

UNIVERSITY OF PUNE
[4364]-799

B. E. (INFORMATION TECHNOLOGY) Examination 2013
MOBILE COMPUTING (414444)
(2008 Course)(ELECTIVE –II) (SEM –I)

[Total No. of Questions:12]
[Time : 3 Hours]

[Total No. of Printed pages :3]
[Max. Marks : 100]

Instructions :

- (1) *Answers any 3 questions from each section*
- (2) *Answer Q1 or Q2, Q3 or Q4 and Q5 or Q6 from Section-I and Q7 or Q8, Q9 or Q10, and Q11 or Q12 from Section-II*
- (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.*

SECTION-I

Q.1a) Explain the need for hand off and step by step Inter-BS Handoff. [8]

b) Explain the concept of frequency reuse channel. [8]

OR

Q.2a) Describe the three hand off detection strategies. [8]

b) Explain the roaming management in GSM. [8]

Q.3a) Explain step by step description of [8]

1) GSM call origination.

2) GSM call termination.

b) Explain the MAP service primitives in GSM network. [8]

OR

Q.4a) Explain VLR failure restoration. [8]

b) Discuss about the architecture of GSM. [8]

- Q.5a) Explain four layers in the SMS protocol. [10]
b) Explain the procedure of International call setup. [8]

OR

- Q.6 Write short notes on: [18]
1) Tariff administration
2) SMS architecture
3) Fixed network number portability.

SECTION-II

- Q.7a) Describe the GPRS architecture. [8]
b) Discuss the Billing procedure in GPRS. [8]

OR

- Q.8a) Describe the WAP protocol. [8]
b) Compare W-CDMA and CDMA 2000. [8]
Q.9a) Describe the goals and requirements of mobile IP. [8]
b) Explain dynamic source routing in MANET. [8]

OR

- Q.10a) Explain IPV6 in detail. [8]
b) Explain important processes used in mobile IP. [8]
Q.11 Write short notes on: [18]

- 1) W-LAN
- 2)RFID
- 3)Spread spectrum technologies

OR

- Q.12 Write short notes on: [18]
1) Wireless Local Loop
2) Java card
3) Bluetooth

[Total No. of Questions: 12]

[Total No. of Printed Pages: 2]

UNIVERSITY OF PUNE

[4364]-113

B. E. (Electrical) Examination - 2013

VLSI Design (2003 Course)

[Time: 3 Hours]

[Max. Marks: 100]

Instruction:

- 1) Answer any 3 questions from each Section
- 2) Answers to the two sections should be written in separate answer-books.
- 3) Neat diagrams must be drawn wherever necessary.
- 4) 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 the EDA tool Design flow in Detail alongwith flow-chart of each stage. 18
- OR**
- Q.2 A Draw and explain Mealy and Moore Modelling used for design of digital circuits using any one example with state diagram, state table, analysis & Designed circuit. 18
- Q. 3 A Which are the various HDL's available example the salient features of HDL 8
- B Design basic gates using suitable Multiplexer. 8
- OR**
- Q. 4 A Differentiate between HDL? High level language. 8
- B Design 16:1 MUX using only 4:1 MUX also explain its truth table. 8
- Q. 5 A Differentiate between sequential & combinational circuit with example. 8
- B Draw circuit & timing diagram of 3bit synchronous up counter & explain the same. 8
- OR**
- Q. 6 A Draw and explain 4 bit universal shift register. 8
- B Draw state diagram of "10101" Detector use Mealy Modelling. 8

SECTION II

- Q. 7 A Explain various Modelling types used in VHDL coding. 18
- OR**
- Q. 8 A Which are the various Data types and Data objects in VHDL? Explain. 18
- Q. 9 A What is sub-program overloading? Explain with example. 8
B What is configuration? Explain with one VHDL example. 8
- OR**
- Q. 10 A What is component? How it is used in programming? give example & explain 8
B What is the Difference between simulation and Synthesis? Explain 8
- Q. 11 A Write VHDL Code for 2 x 4 decoder 8
B Write VHDL code for 8 x 8 RAM 8
- OR**
- Q. 12 A Write VHDL code for 4 bit ALU 8
B Write VHDL code for 16:1 MUX 8

UNIVERSITY OF PUNE
[4364]-108
B. E. (ELECTRICAL), Examination 2013
PROJECT MANAGEMENT
(2003 Pattern)

[Total No. of Questions:12]
[Time : 3 Hours]

[Total No. of Printed pages :2]
[Max. Marks : 100]

Instructions:

- 1) Answers to the two sections should be written on separate answer books.
- 2) Figures to the right indicate maximum marks allotted for the respective question.

Section I

Q1) a) Define Project. Explain the need and characteristics of the project management. (8)

b) Explain various methods of project appraisal. (8)

OR

Q2) a) Explain the different phases in project life cycle. (8)

b) Explain various forms of project organisation. (8)

Q3) Explain various costs associated with project. (16)

OR

Q4) a) How to analyse returns from the project? (8)

b) What are the major causes of project failures? (8)

Q5) Write short notes on, (18)

a) Gantt Chart

b) PERT

OR

Q6) Write short notes on, (18)

a) CPM

b) GERT

Section II

Q7) a) What is materials management? Explain its objectives and functions. (8)

b) What is tendering? What are the different types of tenders? (8)

OR

Q8) Write short notes on, (16)

a) Purchasing Cycle

b) 5 R's of Purchasing

Q9) a) What is inventory management? What are the different types of inventories? (8)

b) What are the different costs associated with inventory? Explain EOQ. (8)

OR

Q10) What is stores management? What are the types of stores and functions of stores management? Describe the stores system. (16)

Q11) Write short notes on, (18)

a) Adjusted Discount Rate Method

b) Certainty Equivalent Method

OR

Q12) Write short notes on, (18)

a) Correlation Coefficient

b) Portfolio Risks

UNIVERSITY OF PUNE

[4364-101]

B.E. (Electrical) Examination-2013

Power system operations control

(2003 pattern)

Time-Three hours

Maximum Marks-100

[Total No. of Question=12]

[Total no. of printed pages= 3]

Instructions:

- (1) Answer 3 questions from Section-I. Answer question 3 from Section-II,
- (2) Answers to the two sections should be written in separate answer books.
- (3) Neat diagrams must be drawn whenever necessary.
- (4) Use of electronic pocket calculator is allowed.
- (5) Figures to right indicate full marks.

SECTION-I

Q.1 (a) Explain the equal area criterion for power system stability. Also sketch the swing curve and show the stable and unstable state on it. (10)

(b) Obtain the expression for swing equation. (06)

OR

Q.2 (a) Obtain the point-by-point solution of swing equation. (10)

(b) What is transient stability? Explain the factors affecting transient stability? (6)

Q.3(a) What is unit commitment? Explain the priority list method of unit commitment. (10)

(b) Explain the various constraint in case of hydro generators. (6)

OR

Q.4 (a) Explain the concept of spinning reserve and thermal unit constraints used for unit commitment. (08)

(b) Explain the dynamic programming method of unit commitment. (8)

Q.5 (a) Obtain the complete block diagram of load frequency control single area case. (12)

(b) Discuss the effect of speed governor dead band on automatic generation control. (06)

OR

Q.6 (a) Sketch and explain the first order appropriate and exact response for LFC single area case. (10)

(b) Draw the block diagram & explain the proportional plus integral control response for LFC single area case. (08)

Q.7 (a) Write a short note on following concepts of energy control. (16)

(i) Centralized control of power system

(ii) Decentralized control of power system.

(iii) Real time monitoring of power system.

OR

Q.8 (a) Write a short note on. (16)

(i) Man-machine interface

(ii) Tele-metering technique

(iii) Data logging unit

(iv) Remote terminal unit

Q.9 (a) Discuss the problems associated with series compensation of line. (8)

(b) Explain the generation and absorption of reactive power. (8)

OR

Q.10(a) discuss any three FACTS controllers used for reactive power control. (10)

(b) Explain problems of A.C. Transmission system. (06)

Q.11 (a) Write a short note on. (18)

(i) Emergency power interchange.

(ii) Capacity interchange

(iii) Diversity interchange.

OR

Q.12 (a) Explain the approach behind economy interchange evaluation. (6)

(b) Explain the working of power pools. (6)

(c) What is energy banking. (6)

UNIVERSITY OF PUNE
[4364]-102
B. E. (Electrical) Examination - 2013
UTILIZATION OF ELECTRICAL ENERGY
(2003 Course)

[Total No. of Questions : 12]
[Time : 3 Hours]

[Total No. of Printed Pages : 4]
[Max. Marks : 100]

Instructions :

- (1) *Section I : Q1 or Q2, Q3 or Q4, Q5 or Q6
Section II: Q7 or Q8, Q9 or Q10, Q11 or 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, electronic pocket calculator and steam tables is allowed.*
- (6) *Assume suitable data, if necessary*

SECTION I

- Q1) a) Explain direct arc heating furnace with suitable diagram. [9]
- b) A pipe of insulating material with relative permittivity of 5 is to be heated [9]
by dielectric heating. The size of the insulating material is $(10 \times 3 \times 3) \text{ cm}^3$.
The supply used has frequency of 200 Megacycles per second. The power absorbed is 400 watt at a power factor of 0.05. Find voltage and current.

OR

- Q2) a) Explain Laser welding with suitable diagram. [9]
- b) With a neat diagram explain Ajax Wyatt induction furnace [9]
- Q3) a) Draw and explain electrical circuit used in refrigerator. [8]
- b) State the principle of anodizing. State its applications. [8]

OR

- Q4) a) State and elaborate Faraday's laws of electrolysis. [8]
b) Draw and explain electrical circuit used in water cooler. [8]
- Q5) a) Define following terms – solid angle, coefficient of utilization, flux, [8]
luminous intensity.
b) With a neat diagram explain construction and working of Halogen Lamp. [8]

OR

- Q6) a) Discuss the considerations involved in simple design problem for indoor [8]
illumination scheme.
b) With a neat diagram explain construction and working of Metal helide lamp. [8]

SECTION II

- Q7) a) With a suitable diagram explain – Pentograph collector. [6]
b) State any six advantages of electric traction. [6]
c) Draw a block diagram of electric locomotive and explain its working. [6]

OR

- Q8) a) With a suitable diagram explain third rail system of current collection [6]
b) State any six disadvantages of steam engine drive. [6]
c) Explain 3 phase low frequency AC system and Kando system of track [6]
electrification.

- Q9) a) Draw typical speed-time curve and explain different terms related to it. [8]
b) Derive the expression for specific energy consumption in electric using [8]
usual notations.

OR

- Q10) a) What is tractive effort? Obtain complete expression for total tractive effort [8]

using usual notations.

b) Explain following terms in case of traction- Average speed, Schedule speed, [8]
coefficient of adhesion.

Q11) a) With a suitable diagram explain series parallel transition process using two [8]
DC series motors.

b) Discuss the difficulties faced for regenerative braking in case of DC series [8]
motor.

OR

Q12) a) State and elaborate desired characteristics of traction motors. [8]

b) With a suitable diagram explain bridge transition process for traction motors. [8]

UNIVERSITY OF PUNE
[4364]-103
B. E.(Electrical)Examination - 2013
INDUSTRIAL DRIVES & CONTROL
(2003 Pattern)

[Total No. of Questions:11]
[Time : 3 Hours]

[Total No. of Printed Pages :3]
[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) Neat diagrams must be drawn wherever necessary.
- (4) Use of logarithmic tables, slide rule, Mollier charts, electronics pocket calculator is allowed.

SECTION-I

- Q1 a) What are advantages of Electric drive? Explain main components Used in drive [8]
- b) Explain four quadrant operation of drive with reference to speed torque characteristics [8]

OR

- Q2 a) A drive has following equations for motor and load torques: [8]
 $T=(1+2 w_m)$ and $T_1=3\sqrt{wm}$
Obtain the equilibrium points and determine their steady state stability
- b) What do you understand by steady state stability? Explain on what factors stability of drive depends. [8]

- Q3 a) Why braking is required for an electrical drive. What are advantages of Electric braking? [8]
- b) A 230V 960 rpm and 200A d.c. separately excited motor has an armature resistance of 0.02Ω . Motor is required to hold the rated load torque by dynamic braking at 1200rpm without emf exceeding 230V. calculate the value of external resistance to be added with armature. [8]

OR

Q4 a) Explain with neat circuit diagram and speed torque characteristics, [8]
Braking of 3 phase Induction motor with plugging

b) Explain dynamic braking of 3 phase induction motor [8]

Q5 a) Explain with neat circuit diagram how speed control is achieved by a 1 [10]
Phase fully controlled converter. Draw o/p voltage waveforms for $\alpha = 45^\circ$. Write the o/p equations of the converter.

b) A 200V 875 rpm and 150A d.c. separately excited motor has an armature [8]
resistance of 0.06Ω . it is fed from single phase fully controlled converter with an
ac source voltage of 220V 50Hz. Assuming continuous conduction calculate

i) Firing angle for rated motor torque and 750 rpm

ii) Firing angle for rated motor torque and -500 rpm.

OR

Q6 a) Explain with neat circuit diagram speed control of 3 phase induction [8]
Motor with stator voltage control.

b) A three phase Y connected squirrel cage induction motor has following [10]
ratings and parameters, 1370 rpm, 400V, 50Hz four pole $R_s = 2.0\Omega$, $R_r' = 3.0\Omega$,
 $X_s = X_r' = 3.5\Omega$ and $X_m = 33.2\Omega$. The motor is controlled by a voltage source
inverter at constant V/f. Calculate

i) Speed for a frequency of 30Hz and 80% of full load torque

ii) Frequency for a speed of 1000rpm and full load torque.

iii) Torque for a frequency of 40 Hz and speed of 1100rpm.

SECTION-II

Q7 a) What is the principle behind V/F speed control strategy? Explain with [8]
necessary diagram of a scheme to implement V/F control method using power
control devices.

b) Draw circuit diagram for transistorized stator control method for 3 phase [8]
induction motor. Explain working principle, voltage & current waveforms at stator
of induction motor.

OR

Q8 a) Compare CSI and VSI for induction motor drive. [8]

b) Justify variable frequency control of induction motor is more efficient than [8]
stator voltage control.

Q9 a) Explain different classes of motor duty and how it affects the choice of [8]

Selection of motor rating.

b) Explain how the variable speed drive allows saving of energy in pump drives. [8]

OR

Q10 a) Explain different methods to reduce the energy loss during starting of induction motor. [8]

b) Explain thermal model of motor for heating and cooling. [8]

Q11 Write short notes on any three [18]

- i) Drives used in sugar mill.
- ii) Drives used in Textile mill.
- iii) Drives used in machine tool application.
- iv) Commutator less D.C. motor.
- v) Drives used in Rolling mill.

UNIVERSITY OF PUNE
[4364]-104
B.E.(Electrical)Examination - 2013
CONTROL SYSTEM II (403145)
(2003 Pattern)

[Total No. of Questions:12]
[Time : 3 Hours]

[Total No. of Printed Pages :3]
[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) All questions carry equal marks.
- (5) Use of logarithmic tables, slide rule, Mollier charts, electronics pocket calculator is allowed.
- (6) Assume suitable data, if necessary.

SECTION-I

- Q1 a) Explain advantages of state variable method over conventional one. [8]
b) Convert the T.F. into phase variable state space form [8]

$$G(s) = \frac{s-3}{s^3-9s^2-24s-20}$$

OR

- Q2 a) Find the T.F. [8]

$$\dot{X} = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ -6 & -11 & -6 \end{bmatrix} X + \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix} u(t)$$

$$Y = [4 \quad 5 \quad 1]X$$

- b) Explain construction of state model by direct decomposition and parallel decomposition with diagram. [8]
- Q3 a) State properties of state state transition matrix. [8]

b) Using Laplace transform method find the matrix exponential e^{At} for [8]

$$\text{i) } A = \begin{bmatrix} 0 & 1 \\ -6 & -5 \end{bmatrix} \quad \text{ii) } A = \begin{bmatrix} 0 & 2 \\ -2 & -4 \end{bmatrix}$$

OR

Q4 a) Explain terms eigen values, eigen vector, modal matrix and vander monde matrix. [8]

b) Diagonalise following matrix [8]

$$A = \begin{bmatrix} -4 & 1 & 0 \\ 0 & -3 & 1 \\ 0 & 0 & -2 \end{bmatrix}$$

Q5 a) Define Controllability and observability. Explain kalmans method to Determine controllability and observability. [10]

b) Determine the controllability and observability properties of following [8]

system: $A = \begin{bmatrix} 0 & 0 & 0 \\ 1 & 0 & -3 \\ 0 & 1 & -4 \end{bmatrix}; B = \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix}; C = [0 \quad 0 \quad 1]$

OR

Q6 a) Explain state observer with block diagram [8]

b) Consider the system defined by: $\dot{x} = Ax + Bu$ [10]

$$\text{where } A = \begin{bmatrix} 0 & 0 & -6 \\ 1 & 0 & -11 \\ 0 & 1 & -6 \end{bmatrix} \quad B = \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix}$$

by using the state feedback control $u = -Kx$ it is desired to have the closed loop poles at: $s = -2 + j3.464$, $s = -2 - j3.464$ and $s = -5$. Determine the state feedback gain matrix K .

SECTION-II

Q7 a) Derive Describing function of saturation with dead zone. [8]

b) Explain limit cycle and jump resonance characteristics of nonlinear system. [8]

OR

- Q8 a) Explain phenomenon exhibited by nonlinear system subharmonic Oscillation, asynchronous quenching, frequency entrainment. [8]
b) Explain how stability is determined by describing function method. [8]
- Q9 a) Define and classify different singular points. [8]
b) Determine the kind of singularity for each of following cases. Also locate the singular points on the phase plane [8]
1. $\ddot{y} + 3\dot{y} + 2y = 0$
 2. $\ddot{y} + 5\dot{y} + 6y = 0$

OR

- Q10 a) With reference to Liapunov's stability explain asymptotic stability, instability, positive definiteness, negative definiteness. [8]
b) Compare D.F. method of stability analysis with phase plane method. Explain isoclines method of constructing phase trajectory. [8]
- Q11 a) Explain different performance index terms like ISE, ITAE, IAE & ITSE. [6]
b) Explain mathematical procedure for optimal control design. [6]
c) Explain factors for designing optimal controller. [6]

OR

- Q12 a) Write short note on : [18]
- i) electric, and hydraulic actuators
 - ii) friction, spring mass
 - iii) Relays and sensors

UNIVERSITY OF PUNE
[4364]-106
B. E. (Electrical) Examination -2013
Power Quality (403143)
(2003 Course)

[Total No. of Questions:12]

[Total No. Printed Pages: 3]

[Time : 3 Hours]

[Max. Marks : 100]

Instructions :

- (i) Attempt q. No. 1 or q. no2, Q. No. 2, Q. No. 3 or Q. No. 4, Q. No. 5 or Q. No. 6 from Section I and Q No. 7 or Q. No. 8, Q. No. 9 or Q. No. 10. Q. No. 11 or Q No. 12 from section II.`
 - (ii) Answers to the **two sections** should be written in **separate answer-books**.
 - (iii) Neat diagrams must be drawn wherever necessary.
 - (iv) Black figures to the right indicate full marks.
 - (v) Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.
 - (vi) Assume suitable data, if necessary.
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SECTION – I

Q.1 a) Define and explain the following terms as per IEEE Std. 1159, such as [8]

- i) Voltage flicker
- ii) Voltage swells
- iii) Voltage sags
- iv) Voltage interruptions.

b) Define grounding as per IEEE dictionary (standard - 100). Which problem occurs due to poor grounding? Explain various grounding practices as per IEEE standard. [10]

OR

Q.2 a) Explain various steps in power quality evaluation. [8]

b) Why are we concerned more about power quality? Explain various [10]

definitions of power quality with reference to each stake holders.

Q. 3a) Explain RMS voltage variation and complex power concept in the power system [8]

b) Explain the following terms related with voltage flicker

- i) Short term (P_{st}) and
- ii) Long term (P_{lt}) voltage flicker.

OR

Q.4 a) Define overvoltage. Suggest various mitigation measures and explain any one in detail. [8]

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

Q.5 a) Define voltage sag and interruption. Explain various mitigation measures for voltage sag. [8]

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

OR

Q.6 a) Explain step by step procedure for assessment of equipments sensitivity to voltage sags. [8]

b) Explain the economic impact of voltage sag and its consequences. [8]

SECTION – II

Q.7 a) Explain the following terms related with waveform distortion [8]

- a) Harmonics
- b) D.C. Offset
- c) Inter-harmonics
- d) Notching

b) Explain step by step procedure and various computer tool for harmonics [10]

analysis.

OR

- Q.8 a) Explain harmonics series and parallel resonances. How to minimize it [8]
b) Explain various harmonic indices and procedure to conduct harmonic evaluation for end-user facilities. [10]

- Q.9 a) Explain transients and mitigation methods for capacitive transients. [8]
b) Explain impulsive transients due to lightening with its adverse impacts on power system equipments.

OR

- Q.10 a) Explain switching transient problems with loads. Which computer tool are used for transient's analysis? [8]
b) Define transient's velocity and surge impedance. Explain the effects of line termination on it. [8]

- Q.11 a) What are the objectives of power quality monitoring? Explain various techniques of data collection related with PQ? [8]
b) Explain procedure for selection of monitoring equipment and use of various equipments required for power quality monitoring. [8]

OR

- Q.12 a) Explain role of intelligent systems in power quality monitoring. [8]
b) Explain reactive and proactive approaches in power quality monitoring. [8]

UNIVERSITY OF PUNE
[4364-107]
B.E.(Electrical) Examination 2013
Illumination Technology
(2003 pattern)

Time-Three hours

Maximum Marks-100

[Total No. of Question=12]

[Total no. of printed pages= 2]

Instructions:

- (1) Answer 3 questions from section-I and 3 questions from section-II Unitwise.
- (2) Answer to the TWO sections should be written in separate answer books
- (3) Neat diagrams must be drawn whenever necessary.
- (4) Figures to the right indicate full marks.
- (5) Your answer will be valued.
- (6) Use of logarithmic tables ,electronic pocket calculator is allowed.
- (7) Assume suitable data whenever necessary.

SECTION-I

- Q.1 (a) Explain good and bad effect of lighting. (9)
(b) With suitable diagram explain how quantification of light is made. (9)
- OR
- Q.2 (a) Explain -properties of light. (9)
(b) Explain -the dependence of human activities on light. (9)
- Q.3 (a) Explain construction and working of LASERs with suitable diagram. (8)
(b) Explain construction and working of low pressure -Mercury Vapour lamp. (8)
- OR
- Q.4 (a) Explain construction and working of solid Sodium Argon Neon Lamp with suitable diagram. (8)
(b) Explain construction and working of Tungsten halogen lamp & State their types. (8)
- Q.5 (a) What are different types of lighting fixtures according to Photometric usages? Explain each type in brief. (8)
(b) Explain dimming for control of light . Explain different methods to achieve dimming . (8)

OR

- Q.6 (a) Explain any one type of electronic ballast for lamps. (8)
(b) What are different types of lighting fixtures according to installation? Explain each type in brief. (8)

SECTION-II

- Q.7 (a) Elaborate the steps involved in design of illumination scheme for indoor installation-Residential. (9)
(b) Elaborate the steps involved in design of illumination scheme for indoor installation-using coefficient of utilisation. (9)

OR

- Q.8 (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 installation -Educational facility. (9)

- Q.9 (a) Give the comparison between different light sources. (8)
(b) State the problems faced in energy efficient lighting. How these problems can be overcome? (8)

OR

- Q.10 (a) Give the comparison between different control gears used for control of light. (8)
(b) With a suitable example explain zonal cavity method for outdoor illumination scheme design. (8)

- Q.11 (a) What is meant by cold lighting? How it is achieved? State applications of cold lighting. (8)
(b) Explain -Central systems for emergency lighting. (8)

OR

- Q.12 (a) Explain -Stand alone system for emergency lighting. (8)
(b) Explain photovoltaic lighting with suitable diagrams. (8)

UNIVERSITY OF PUNE
[4364-109]
B.E.(Electrical) Examination 2013
Restructuring & Deregulation
(2003 pattern)

Time-Three hours

Maximum Marks-100

[Total No. of Question=12]

[Total no. of printed pages= 3]

Instructions:

- (1) Answer any three questions from each section.
- (2) Answer to the TWO sections should be written in separate answer books
- (3) Neat diagrams must be drawn whenever necessary.
- (4) Figures to the right indicate full marks.
- (5) Use of steam tables is allowed.

SECTION-I

- Q.1 (a) Discuss functions and roles of following institutions in Indian Power Sector. (16)
- (i) Central Electricity Authority (CEA)
 - (ii) Power Grid Corporation of India Ltd. (PGCIL)
 - (iii) Ministry of Power
 - (iv) Planning commissions.

OR

- Q.2 (a) Discuss the salient features of Electricity Act. 2003. (8)
- (b) discuss in detail National Electricity Policy and National Tariff Policy. (8)

- Q.3 (a) Explain the important factors to be considered while designing a tariff for electricity pricing. (8)
- (b) Explain the regulatory process at state and national level in India. (8)

OR

- Q.4 (a) Explain with numerical example, Internal Rate of Return (IRR) method for calculating economic investment option. (8)
- (b) Explain with numerical example, Net present value (NPV) of the project. (8)

- Q.5 (a) Explain non-price issues important in regulation of power sector. (9)
- (b) State and explain the procedure of setting tariff under restructured power sector. (9)

OR

- Q.6 (a) Explain performance indices at generation, Transmission and Distribution level. (9)
- (b) Explain following concepts. (9)
- (i) Subsidy and cross-subsidy
 - (ii) Tariff based on penalties and incentives
 - (iii) Fixed and variable cost

SECTION-II

- Q.7 (a) Explain the various models based on energy trading briefly. (8)
- (b) Compare the models. (8)
- (i) Wholesale competition
 - (ii) Retail competition

OR

- Q.8 (a) Explain pool model and bilateral dispatch. (8)
- (b) Write a note on California Energy Crisis. (8)

- Q.9 (a) Explain the peculiarity of electricity as a commodity. (8)
(b) Describe. (8)
(i) integrated trading model
(ii) Decentralized trading model

OR

- Q.10 (a) Explain the impact of market reform on regulation & Externalities. (8)
(b) Write a short note on metering and accounting issues. (8)

- Q.11 (a) Comment on transmission rights and pricing. (8)
(b) Explain the various transmission pricing methods briefly. (10)

OR

- Q.12 Write a short note on. (18)
(a) Congestion issues and management
(b) Availability based tariff.(ABT).

[Total No. of Questions: 12]

[Total No. of Printed Pages: 3]

UNIVERSITY OF PUNE

[4364]-110

B. E. (Electrical) Examination - 2013

ENERGY MANAGEMENT (2003 Course)

[Time: 3 Hours]

[Max. Marks: 100]

Instructions:

- 1 Answer *THREE* questions from Section 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 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.
- 7 All questions are compulsory

SECTION -I

- | | | | |
|-----|---|--|---|
| Q.1 | A | Explain:-
1) Renewable and Non-renewable energy
2) Primary and Secondary energy sources. | 4 |
| | B | What is energy security? Explain in detail. | 4 |
| | C | Explain important features of Electricity act 2003 | 8 |

OR

- | | | | |
|------|---|--|---|
| Q.2 | A | Explain short term policies regarding energy sources in India. | 8 |
| | B | Briefly explain the steps taken by Govt. of India to reform the energy sector. Why the energy sector in India is reformed. | 8 |
| Q. 3 | A | What is role of energy manager and list his duties in any industry. Why it is mandatory for industry to depute energy manager. | 8 |
| | B | Explain the concept of supply side management and demand side management with advantages and disadvantages. | 8 |

OR

- Q. 4 A Explain the concept of energy management and structure of energy management group. 6
- B Explain TOD and ABT tariff and its impact on energy management. 6
- C Explain the term energy policy. What are points to be considered while framing the energy policy. What is its importance. 4
- Q. 5 A Explain the Sankey diagram. Why it is important for EM and EA 6
- B Explain the difference between preliminary energy audit and detailed energy audit. 6
- C List the instruments which are important in electrical energy audit. 6
- OR**
- Q. 6 A Explain the usefulness of CUSUM technique in energy auditing. 6
- B The audit phase of detailed energy audit is important. Explain why? 6
- C What is role of energy manager in audit phase and post-audit phase of detailed energy auditing? 6
- SECTION II**
- Q. 7 A Explain the following financial analysis tools- 6
- i) NPV
- ii) ROI
- iii) SPP
- B Explain the objectives of carrying sensitivity analysis. 6
- C Calculate the SPP and ROI (in percent) on the investment for boiler that cost Rs. 80 Lakhs to purchase and Rs.5 Lakhs per year on an average to maintain and operate and is expected to save Rs. 32 Lakhs per year. 6
- OR**
- Q. 8 A Explain the various cost factors, various sources of capital and the time value of money. 6
- B Investment on energy saving proposal is Rs. 17 Lakhs, annual saving for first four years is Rs. 1,32,000 , Rs. 1,99,000 , Rs. 3,10,000 and Rs. 4,50,000 . Consider the capital cost as 10% what is the net present value of the proposal. 6
- C Explain the importance of reaction power management to same revenue in energy management. 6

Q. 9	A	List the various energy conservation opportunities in water pumping systems.	8
	B	Explain the concept of cogeneration. What are advantages.	8
OR			
Q. 10	A	Explain the energy conservation opportunities in lighting system.	8
	B	State affinity laws as applicable to centrifugal pumps and list energy conservation opportunities in water pumping systems.	8
Q. 11	A	Explain energy audit case studies in- i) Chemical industry ii) Cement industry	16
OR			
Q. 12	A	What are the probable areas in which energy can be saved for municipal corporation? Explain the financially attractive measures by which energy can be saved.	8
	B	Explain the energy audit case study in IT industry what are areas in IT industry where the energy can be saved to reduce revenue loss.	8

[Total No. of Questions: 12]

[Total No. of Printed Pages: 2]

UNIVERSITY OF PUNE

[4364]-111

B. E. (Electrical) Examination – 2013

Switchgear & Protection (2003 Course)

[Time: 3 Hours]

[Max. Marks: 100]

Instructions:

- 1 *Answer 03 questions from each section.*
- 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 electronic pocket calculator is allowed.*
- 6 *Assume suitable data, if necessary.*

SECTION – I

- | | | | |
|-----------|---|--|----|
| Q.1 | A | What is zone of protection? Explain primary and backup protection with circuit diagram. Also explain various types of back up protection. | 8 |
| | B | Explain the essential qualities of protective relaying. | 8 |
| OR | | | |
| Q.2 | A | With neat constructions diagrams explain the directional over current relay. | 8 |
| | B | Obtain the torque equation of induction type relay. | 8 |
| Q.3 | A | Explain the various modes of arc extinction in detail. | 8 |
| | B | What is restriking voltage? Obtain the expression for rate of rise & restriking voltage. | |
| OR | | | |
| Q.4 | A | What is resistance switching? why it is adapted? Obtain the expression for opening resistance used in circuit breaker. | 8 |
| | B | Sketch the cut-off characteristics of HRC fuse & explain the terms i) current rating ii) Prospective peak current iii) cut-off iv) Fusing factor | 8 |
| Q.5 | A | Explain the ratings of high voltage circuit breaker. | 12 |
| | B | With block diagram explain working of Auto recloser. | 6 |

OR

Q. 6		Write short notes on	18
	i.	Vacuum circuit breaker	
	ii.	Sf ₆ circuit breaker	
	iii.	Gas insulated substation	

SECTION II

Q. 7	A	With neat diagram explain the constructions & working of Buchholz relay. State its advantages & disadvantages.	10
	B	With reference to alternator protection explain following abnormal operating conditions i) Loss of prime-mover ii) Over speeding	8

OR

Q. 8	A	With neat diagram explain percentage differential protection of 3-phase Δ/Δ connected transformer. A 3phase transformer of 220V/11000V is connected in Δ/Δ (star/delta). The CT 220v side have a current ratio of 600/5. What should be CT ratio on 11,000V side.	10
	B	Explain protection of alternator against loss of excitation.	8

Q. 9	A	With neat block diagram explain PLCC employed in transmission line protection.	8
	B	Explain the principle of distance relaying applied to protection of transmission lines, Draw the characteristics of impedance relay , reactance relay and Mho relay in R-X plane showing the operating & non operating regions.	8

OR

Q. 10	A	With neat sketch explain three stepped distance protection scheme for transmission lines.	8
	B	What are merits of PLCC. Compare pilot wire relaying with carrier current protection.	8

Q. 11	A	With neat block diagram explain numerical relay	8
	B	Compare static relay in terms of merits and demerits with conventional relay.	8

OR

Q. 12	A	Give block diagram of static relay. State different component of static relay. Explain the operation of static in detail.	8
	B	With neat block diagram describe the microprocessor based overcurrent relay.	8

UNIVERSITY OF PUNE

[4364]-112

B. E. (*Electrical Engineering*) Examination - 2013*Digital Control System (403149)(2003 Course)*

[Time: 3 Hours]

[Max. Marks: 100]

Instructions:

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

SECTION -I

- Q.1 A Explain sampling and reconstruction process. State the sampling theorem & give its importance. 8
- B Determine whether the following systems are time variant or not with proper justifications. 8
- i) $y(n)=\cos[x(n)]$;
 - ii) $y(n)=nx(n)$;
 - iii) $y(n)=x(n)+nx(n-2)$;
 - iv) $y(n)=x(-n)$.

OR

- Q.2 A Compare Digital Control System with Analog control system. 8
- B Perform following basic operations for 2 samples on discrete signal $x(n)=\{1,2,3,4,5\}$ 8
- ↑
- i. Time delay
 - ii. Folding and advance
 - iii. Downscaling &
 - iv. Upscaling.
- Q. 3 A Explain various methods of Convolution in Discrete time system. 8
- B Draw a neat block diagram of a step motor control system & explain the function of each block 8

OR

- Q. 4 A Consider two sequences: $x(n)=\{1,2,1,2\}$ and $h(n)=\{2,2,-1,1\}$. Obtain the linear convolution by multiplication method & verify by Tabulation method. 8
- B Explain with neat diagram the Direct Form-I and Direct form-II representation of a discrete time system. 8
- Q. 5 A Derive the Z transform & ROC of the following: 6

- i. Unit Impulse
 - ii. Delayed unit impulse
 - iii. Unit ramp
- B Obtain the Z transform with its ROC: 12
- i. $x(n)=[3(4)^n - 5(3)^n]u(n)$, using Linearity property.
 - ii. $f(t) = e^{-at} \cdot \sin wt$

OR

- Q. 6 A Explain different methods of Inverse Z transform 6
- B Obtain Inverse Z transform of the following: 12
- i. $x(z) = \frac{10z}{(z-1)(z-2)}$;
 - ii. $x(z) = \frac{z^3}{(z-1)(z+0.8)(z-0.5)}$

SECTION II

- Q. 7 A Explain any one method of evaluation of state feedback gain matrix 8
 $k=[k_1, k_2, k_3 \dots k_n]$
- B Investigate the stability of given cha. eqⁿ by Jury's Test 8
 $F(z) = z^4 - 0.6z^3 - 0.81z^2 + 0.67z - 0.12 = 0$

OR

- Q. 8 A Explain mapping betⁿ S-plane & Z-plane with proper diagrams 8
- B Write a short note on pole placement technique. 8
- Q. 9 A Define State Transition Matrix & explain its properties. 8
- B Find State Transition Matrix using Laplace method, where 8

$$x(K + 1) = \begin{bmatrix} -1 & 1 \\ -0.16 & 0 \end{bmatrix} \begin{bmatrix} x_1/k \\ x_2/k \end{bmatrix} + \begin{bmatrix} 1 \\ 0.3 \end{bmatrix} u(k)$$

OR

- Q. 10 A Derive the solution of a non-homogeneous state eqⁿ of a discrete-time 8
system from first principle.
- B Determine a suitable state feedback gain matrix K for following system 8
such that system will have closed loop poles at $Z=0.5 \pm j0.5$
 $G = \begin{bmatrix} 0 & 1 \\ 0.16 & -1 \end{bmatrix}; H = \begin{bmatrix} 0 \\ 1 \end{bmatrix}$

- Q. 11 A Explain i) Direct Decomposition method and ii) Parallel decomposition 9
method of realization of the pulse Transfer Function into a discrete-
time states pace model.
- B Draw digital lag and lead compensating network and obtain its Z 9
transfunction.

OR

- Q. 12 A Define & explain the concept of controllability & observability of 9
discrete time control system with their methods.
- B Investigate the controllability and observability of the following 9
discrete time system.

$$x(k+1) = \begin{bmatrix} -1 & 1 \\ 0 & -1 \end{bmatrix} \begin{bmatrix} x_1(k) \\ x_2(k) \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u(k)$$

$$y(k) = [1 \quad 1]x(k)$$

[Total No. of Questions: 12]

[Total No. of Printed Pages: 3]

UNIVERSITY OF PUNE

[4364]-114

B. E. (Electrical) Examination - 2013
High Voltage Engineering (2003 Course)

[Time: 3 Hours]

[Max. Marks: 100]

Instructions:

- 1 *Answer any one question from each Unit.*
- 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.*
- 6 *Use of logarithmic tables and electronic pocket calculator is allowed.*
- 7 *Assume suitable data, if necessary.*

SECTION – I

Unit-I

- Q.1 A Explain the term ionization. With reference to break down in gases explain the following ionization processes. 08
- i. Impact ionization
 - ii. Photo ionization
 - iii. Ionization by metastables.
- B Derive current growth equation in presence of primary and secondary ionization process in uniform field. Define Townsend's first and second ionization coefficients. 08

OR

- Q.2 A Compare Townsend's theory and streamer theory of breakdown in gaseous dielectrics. 08
- B What is Paschen's law? Give its limitations and explain the Paschen's curve. 08

Unit-II

- Q.3 A Explain the following 10
- a. Breakdown in solid dielectrics due to cavity

b. Stressed oil volume theory.

- B A solid dielectric specimen of dielectric constant of 4.0 has an internal void of thickness 1mm. the specimen thickness is 1cm and is subjected to a voltage of 80kv(rms). If the void is filled up with air and if the breakdown strength of air is taken as 30kv (peak)/cm. Find relation between voltage across cavity V_1 and applied voltage V across specimen. Also find the applied voltage at which cavity breaks down. 06

OR

- Q. 4 A Explain what is meant by commercial liquids. With reference to conduction and breakdown in commercial liquids explain suspended particle mechanism. 08
- B What are composite dielectrics? Give at least three practical examples of composite dielectrics and their purpose. 08

Unit-III

- Q. 5 A Explain the terms protective level, withstand level and protective margin. Explain the different points to be considered in insulation co-ordination. Draw the typical volt-time characteristics of different substation equipments. 10
- B Define rated voltage, spark over voltage and residual voltage fro lightning arrester. State the desired characteristics of lightning arrester. 08

OR

- Q. 6 A Write note on direct and indirect lightning stroke. Draw the volt-time and current-time characteristics of lightning stroke to indicate the rate of rise of voltage and current and wave front time. 09
- B Explain the various causes of switching over voltages and remedial actions to control them. 09

SECTION II

Unit-IV

- Q. 7 A With neat sketch explain the method of generation of high ac voltage of power frequency using cascade connection of the transformers. 10
- B Write notes on trigatron gap. 06

OR

- Q. 8 A What is impulse voltage? Explain with neat sketch the various parts of modified Marx circuit. State its advantages. 10
- B A 12 stage impulse generator has 0.126 microfarad capacitor. The wavefront and wavetail resistances connected are 800 ohms and 5000 ohms respectively. If the load capacitor is 1000 picofarad, find the front times and tail times of impulse wave produced. 06

Unit-V

- Q. 9 A With neat diagram explain CVT. Explain its advantages also. 08

- B State the hall effect with neat diagram explains its use for measurement of high current. 08
- OR**
- Q. 10 A Write note on sphere gap voltmeter. State and explain the different factors affecting the reading. How correction factors for atmospheric condition changes are applied. 10
- B A generating voltmeter has to be designed so that it can have range from 20 to 200 KV dc If the indicating meter reads a minimum current of 2 microampere and maximum current of 25 microampere, what should be the capacitance of the generating voltmeter be? Assume speed of driving motor 1500rpm. 06
- Q. 11 A Explain the method of using Schering bridge for measurement of partial discharge. Draw the neat sketch of Schering bridge. Write features of high voltage Schering bridge. 10
- B Write note on testing of insulators and cables. 08
- OR**
- Q. 12 A Write note on testing of
- a. Power transformer 09
 - b. Surge diverter 09

[Total No. of Questions: 12]

[Total No. of Printed Pages: 2]

UNIVERSITY OF PUNE

[4364]-116

B. E. (Electrical) Examination - 2013

ANN & Applications in electrical engineering(2003 Course)

[Time: 3 Hours]

[Max. Marks: 100]

SECTION -I

- Q.1 A What is a neural Network?How is a neuron model in a 12
 B Enlist all transfer functions in ANN. 6
- OR**
- Q.2 A What are ancient philosophy of neural network learning. 9
 B Differentiate with proper sketch between ANN & 9
 Biological neuron.
- Q. 3 A Differentiate between supervised & unsupervised 8
 Learning process and hence explain role of a teacher in
 neural network.
- B Realize a Hebb net for the OR function with bipolar 8
 inputs and targets.
- OR**
- Q. 4 A What do you mean by memory based learning.Explain . 8
 B Draw a neat sketch for Adaline neural network. 8
- Q. 5 A Explain the version weight update methods. 8
 B Describe perceptron architecture with neat sketch. 8
- OR**
- Q. 6 Write a short note on : 16
 (i)Perceptron learning
 (ii)Learning curves
 (iii)Learning Rate Annealing Techniques.

SECTION II

- Q. 7 A Write an algorithm,based on the back-propagation 10
 concept that can be used to update weight and biases.

	B	Discuss MLP for pattern classification.	8
		OR	
Q. 8		Discuss following in detail. (i) Learning Rate η and its effect (ii) Back-propagation concept (iii) Momentum	18
Q. 9	A	Explain APT 1 neural network with neat sketch.	8
	B	Explain BAM theory.	8
		OR	
Q. 10	A	Explain with neat sketch on Hopfield network.	8
	B	$P_1 = [1 \ 1]^T$ $P_2 = [-1 \ 1]^T$ Design Hopfield network to recognize above prototype vectors.	8
Q. 11		Develop ANN to planning and load forecasting of a power system. Give planning period, failure rate, repair rate, probability of failure as input to ANN. Apply proper T.F. to find out activation function as load forecasting.	16
		OR	
Q. 12		Apply ANN to load dispatch at load distribution centre.	16