also draw the VI charts. [10]

OR

Q6 Write short notes on- [18]

a) Statcom

b) UPfc

Q7 a) Define Unit commitment Explain any four operational constraints to be considered while deciding unit commitment [10]

b) Compare 'priority list method' and 'dynamic programming method of unit commitment [6]

OR

Q8 a) Explain with mathematical formulation, the economic load dispatch [10]

of thermal generating units, when transmission loss is neglected. The total generation must meet the total load demand.

b) Write short note [6]

i) Heat rate curve of thermal unit

ii) Cost curve of thermal unit

Q9 a) With neat block diagram, explain two area load frequency control [12]

b) Explain following concepts [6]

i) Control area concept

ii) Area control error

iii) Necessity of automatic generation control

OR

Q10 a) Explain the working of proportional plus integral load frequency control of an isolated power system [10]

b) Write short note on [8]

i) Speed governor dead band

ii) Generator rate constraint

Q11 Write short note on following [16]

i) Energy banking

ii) Emergency power interchange

iii) Capacity interchange

OR

Q12 a) Explain the operation of power pools [8]

b) Explain the transaction of power in case of inter-utility and multi-utility scenario [8]

UNIVERSITY OF PUNE
[4364-523]
B.E. (Electrical) Examination-2013
Control System II
(2008 pattern)

Time-Three hours **Maximum Marks-100**
Total No. of Question=12 **[Total no. of printed pages= 4]**

Instructions:

(1)Answer any Three questions from each section.
(2)Answers to the two sections should be written in separate answer books.
(3)Neat diagram must be drawn necessary.
(4)Figures to the right indicate full marks.
(5)Assume suitable data wherever necessary.
(6)Use of logarithmic tables,slide-rule,mollier charts,,calculator and steam tables is allowed.

SECTION-I
UNIT-I

Q.1
(a)What is need of compensation?What are different types of compensating networks? (6)

(b)Design a lag compensator for the given system with specifications. (12)

$$G(S)=\frac{K}{S(1+0.1S)(1+0.25)}$$

Kv=100 phase margin>=45^o

OR

Q.2
(a)What is lag-lead compensator. Derive it's transfer function. (6)

(b)The forward path transfer function of a certain unity feedback control system is given by $G(S)=\frac{K}{S(S+2)(S+30)}$ (12)

The system has to satisfy following specifications
(a)Phase margin>=35^0
(b)Gain Margin >=20 db
(c)Steady state error coefficient for unit ramp input <=25
Design the suitable lead compensator.

UNIT-II

Q.3

(a)What is the significance of state transition matrix?State it's properties. (8)

(b)Find the state transition matrix using Laplace inverse method. (8)

$$A=\begin{bmatrix} 0 & 1 \\ -4 & -5 \end{bmatrix}$$

OR

Q.4

(a)Define terms eigen values ,eigen vector and modal matrix. (6)

(b)For a given system. (10)

$$A=\begin{bmatrix} 0 & -2 \\ 1 & -3 \end{bmatrix} x+\begin{bmatrix} 0 \\ 1 \end{bmatrix} u$$

y=[1 0]x $x(0)=\begin{bmatrix} 0 \\ 1 \end{bmatrix}$

obtain x(t)for unit step input at t=0.

UNIT-III

Q.5

(a)Define controllability and observability .Explain any one method method to determine it . (8)

(b)For the following system determine controllability and observability . (8)

$$A=\begin{bmatrix} -1 & 1 & 0 \\ 0 & -4 & 2 \\ 0 & 0 & -10 \end{bmatrix} \quad , \quad B=\begin{bmatrix} 1 \\ 0 \\ 1 \end{bmatrix}$$, c=[1 0 1]

OR

Q.6

(a)A system is given by x=Ax+By (8)

$$A=\begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ 0 & -2 & -3 \end{bmatrix} \quad , \quad B=\begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix} \quad ,$$

It is desired to place close loop poles at -2,-1 $\pm j1$. Obtain state feedback gain matrix.

(b)Explain the procedure to design state observer. (8)

SECTION-II
UNIT-IV

Q.7
(a)Design PI controller having unity feedback forward transfer function $G(s)=\frac{150}{(S+1)(S+5)}$ with phase margin 35^0 and gain cross over frequency 8 rad/sec. (10)

(b)Explain 2 iegler Nichol method. (8)

OR

Q.8
(a)A unity feedback control system having an open loop transfer function. $G(s)=\frac{150}{(S+1)(S+5)(S+10)}$ Required steady state error << 0.08 for a unit ramp input and phase margin > 50^0 at gain cross over frequency 6 rad/sec.Design PID controller for given system. (10)

(b)A unity feedback system has a plant $G(s)=\frac{K}{S(TS+1)}$ with cascade controller.
Ds=Kc(1 +TdS).Describe the effects of Kc & TD on steady state error,settling time and peak overshoot of the system response. (8)

UNIT-IV

Q.9
(a)Explain for nonlinear system. (8)
(i)Jump resonance (ii)Limit cycle
(iii)Asynchronous quenching (iv)Subharmonic oscillations

(b)Derive describing function of relay with dead zone. (8)

OR

Q.10
(a)Explain various nonlinearities present in the systems. (8)

(b)Explain stability analysis with describing function. (8)

UNIT-VI

Q.11
(a)Define. (8)

(i)phase plane (ii)Phase trajectory
(iii)phase portrait (iv)Limit cycle

(b)Describe Isocline method to construct phase plane trajectory of second order system. (8)

OR

Q.12

(a)What are the different types of singular points. Explain all-types of singular points considering second order system with step input. (8)

(b)Define. (8)

(i)Positive and negative definiteness.

(ii)Positive and negative semi definiteness.

UNIVERSITY OF PUNE
[4364]-524
B.E (ELECTRICAL) Robotics and Automation
(2008 COURSE)

[Time : 3 Hours] **[Max. Marks:100]**
Total No. of Questions : 12 **[Total No. of Printed Pages:2]**

SECTION I

Q.1 a) State Law of Robotics as stated by issac Asimov. Also define a robot as per Russian Industrial Association (R/A). [6]

b) Discuss Cartesian robot and articulated robot for [10]
i) coordinate system ii) work envelope (Draw figure)
iii) Advantages & Disadvantages iv) Applications.

OR

Q.2 a) Describe different components of a typical robot system explaining their function with the help of a block diagram. [10]

b) Compare CNC machines with robots [6]

Q.3 a) Explain in details, Classification of robots according to the form of motion. Discuss example of each class in brief. [9]

b) Discuss selection criteria for drive technology in robot. Here compare hydraulic and electro drive technology stating their applications. [9]

OR

Q.4) Explain the following terms : [18]
a) work envelop b) Spatial Resolution c) compliance
d) Roll, Pitch, Taw e) Reputability f) Degree of freedom

Q.5 a) Explain working of following types of grippers. [8]
i) Vacuum type ii) Magnetic type.

b) Explain the method for rotary to rotary motion conversion. [8]

OR

Q.6 a) Explain how Lagrengian analysis can be applied for a single prismatic joint working against gravity. [8]

b) What are the different types of end effectors? With the help of a neat diagram, explain any two end effectors. [8]

SECTION - II

Q.7 a) Draw a net diagram to 'Stanford Robot' explaining the degrees of freedom. Also show all the coordinate frames attached to the robot. [10]

b) The coordinates of a point one (2,2,0) w. r. t. a movable cartesian frame OUVW. Find the coordinates of the point w.r.t. the fixed cartesian frame OXYZ if the movable frame is obtained by a rotation of 60^0 about the Z axis is followed by translation of 5 units along the rotated V axis [8]

OR

Q.8 a) With the help of a neat diagram, of line all D-H parameters. [9]

b) Explain the concept of inverse kinematics its importance and problems associated with it. [9]

Q.9 a) Explain 'Resolved motion position Coutrl'(RMPC) for controlling robot manipulator. [8]

b) Explain the concepts of manipulator jacobian, , jacobian inverse and singularities in brief [8]

OR

Q.10. a) Explain Rmc with the help of neat sketch [8]

b) Explain JPC with the help of neat sketch [8]

Q.11) Write a note on : [16]

i) Exeskelton and Teach pendent

ii) Classification of robot languages

OR

Q.12) Write a note on : [16]

i) on line and off line programming

ii) Robot for past sorting and inspection.

iii) Sensers, Actuators and their selection criteria for a robot application.

UNIVERSITY OF PUNE
[4364]-525
B. E. (Electrical) Examination - 2013
POWER QUALITY(403143)
(2008 Pattern)

[Total No. of Questions:12] **[Total No. of Printed Pages :3]**
[Time : 3 Hours] **[Max. Marks : 100]**

Instructions :

*(1) Answer **Q1 or Q2, Q3 or Q4, Q5 or Q6** from section I and **Q7 or Q8, Q9 or Q10, Q11 or Q12** from section II.*
*(2) Answers to the **two sections** should be written in **separate answer-books**.*
(3) Black figures to the right indicate full marks.
(4) Neat diagrams must be drawn wherever necessary.
(5) Use of non-programmable electronics pocket calculator is allowed.
(6) Assume suitable data, if necessary.

SECTION-I

Q1 a) What are symptoms of poor power quality? How good grounding practice improve power quality? [8]

b) Define term power quality. State various power quality issues. How these are characterized? [10]

OR

Q2 a) What are adverse effects of poor grounding system on system operation and Quality of power supply? [8]

b) i) Classify voltage variations. ii) What way transients are differing from harmonics? [10]

Q3 a) What is voltage flicker? Explain various causes of voltage flickers. How voltage flickers are measured? [8]

b) Explain the following terms related with voltage flicker i) Short term(P_{st}) and ii) Long term(P_{lt}) voltage flicker. [8]

OR

Q4 a) Discuss causes of over voltages in power systems. Explain mitigation methods for over voltages. [8]

b) Enlist various sources of voltage flicker? Explain voltage flicker adverse impacts on power system equipments. [8]

Q5 a) Why voltage sag is important power quality event compared to other events? Explain economic impact of voltage sag. [8]

b) Explain influence of fault location and fault level on voltage sags and concept of area of vulnerability. [8]

OR

Q6 a) Explain step by step procedure for assessment of equipments sensitivity to voltage sags. [8]

b) Discuss sag requirements for computer and allied equipment. Explain CBEMA and ITIC curve in reference to power quality. [8]

SECTION-II

Q7 a) Define terms harmonics, inter harmonics and sub-harmonics. Also explain various power quality indices used for assessment of harmonics. [8]

b) Explain impacts of harmonics on power system equipments. [10]

OR

Q8 a) Explain following terms in context to non sinusoidal supply conditions- [8]

i) True power factor ii) Distortion power factor iii) Total harmonic distortion

b) In context to harmonic attenuation explain- i) Effect of system response [10]

ii) Series and parallel resonance

Q9 a) Explain various sources of transient over voltages. [8]

b) Define transient's velocity and surge impedance. Explain the effects of the termination on it. [8]

OR

Q10 a) Explain transient introduced by capacitor and load switching. [8]

b) Explain impulsive transients due to lightening with its adverse impacts on power system equipments. [8]

Q11 a) What is need of power quality measurements? Also state selection criteria of power quality assessment equipments. [8]

b) What is reactive approach for power quality monitoring? Is there any restriction on location of power quality monitors? [8]

OR

Q12 a) Explain the role of intelligent systems in power quality monitoring. [8]

b) In context to power quality monitoring explain following [8]

i) Initial site selection for power quality monitoring

ii) Requirement of power quality monitors and duration of monitoring

UNIVERSITY OF PUNE

[4364]-527

B. E. (ELECTRICAL ENG) Examination 2013

PROJECT MANAGEMNT 403143(2008 Pattern)

[Total No. of Questions:12] **[Total No. of Printed pages :2]**

[Time : 3 Hours] **[Max. Marks : 100]**

Instructions :

(1) Answers to the two Sections should be written in separate answer-books

(2) Figures to right indicate full marks.

SECTION I

Q1) Define 'project'. Explain characteristics of project. [16]
How projects are classified?

OR

Q2) a) How projects are appraised? [8]

b) Explain various types of project organizations. [8]

Q3) Explain various components of cost associated with project. [16]

OR

Q4) a) Explain 'profitability index 'and' return on investment (ROI): [10]

b) What are the reasons of project failures? [6]

Q5) a) Explain 'critical path method (CPM) in detail [9]

b) Explain 'programme Evaluation and review technique (PERT) in detail. [9]

OR

Q6) Write short Notes on, [6]

a)Gantt chart

b) Activity on Arrow Diagram (AOA) and Activity on Node Diagram (AON) [6]

c) Graphical Evaluation and Review Technique (GERT) [6]

SECTION II

Q7) ‘project cost estimating and budgeting is a very important aspect of project management . Explain how cost estimating and budgeting processes are carried out. [16]

OR

Q8)a) Explain various factors responsible for cost escalation [8]

b) Describe project accounting systems. [8]

Q9) a) Explain processes of project quality management [10]

b) How quality of procured items is managed? [6]

OR

Q10) a) Explain various techniques of quality assurance and control. [10]

b) How International projects are managed? [6]

Q11) Write short notes on. [6]

a) Sources of risks [6]

b) Adjusted discount rate method [6]

c) Certainty equivalent method

OR

Q12) Write short notes on, [6]

a)portfolio risks

b)Capital Asset pricing Model (CAPM) [6]

c) Correlation Coefficient [6]

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B. E. Electrical Examination - 2013

RESTRUETURING AND DEREGULATION

(Course 2008)

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

[Time : 3 Hours] **[Max. Marks : 100]**

1) *Answer **any three** questions from each I and three questions from section II*
2) *Answer not more than 3 questions of which at least questions must be from each section*
   *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.*
5) *Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.*
6) *Assume suitable data, if necessary.*

SECTION I

Q.1 a) Explain in detail the functions of [12]
i) CEA
ii) PFC

b) Why the reformation has taken place in electrical power system [6]

OR

Q.2 a) What are various challenges before Indian Power Sector [9]

b) Explain the operation of Indian Energy Exchange [9]

Q.3 a) Write short notes [8]

i) Capital Cost

ii) Debt and Equity

iii) Depreciation

b) Explain Average, Marginal and Avoided Costs. [8]

OR

Q.4 a) Explain the tariff-Setting principle [8]

b) What do you mean by [8]

i) Subsidy & cross – subsidy

ii) O and M expenses.

Q.5 a) What is role of regulation? [8]

b) What are the regulation externalities? [8]

OR

Q.6 a) Write short note on [10]

i) CERC

ii) Regulatory Process in India

b) Give the structure of regulatory process in India [6]

SECTION – II

Q.7 a) Explain Pool Model based on contractual arrangement. [8]

b) Explain wholesale competition & retail competition model based on industry structure. [10]

OR

Q.8 a) Explain various ownership models. [9]

b) Explain electricity reforms in Nordic pool & uk [9]

Q.9 a) Explain various methods of transmission pricing. [8]

b) Explain power exchange in India [8]

OR

Q.10 a) Explain in detail wheeling trading model [8]

b) Compare integrated trading model and de centralized trading model [8]

Q.11 a) Explain the working of ISO [8]

b) Explain and compare TRANSO and ISO [8]

OR

Q.12 a) Explain the congestion issues & management [8]

b) Write a note of availablity based TARISS (ABT) [8]

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B. E. (Electrical) Examination May 2013

EXTRA HIGH VOLTAGE TRANSMISSION

(2008 Course)

[Total No. of Questions:12] **[Total No. of Printed pages :5]**

[Time : 3 Hours] **[Max. Marks : 100]**

Instructions : *(1) Answer any one questions from each unit*

(2) Answers any 3 questions from each section

(3) Answers to the two Sections should be written in separate answer-books

(4) Neat diagram must be drawn wherever necessary.

(5) Figures to the right indicate full marks.

(6) Assume suitable data, if necessary.

(7) Use of logarithmic tables slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.

SECTION-I

UNIT I

Q.1 a) The sending end voltage and receiving and voltage are nearly equal [8]
to E state the expression for power handling capacity of the line in terms of E and line parameters Also find expressions for current in each line of circuit, power lass in each circuit ad percentage power loss of each circuit.

b) Write note on different types of winds creating oscillations/ vibrations [8]
of the line state the different factors on which the effect of wind depends Discuss about frequency of oscillations wind velocity, amplitude for each type of wind

OR

Q.2 a) Write note on dumpers and spacers Draw the neat sketches. [8]

b) Write equations for travelling waves due to any disturbance occuring [8]
on long transmission line. Derive expression for voltage V(x) and current

I(x) at any point ''x'' meter away from the receiving end

UNIT II

Q.3 a) For three phase 400kv horizontal line, phase spacing S=11 meter, [10]
height of conductors above ground H=15 meter, conductors are
2×3.18 cm. diameter, bundle spacing B=45.72 cm. Calculate the elements
of maxwell's coefficient matrix. Write expression for matrix of flux
linkanges of three conductors, matrix for inductances for untransposed
and transposed line with units.

b) A moose conductor has the following details: [6]
outer diameter 31.8 mm Area of aluminium 515.7 mm^2 calculate the resistance
of 1 km of double moose bundled conductor at 50^0 C. given that $\varrho_{aluminium}$
$=2.7\times10^{-8}$ ohm-meter, at 20^0 C and temperature resistance coefficient of
aluminium at 0^0C. 4.46×10^{-3} /^{0}C (Increase length by 5% for stranding)

OR

Q.4 a) If matrix [D] is of size 3×3and with all elements as one. Derive the [8]
expression for matrix[L] and [C] of completely transposed line in terms of
matrix [D] and unit matrix [U] If average value of ground inductance Lg is
to be considered, then derive expression for total inductance matrix [L]

b) Write note on diagonalization of matrix of inductances of the line. [8]

UNIT III

Q.5 a) Two conductors of single phase line are ''2d'' meter apart, r=radius [8]
of each conductor. Derive the expression for voltage between two conductors
in terms of charge q coulomb of each conductor. Also find expression for
capacitance C of 1 meter length of conductor and surface voltage gradient Er.

b) A single conductor of ehv transmission line, strung above the ground is used [6]

for experimental purposes to investigate high voltage effects. The conductor is expanded ACSR with diameter 0.0625 meter and line height is 21 meter above ground calculate the voltage to ground which will make its surface voltage gradient equal to corona inception gradient E_0. E_0 is given as

$E_0 = \frac{30 \times 10^2}{\sqrt{2}} \frac{1}{m} \left(1 + \frac{0.301}{\sqrt{r}}\right)$ kv/ meter where r is radius of conductor in cm in this formula and m=1.3 required for stranding effect.

Also calculate capacitance to ground cg per km length of conductor

c) A charge of 10 micro coulomb is placed at distance 2 meters from center of sphere of radius 0.5 meter calculate magnitude, polarity and location of a point charge which will make the sphere at zero potential. [4]

OR

Q.6 a) Derive the condition for maximum charge on ehv conductor of three phase line in terms of elements of matrix [M] where $[M] = [P]^{-1}$ and [P] is maxwell's potential coefficient matrix [8]

b) Neglecting the effect the image charges and charges of other phases find expression for maximum and minimum voltage gradient on surface of subconductors of bundle of two subconductors.

c) A conductor 5 cm diameter is strung inside an outer cylinder of 2 meter radius. Find corona inception gradient Eo using $Eo = 21.92 \times 10^2 \left(1 + \frac{0.308}{\sqrt{r}}\right)$ kv/meter where r is radius of conductor in meter Also find corona inception voltage. [4]

SECTION II

UNIT IV

Q.7 a) Discuss about the effects of high electrostatic fields on humans, animals [8]

and plants

b) Find expression for electrostatically induced voltage in any conductor of unenergized three phase circuit of double circuit line [8]

OR

Q.8 a) Write note on effects of high magnetic fields on human health. [8]

b) Explain the procedure to find the electrostatically induced voltage on ground wire. What is use of ungrounded ground wire? [8]

UNIT V

Q.9 a) Draw the connection diagram of 3 phase full wave bridge rectifier mark line currents and currents through the thyristors. Derive the expression for line current in terms of de current. What is effect of ignition delay angle $\propto$ on phase displacement between ac voltage and current [8]

b) Draw the sketch of HVDC system showing various components Describe each component briefly [8]

OR

Q.10 a) Explain the inversion mode operation of converter. Explain the effect of commutation overlap angle on the threshold value of ignition delay angle What is meant by threshold value of ignition delay angle [8]

b) Derive the expression for converter transformer rating in terms of ideal no load dc voltage and rated direct current. [8]

UNIT VI

Q.11 a) Discuss about the ideal and actual VI characteristics of the converter [10]

b) Write note on reactive power requirement of HVDC converters [8]

OR

Q.12 Write note on following

i) Individual phase control system for CEA control [9]

ii) Use of tap charge control to keep ignition delay angle $\propto$ extinction angle γ within acceptable range and limitations on minimum value of of $\propto$ and γ [9]

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B. E. (Electrical Engineering)
Examination – 2013 (semester-II)
SMART GRID Elective IV
(2008 Pattern)

[Time : 3 Hours] **[Max. Marks : 100]**
Total No. of Questions : 12 **[Total No. of Printed Pages :2]**

Instructions :

*(1) Answers to the **two sections** should be written in **separate answer-books**.*
(2) Attempt Section I :Q1or Q2, Q3 or Q4, Q5 or Q6 and Section II: Q7 or Q8, Q9 or Q10, Q11 or Q12
(3) Black figures to the right indicate full marks.
(4) Neat diagrams must be drawn wherever necessary..
(5) Assume suitable data, if necessary.

SECTION I

Q1) a) High light on evolution of electric Grid and the Concept of Smart Grid. [10]

b) Write a note on opportunity and barriers in Smart Grid. [8]

OR

Q2) a) High light on need and functions of Smart Grid. [10]

b) Write a note on present development in Smart Grid considering any one case study. [8]

Q3) a) Explain how Smart Meters can be play an important role to make a system Smart. [8]

b) Explain the concept Plug in Hybrid Electric Vehicles. [8]

OR

Q4) a) Explain how Smart Appliances can be the part of Smart Grid. [8]

b) Explain the concept Vehicle to Grid. [8]

Q5) a) Write a note on Smart Substation. [8]

b) Explain the concept SMES. [8]

OR

Q6) a) Write a note on Substation Automation. [8]

b) Write a note on Phase Measurement Unit. [8]

SECTION II

Q7) a) Describe the concept and formation of Micro Grid. [10]

b) Write a note on Micro turbine. [8]

OR

Q8) a) Discuss different issues of micro grid when interconnected. [10]

b) Write a note on captive power plant. [8]

Q9) a) Write a note on, Power quality management in smart grid. [8]

b) Describe the concept, power quality conditioners related to smart grid. [8]

OR

Q10) a) Describe the power quality issues of grid connected renewable energy sources. [8]

b) Explain the power quality audit and its importance in smart grid. [8]

Q11) a) Explain the, concept WAN related to smart grid. [8]

b) Write a note on Wi-Max based communication in smart grid. [8]

OR

Q12) a) Explain the importance of Bluetooth in smart grid. [8]

b) Write a note on, Broadband over power line. [8]

[Total No. of Questions:12] **[Total No. of Printed Pages:3]**

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[4364]-533
B. E. (Electrical) Examination - 2013
Industrial Drives & Control (2008 Course)
[Time: 3 Hours] **[Max. Marks: 100]**

Instructions:

1 *Answers three questions from* ***sections I*** *and three question 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 *Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.*

SECTION -I

Q.1	A	Explain speed torque conventions and multi quadrant operation of drives.	8
	B	Obtain the equilibrium points and their steady state stability when motor and load torques are $T = -1-2W_m$ and $T_1 = -3 (W_m)^{1/2}$	8

OR

Q.2	A	Explain load equilisation in an electric drive. How is it achieved	8
	B	A drive has following parameters T= 150-0.1 N N-m and T_1 = 100 N-m where N is rpm. Initially the drive is opening in steady state. The characteristics of load torque are changed to T_1 = -100 N-m. Calculate initial and final equilibrium speeds	8
Q. 3	A	State and explain important features of various methods of banking of DC motor.	8
	B	A 230 V, 960 rpm, 200A dc separately excited motor has an armature resistance of 0.02 Ω . motor is required to hold the rated load torque by dynamic braking at 1200rpm without emf exceeding 230 V. Calculate the value of external resistance to be connected across armature	8

OR

Q. 4	A	Explain plugging of Induction motor. What precautions are to be taken during plugging operation of Induction motor.	8
	B	A three 440 V, 50 Hz, 6 pole star connected IM has following parameters referred to stator side: R_S = 0.5 Ω, R_r' = 0.6 Ω , $X_s = X_r'$ = 1 Ω . Stator to rotor turns ratio is 2. If the motor is used for regenerative braking , determine maximum overhauling torque it can hold and the range of speed in which it can safely operated.	8
Q. 5	A	Explain with neat diagram how speed control of three phase fully controlled converter is achieved? Draw output voltage waveforms for $\alpha = 30^0$.	10
	B	A 220 V, 24 A 1000rpm separately excited dc motor has an armature resistance of 2 Ω. Motor is controlled by chopper with frequency of 500 Hz and a source voltage of 230 V. Calculate the duty ratio for 1.2 times rated torque and 500rpm	8

OR

Q. 6	A	Explain the closed loop control of DC series motor with the help of block diagram	8
	B	A 220 V, 50 A 1500rpm separately excited dc motor has an armature resistance of 0.5 Ω fed from three phase fully controlled converter. AC source has a line voltage of 440V, 50Hz. A star –delta connected transformer is used to feed the armature so that the motor terminal voltage equal to rated voltage when converter firing angle is zero. i. Calculate transformer turns ratio ii.Determine α when a. Motor is running at 1200rpm and rated torque b. Motor is running at 800rpm and twice the rated torque. Assume continuous conduction.	10

SECTION II

Q. 7	A	How speed control is achieved in induction motor. Explain different methods available for speed control of induction motor.	8
	B	A three phase 440 V, 50 Hz, 945rpm , 6 pole delta connected IM has following parameters referred to stator side: $R_S = 2.0\ \Omega$, $R_r' = 2.0\ \Omega$, $X_s = 3.0\ \Omega$, $X_r' = 4\ \Omega$. When driving a fan load at rated voltage it runs at rated speed. The motor speed is controlled by stator voltage control. Determine i) Motor terminal voltage, current and torque at 800rpm ii) Motor speed , current and torque at , terminal voltage 280 V.	8
		OR	
Q. 8	A	Explain V/F control method of Induction motor through CSI control.	8
	B	Compare CSI and VSI control of Induction motor with their relative merits and demerits.	8
Q. 9	A	Explain how using static rotor resistance control energy saving is achieved during starting of Induction motor.	8
	B	Explain Static Sherbius Drive used for slip power recovery	8
		OR	
Q. 10	A	Explain various motor duty types with one example each.	8
	B	A motor has a heating time constant of τ_h = 2.2 Hrs and a cooling time constant of τh = 3.5 Hrs. The motor has final steady temperature rise of 65^0C and losses are proportional to $(\text{load})^2$.the motor is started from cold runs on duty cycle of rated load for 2hrs and the motor is switched off 1hr and then loaded to 1.5 times rated load for 1hr. Determine the temperature rise the end of cycle.	8
Q. 11		Write short notes on any three	18
	i)	with block diagram vector control of three phase induction motor.	
	ii)	Four quadrant operation of drive for rolling mills	
	iii)	Drives in machine tool applications	
	iv)	Drives used in sugar mill	

[Total No. of Questions: *12*] **[Total No. of Printed Pages: 3]**

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B. E. (ELECTRICAL)(Sem II) Examination - 2013

VLSI DESIGN (Elective - III) (403150) (2008 Course)

[Time: *3* **Hours]** **[Max. Marks: 100]**

Instructions:

1. *Answers to the **two sections** should be written in **separate answer-books**.*
2. *Black figures to the right indicate full marks.*
3. *Your answer will be valued as a whole*
4. *Neat diagrams must be drawn wherever necessary.*
5. *Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.*
6. *Assume suitable data, if necessary.*

SECTION –I

Q.1	A	Draw state diagram to detect 1111 sequence using mealy and moore model.	8
	B	Draw the timing diagram of MOD 7 Asynchronous counter and MOD 5 Synchronous counter.	10

OR

Q.2	A	Implement AND, OR NAND, NOR gate using 4 : 1 multiplexer.	8
	B	Draw state transition table MOD 6 counter using T flip-flop. Also implement its Design diagram.	10

Q. 3	A	Explain EDA tool Design flow using a Flow chart	8
	B	Define the terms : i) Concurrent statement ii) Sub program iii) Component iv) Configuration	8

OR

Q. 4	A	State and explain any 4 types of data types & data objects used in VHDL.	8
	B	Write VHDL code for 8:1 Demultiplexer & also draw its internal circuit diagram.	8
Q. 5	A	What do you mean by sub-program overloading? Explain with example using VDHL code.	8
	B	Write VDHL code for J-K flip-flop using process statement.	8

OR

Q. 6	A	Which are the nine different values of std-logic? Also write entity to create an array of 8x8 with data types as std-logic vector.	8
	B	What do you mean by configuration? Explain with an example in VHDL code	8

SECTION II

Q. 7	A	Explain voltage transfer characteristics of CMOS inverter	8
	B	Explain the construction of MOSFET device.	8

OR

Q. 8	A	Define the concept of 1.FAN-IN, FAN-OUT figure of merit and Noise margin w.r.t. CMOS. Also state its standard values.	8
	B	State standard device specifications of MOSFET.	8
Q. 9	A	Draw and explain Architecture of FPGA.	8
	B	Write a note on simulation and Synthesis.	8

OR

Q. 10	A	Differentiate PAL and PLA	8
	B	Draw and explain standard Architecture of CPLD	8
Q. 11	A	Write VHDL code for 4 bit Adder.	8
	B	Write VHDL code for 8 x 8 RAM.	10

OR

Q. 12	A	Draw block diagram of ALU & also write its VHDL code	8
	B	Write VDHL code for 4 bit shift register with parallel load and serial right shift output	10

[Total No. of Questions: 12] **[Total No. of Printed Pages: 4]**

UNIVERSITY OF PUNE

[4364]-535

B. E. (Electrical) Examination - 2013

High Voltage Engineering

(2008 Course)

[Time: 3 Hours] **[Max. Marks: 100]**

Instructions:

1 *Answer any three questions from Section I and any three 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.*

5 *Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.*

6 *Assume suitable data, if necessary.*

SECTION -I

Q.1 A Derive the current growth equations according to Townsend's theory, in presence of primary and secondary process. Also define Townsend's first & second ionization coefficient. 10

B In an experiment, in a certain gaseous dielectric material, the ratio of steady state current and initial current (I/I_o) is $5*10^7$. The gap spacing between plane electrodes is 0.5 cm. The Townsend's first ionization 6

coefficient (α) is 11.6/torr-cm. Calculate Townsend's secondary ionization coefficient (γ). Check the fulfillment of Townsend's breakdown criterion.

OR

Q.2	A	Write short note on following i) Corona Discharge and breakdown in non-uniform field ii) Townsend's breakdown criterion	8
	B	Explain streamer theory of breakdown of gaseous dielectrics.	8
Q. 3	A	Explain following breakdown phenomenon of solid insulating materials i) Treeing and tracking phenomenon ii) Breakdown due to Internal Discharge	12
	B	Explain mechanisms of breakdown in composition dielectric material.	6

OR

Q. 4	A	Explain following breakdown phenomenon of liquid dielectric materials i) Suspended particle theory ii) Cavitations and bubble theory iii) Stressed oil volume theory	12
	B	Which types of impurities are present in liquid dielectric materials? Explain how liquids are classified based on that?	6
Q. 5	A	Explain with schematic diagram, explain the lightning phenomenon.	8
	B	Explain various reasons for switching surges. Also state the remedial actions for the same.	8

OR

Q. 6	A	Explain the statistical method of insulation co-ordination.	8
	B	What is the function of lightning arrester? Compare horn gap lightning arrester with ZnO metal oxide arrester.	8

SECTION II

Q. 7	A	Describe series and parallel resonance system of generation of high dc voltages.	10
	B	A Cockroft-Walton type voltage multiplier has 8 stages with capacitances, all equal to 0.05μF. The supply transformer secondary voltage is 125 KV at a frequency of 150 Hz. If the load current to be supplied is 5Ma, Find (a)% Ripple, (b) the regulation (c) optimum number of stages for minimum regulation or voltage drop and (d) maximum output voltage	8

OR

Q. 8	A	A 100 KVA, 250 V/200KV feed transformer has resistance and reactance of 1% and 5% respectively. This transformer is used to test a cable at 400 KV at50Hz. The cable takes a charging current of 0.5A at 4000KV. Determine the series inductance required. Assume 1% resistance of inductor. Also determine input voltage to the transformer. Neglect dielectric loss of the cable.	10
	B	Explain any two methods of Tripping and control of impulse generators.	8
Q. 9	A	Write down specific characteristics of cathode ray oscillographs used for impulse voltage measurements.	4
	B	With neat diagram explain measurement of dielectric constant and loss factor.	7

	C	A generating voltmeter has to be designed so that it can have a range from 30 to 200 kV DC it the indicating meter reads a minimum current of 2 micro ampere what will be maximum current of meter? What should be the capacitances of generating voltmeter be?	5

OR

Q. 10	A	Design a peak reading voltmeter along with a suitable micro meter such that it will be able to read voltage of 80 Kv peak. The capacitances potential divider available is of the ratio 1000:1.	4
	B	With a neat sketch describe electrostatic voltmeter. Write down its advantages and disadvantages.	7
	C	Describe in brief any one method of measurement of high A.C. Current.	5
Q. 11	A	Give classification of H.V. laboratories along with size and ratings.	8
	B	Write down any two tests performed on insulators.	8

OR

Q. 12		What are type and routine tests? Write down various names of type and routine tests performed on circuit breaker . Explain any two in detail.	16

[Total No. of Questions: 12] **[Total No. of Printed Pages: 4]**

UNIVERSITY OF PUNE

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B. E. (Electrical) Examination - 2013

Digital Signal Processing Elective III

(2008 Course)

[Time: 3 Hours] **[Max. Marks: 100]**

Instructions:

1 *Answer any three questions from each section*

2 *Answer three question from section I and three questions from section II*

3 *Answers to the two sections should be written in separate answer-books.*

4 *Neat diagrams must be drawn wherever necessary.*

5 *Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.*

6 *Assume suitable data, if necessary.*

SECTION -I

Q.1 A Give detail classification of discrete time signal. 6

B Perform linear convolution on 12

i) $x(n) = \{1,2, \underset{\uparrow}{3}, 2,1\}$

$h(n) = \{\underset{\uparrow}{1},2,2,1\}$ using tabular method.

ii) $x(n) = \delta(n-1) - \delta(n) + \delta(n+1)$
$h(n) = u(n) - u(n-3)$ using multiplication method

OR

Q.2	A	Check whether following signal is linear or non-linear, time variant or invariant, static or dynamic $y(n) = x(n) \cos(won)$	6
	B	With suitable block diagram explain analog to digital conversion system.	6
	C	State the stability and causality property of LTI system.	6
Q. 3	A	State and explain following properties of D.T.F.T. (i) Linearity (ii) Time shifting.	8
	B	Determine inverse z-transform of following using partial faction method. $x(z) = \frac{\frac{5}{3}z^{-1}}{1-\frac{7}{3}z^{-1}-\frac{2}{3}z^{-2}}$ with ROC i) $\lvert z\rvert > 2$ ii) $\lvert z\rvert < \frac{1}{3}$ iii) $2 > \lvert z\rvert > \frac{1}{3}$	8

OR

Q. 4	A	Find z-transform of following sequences with ROC i) $x(n) = \delta(n+1) + \delta(n) - \delta(n-1) + \delta(n+2)$ ii) $x(n) = \left(\frac{1}{2}\right)^n u(n-1)$	8
	B	Explain following properties of z –transform i] linearity	8

ii] Time-shifting

Q. 5	A	What do you mean by ideal selective filters? Draw the ideal filter characteristic of all type of filters.	6
	B	Find magnitude and phase response of a system described by $y(n) + \frac{1}{2}y(n-1) = x(n) - \frac{1}{4}x(n-1)$	10

OR

Q. 6	A	Define and explain group delay and phase delay	7
	B	State and explain the four types of generalized linear phase systems.	9

SECTION II

Q. 7	A	State and explain linearity and periodicity properties of DFT.	8
	B	Obtain 4-point DFT of following sequence $x(n) = \{1,2,3,4\}$	8

OR

Q. 8	A	Explain Radix-2 DIT-FFT algorithm for 8-point DFT	8
	B	Perform 4-point circular convolution on i] $x(n) = \{1,2,2,3\}$ & $h(n) = \{1,1,1\}$ ii] $x(n) = \{2,2,1\}$ & $h(n) = \{1,2\}$ using any method	8
Q. 9	A	Give the compassion between analog and digital filters	6
	B	Design a linear phase FIR band pass filter of order seven which is described by	12

$H_d(w) = e^{-j3w}$ for $\pi/6 < |w_c| < \pi/3$

Use hamming window which is given by

$$W_H(n) = 0.54 + 0.46 \frac{\cos(2\pi n)}{M-1}$$

OR

Q. 10	A	Explain bilinear transformation method for designing of I I R filter	6
	B	Compare FIR filter and I I R filter	5
	C	Explain design steps of I I R butter worth filter.	7
Q. 11	A	Explain application of DSP in harmonic analysis with suitable block diagram.	8
	B	Explain application of DSP in induction motor control with block diagram.	8

OR

Q. 12	A	The difference equation is given by	10

$$y(n) - \frac{1}{2}y(n-1) = x(n) - 2x(n-1) + 3x(n-2)$$

i) Check whether the system is FIR or IIR
ii) Realize it using direct form –I and direct form-II structure

	B	Explain parallel form and cuscade form structure of IIR system.	6

[Total No. of Questions: 12] **[Total No. of Printed Pages: 2]**

UNIVERSITY OF PUNE
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B. E. (Electrical) Examination - 2013
DIGITAL CONTROL SYSTEMS (2008 Course)

[Time: 3 Hours] **[Max. Marks: 100]**

SECTION -I

Q.1 A Draw a configuration of a basic digital control scheme in block diagram and explain the function of each block. 6

B Explain Linearity property of a system and determine whether the following systems are linear or not with proper justification. 6

i) $Y(n) = X(n) + n\,X(n+1)$

ii) $Y(n) = n\,X^2(n)$

iii) $Y(n) = \frac{1}{3}[X(n) + X(n-1) + X(n-2)]$

C Explain various types of Analog to digital converters. 5

OR

Q.2 A Discuss the advantages and limitations of Digital Control Systems. 6

B Explain the sampling and reconstruction process, state the sampling theorem and give its importance. 6

C Explain Digital to Analog converter with block diagram. 5

Q. 3 A State and prove important properties of Z-transform. 5

B Determine the Z-transform and ROC of the following signals. Also mention the particular property, which you will use. 12

i) $X(n) = (a^n + a^{-n})\,u(n)$

ii) $X(n) = (\cos \omega_0 n)\,u(n)$ ----use Euler's identity

OR

Q. 4 A State and prove the initial and final value theorems for X(z). 5

B Determine inverse Z-transform of the following 12

i) $X(z) = \frac{4Z}{(Z+0.5)^2}$ for $|Z| > 0.5$

ii) $Z^2/0.5 - 1.5Z + Z^2$ for $|Z| < 0.5$

Q. 5 A Show how a mapping of Left Half of the S-plane is done into the Z-plane with Stable and unstable regions. 8

B Examine the stability of the system by Bilinear transformation method, whose characteristic equation is: 8

$F(z) = Z^3+3Z^2+2Z-3=0$

OR

Q. 6 A Describe the general rules for constructing the Root Loci in designing LTI discrete time control system. 8

B The characteristic equation of discrete time unity feedback control system 8

is given by : $Z^3+(3K)Z^2+(K+2)Z + 4=0$. Determine the range of gain K for stability of the system by use of Jury's stability test.

SECTION II

Q. 7 A Explain discretization of continuous-time state space equation 8

$X^0 = Ax + Bu; \quad y = Cx + Du$

B Determine the pulse transfer function of a system 8

$$X(K+1) = \begin{bmatrix} 0.8 & 1 \\ 0 & 0.5 \end{bmatrix} X(k) + \begin{bmatrix} 1 \\ 0.5 \end{bmatrix}$$

$Y(k) = [1 \ \ 0] X(k)$

OR

Q. 8 A Discuss the various methods used for STM 8

B Determine STM by Cayley-Hamilton theorem 8

$$X(K+1) = \begin{bmatrix} 1 & -1 \\ 0 & 2 \end{bmatrix} X(k) \quad \text{Take } X(0) = \begin{bmatrix} 1 \\ -1 \end{bmatrix}$$

Q. 9 A What is the principle of duality? Also explain effect of pole zero cancellation on the system with suitable example. 8

B Investigate controllability and observability for the following system. 8

$$A= \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ -6 & -11 & -6 \end{bmatrix} \quad B= \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix} \quad C=[4 \quad 5 \quad 1]$$

OR

Q. 10 A What is Full order observer? With the help of a block diagram explain it. 8

B For the system 8

$X (K+1) = G X(k) + H U (K) ; Y(k) = C X (k)$ where

$$G = \begin{bmatrix} 0 & 20.6 \\ 1 & 0 \end{bmatrix}, \ H= \begin{bmatrix} 1 \\ 0 \end{bmatrix} \text{ AND } C = [1 \quad 0]$$

Design a full state observer for the desired eigen values of observer matrix

As $Z_1 = -1.8 + j2.4$ & $Z_2 = -1.8 – j2.4$

Q. 11 A Draw a neat block diagram of digital temperature control scheme and explain the function of each block. 8

B Consider the system defined by 10

$$G (z) = \frac{z+1}{z^2+z+0.16}$$

Obtain state space representation for this system in Controllable canonical form.

OR

Q. 12 A Explain control algorithm for temperature control scheme. 8

B Consider the system defined by 10

$$G (z) = \frac{z^3+8z^2+17Z+8}{(z+1)(z+2)(z+3)}$$

Obtain state space representation for this system in Jordan canonical form.