

7E7041

Roll No. \_\_\_\_\_

Total No of Pages: 2

7E7041

B. Tech. VII Sem. (Main/Back) Exam., Nov.-Dec.-2016

Electrical &amp; Electronics Engineering

7EX1A Power System Planning

EE, EX

Time: 3 Hours

Maximum Marks: 80

Min. Passing Marks Main : 26

Min. Passing Marks Back: 24

*Instructions to Candidates:*

*Attempt any five questions, selecting one question from each unit. All questions carry equal marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*

*Units of quantities used/calculated must be stated clearly.*

*Use of following supporting material is permitted during examination.*

*(Mentioned in form No. 205)*

1. NIL2. NIL**UNIT - I**

Q.1 Discuss the importance of load forecasting in power system planning. Give salient features of various forecasting techniques. Which method of load forecasting would you suggest for long term & why? Discuss in detail. [16]

**OR**

Q.1 (a) Explain the concept of least cost utility planning with the aid of flowchart? [8]  
(b) Describe Electricity Regulation & Electrical Forecasting Techniques briefly? [8]

**UNIT - II**

Q.2 Explain for generation planning. Why Integrated Power Generation is required? What are the various methods of cogeneration? Explain in brief. [16]

**OR**

- Q.2 Describe the importance and execution of Transmission System Planning on long term basis and also discuss the concept of Rational Tariffs. [16]

**UNIT - III**

- Q.3 Write the design method of system operating planning. Explain briefly how these methods help in improvement of reliability. [16]

**OR**

- Q.3 Explain the functions of Power System Simulator with the help of Block diagram and also discuss about the importance of computerized management. [16]

**UNIT - IV**

- Q.4 Formulate the optimal hydrothermal scheduling problem considering the inequality constraints on the thermal generation and water storage employing penalty functions. Find out the necessary equations & gradient vector to solve the problem. [16]

**OR**

- Q.4 Give the concept of optimal unit commitment. Discuss the reliability based generation system. What is meant by unit maintenance schedules? [16]

**UNIT - V**

- Q.5 (a) What is insulation coordination? Write basic terminologies of electrical power system and explain in brief. [8]  
 (b) Discuss least cost optimization problem for non-conventional power plants. [8]

**OR**

- Q.5 (a) Discuss about computer aided planning & effect of computer aided planning on cost. [8]  
 (b) Explain process diagram of Hydro & Thermal Plant. [8]

<b>7E7042</b>	Roll No. _____	Total No of Pages: <b>4</b>
	<b>7E7042</b> <b>B. Tech. VII Sem. (Main/Back) Exam., Nov.-Dec.-2016</b> <b>Elect. Electronics Engineering</b> <b>7EX2A Power System Analysis</b> <b>EE, EX</b>	

**Time: 3 Hours**

**Maximum Marks: 80**  
**Min. Passing Marks Main: 26**  
**Min. Passing Marks Back: 24**

*Instructions to Candidates:*

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*Units of quantities used/calculated must be stated clearly.*

*Use of following supporting material is permitted during examination.*

*(Mentioned in form No. 205)*

1. NIL

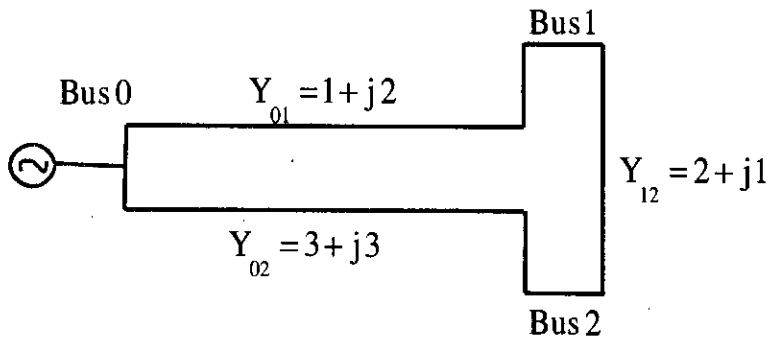
2. NIL

### UNIT – I

- Q.1 (a) Elaborate the functions of single line diagram for a balanced three phase system with suitable steps. [8]
- (b) The primary and secondary winding of a single phase 1000 KVA, 2000/1000 volts transformer have leakage reactance each of  $2\Omega$ . Find per unit reactance of the transformer. [8]

**OR**

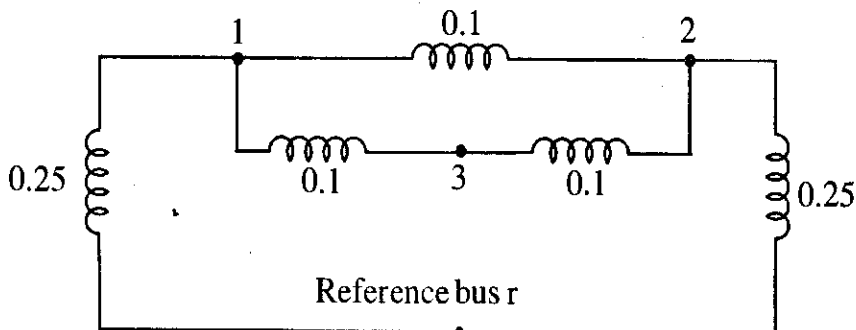
- Q.1 (a) Determine nodal admittance matrix for the power system represented by single line diagram as shown in figure below [8]



- (b) Discuss the advantages of using  $Y_{bus}$  model of power system network for load flow analysis. [8]

**UNIT - II**

- Q.2 (a) For the 3 - bus network build  $[Z_{bus}]$ . [8]



- (b) In step by step formulation of  $Z_{bus}$  it is not necessary to include the case of an element connected between two new buses. Why? [8]

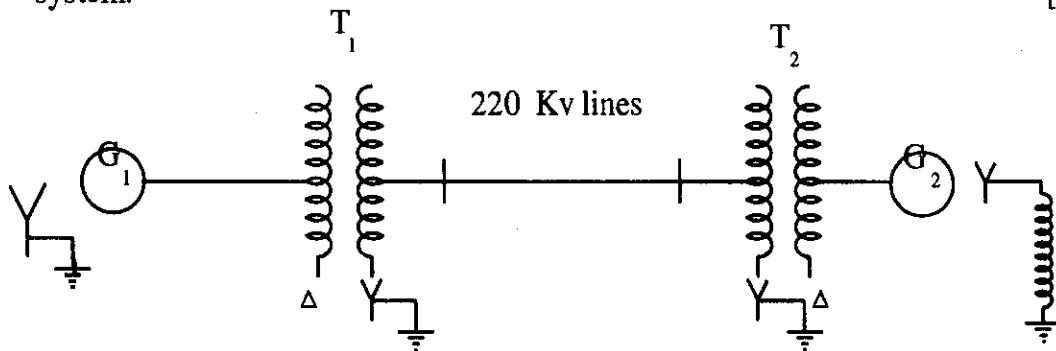
**OR**

- Q.2 (a) Discuss the analysis of short circuit on a loaded synchronous machine and draw model for computing subtransient current, transient current. [8]

- (b) A 3 – phase 15 MVA, 10KV alternator has internal reactance of 6% and negligible resistance. Find the external reactance per phase to be connected in series with the alternator so that steady current on short circuit does not exceeds 6 times the full load current. [8]

### UNIT – III

- Q.3 (a) Write a short note on sequence impedance of transformer. [6]
- (b) Figure show a power system network. Draw the Zero Sequence diagram for this system. [10]



The system data are as –

G	50 MVA	11 KV	$X_0 = 0.08$ P. U.
T <sub>1</sub>	50 MVA	11/220KV	$X_0 = 0.1$ P. U.
G <sub>2</sub>	30 MVA	11 KV	$X_0 = 0.07$ P. U.
T <sub>2</sub>	30 MVA	11/220KV	$X_0 = 0.09$ P. U.

### OR

- Q.3 (a) Derive expressions for fault current by symmetrical components method for single line to ground fault. [8]
- (b) Determine the symmetrical components of current in a three phase system, the original phasors of which are:- [8]

$$I_a = 12 + j6, \quad I_b = 12 - j12, \quad I_c = -15 + j10$$

**UNIT - IV**

Q.4 A 30 MVA , 11KVA generator has  $Z_1 = Z_2 = j 0.2 \text{ P. U.}$   $Z_0 = j 0.05 \text{ P. U.}$  A line to line fault occurs on the terminals of the generator. Find the line currents and line to neutral voltages under fault conditions. Assume that the generator neutral is solidly ground and that the generator is operating at no load and at rated voltage at the occurrence of fault. [16]

**OR**

- Q.4 (a) Derive the necessary equation to determine the fault current for a double line to ground fault (L - L - G). Draw a diagram showing the inter connection of sequence network. [10]
- (b) Why is 3 -  $\phi$  symmetrical fault more severe than a 3 -  $\phi$  unsymmetrical fault. [6]

**UNIT - V**

Q.5 Explain different type of buses and variables in given power system. Also derive steady state load flow equation. Also give assumption and restriction for solving load flow equation. [16]

**OR**

- Q.5 (a) What do you mean by load flow problems. [6]
- (b) Explain Newton Raphson method for load flow analysis with the help of flow chart. [10]

7E7043

Roll No. \_\_\_\_\_

Total No of Pages: **2****7E7043****B. Tech. VII Sem. (Main) Exam., Nov.-Dec.-2016****Electrical & Electronics Engineering****7EX3A Artificial Intelligence Techniques****EE, EX****Time: 3 Hours****Maximum Marks: 80****Min. Passing Marks Main : 26****Min. Passing Marks Back: 24***Instructions to Candidates:*

*Attempt any five questions, selecting one question from each unit. All questions carry equal marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*

*Units of quantities used/calculated must be stated clearly.*

*Use of following supporting material is permitted during examination.*

*(Mentioned in form No. 205)*

1. NIL \_\_\_\_\_

2. NIL \_\_\_\_\_

**UNIT – I**

Q.1 (a) Define artificial intelligence. Discuss the area in which application of AI are used. [8]

(b) What are the applications of Artificial Intelligence? [8]

**OR**

Q.1 (a) What are building tools and shells? Write their importance. [8]

(b) Briefly explain how artificial intelligence techniques can be represented. List out some of task domain of artificial intelligence. [8]

**UNIT – II**

Q.2 (a) Differentiate between procedural versus declarative knowledge. [8]

(b) How knowledge can be represented using logics rules, frames? [8]

OR

- Q.2 Discuss the following search techniques with the help of an example. Also discuss the benefit and short comings of each one: [16]
- (a) Breadth first search
- (b) Depth first search

UNIT - III

- Q.3 (a) Describe biological neuron and synapses. [8]
- (b) What are the different types of activation functions? [8]

OR

- Q.3 (a) What are the limitations of perceptrons? [8]
- (b) Differentiate between single layer and multilayer perceptrons. [8]

UNIT - IV

- Q.4 (a) What is difference between supervised and unsupervised learning? [8]
- (b) What is Kohonen's self organizing map? Explain. [8]

OR

- Q.4 Explain the back propagation algorithm. What are the two different passes of back propagation algorithm? [16]

UNIT - V

- Q.5 (a) What do you mean by membership function with fuzzy set? Also describe various types of membership functions. [12]
- (b) What is fuzzy controller? Discuss the basic steps involved in design of fuzzy controller. [4]

OR

- Q.5 (a) Explain the procedure of Genetic Algorithm with example. [8]
- (b) Explain the following terms with example in reference to Genetic Algorithm - [8]
- (i) Population
- (ii) Crossover
- (iii) Reproduction
- (iv) Mutation



7E7044

Roll No. \_\_\_\_\_

Total No of Pages: **3****7E7044****B. Tech. VII Sem. (Main) Exam., Nov.-Dec.-2016****Electrical Engineering****7EX4A Non Conventional Energy Sources****Time: 3 Hours****Maximum Marks: 80****Min. Passing Marks Main : 26****Min. Passing Marks Back: 24***Instructions to Candidates:*

*Attempt any five questions, selecting one question from each unit. All questions carry equal marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*

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*Use of following supporting material is permitted during examination.*

*(Mentioned in form No. 205)*

1. NIL2. NIL**UNIT - I**

- Q.1 (a) Explain the difference between conventional and non-conventional energy sources. [6]
- (b) Give the brief idea about world energy situation. [5]
- (c) Discuss the Indian Energy Scenario in present situation. [5]

**OR**

- Q.1 (a) Explain different components used and power generation process through Tidal power plants. Also describe single basin and double basin arrangement in Tidal power generation. [8]
- (b) What are the advantages and limitations of tidal power generation? [4]
- (c) What is the future prospects of electrical energy generation in India through Tidal power plants? [4]

**UNIT – II**

- Q.2 (a) What is the principle of Solar photovoltaic power generation? What are the main elements of a Photovoltaic system? [8]
- (b) How solar radiations on tilted surface can be calculated? Discuss its mathematical expressions. [8]

**OR**

- Q.2 (a) What do you mean by concentrating collector? Discuss paraboloidal and heliostat collector configuration. [8]
- (b) Explain various components and working principle of solar cell and concept of solar cell array. [8]

**UNIT – III**

- Q.3 (a) Explain following basic electric generation schemes through wind energy; [8]
- (i) Constant Speed Constant Frequency
  - (ii) Variable Speed Variable Frequency
  - (iii) Variable Speed Constant Frequency
- (b) What are the advantages of vertical Axis machines over Horizontal type machines? Describe a rotor for relatively low velocity wind. [8]

**OR**

- Q.3 (a) What do you understand by Geothermal energy? Explain different components and working principle of basic geothermal steam power plant. [8]
- (b) Enumerate various advantages and disadvantages of geothermal energy generation. Also explain application and future prospects of geothermal energy in India. [8]

**UNIT – IV**

- Q.4 (a) Differentiate nuclear fusion and nuclear fission process with example. Also describe process of energy generation through nuclear fission in detail. [8]
- (b) Explain magnetic confinement and inertial confinement phenomenon in detail. [8]

**OR**

- Q.4 (a) Explain different components and working principle of Tokamak reactor for electrical energy generation. [8]
- (b) What are the various advantages of nuclear fusion? Explain laser fusion reactor in detail. [8]

**UNIT – V**

- Q.5 (a) Explain the concept of electricity generation through biomass. Describe the different biomass conversion technologies in brief. [8]
- (b) Explain in brief; [4x2=8]
- (i) Deen Bandhu Biogas Plant
- (ii) Pragati Design Biogas Plant

**OR**

- Q.5 (a) Explain the concept of electricity generation through biogas. Describe fixed dome type biogas plant in detail. [10]
- (b) Explain the Ethanol production process in detail. [6]
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<b>7E7045</b>	Roll No. _____	Total No of Pages: <b>3</b>
<b>7E7045</b>		
<b>B. Tech. VII Sem. (Main/Back) Exam., Nov.-Dec.-2016</b>		
<b>Elect. Electronics Engineering</b>		
<b>7EE5A Power System Engineering</b>		

**Time: 3 Hours**

**Maximum Marks: 80**

**Min. Passing Marks Main: 26**

**Min. Passing Marks Back: 24**

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*Use of following supporting material is permitted during examination.*

*(Mentioned in form No. 205)*

1. NIL

2. NIL

### UNIT - I

Q.1 (a) Derive and discuss the condition for economic loading of generating plant considering losses of transmission line. [8]

(b) Draw and discuss input output curve for thermal generating unit. [8]

OR

Q.1 (a) Determine the equation of incremental transmission loss penalty factor. [8]

(b) Assume that the loss coefficients in 1/mw of a power system having two generating stations are: [8]

i	j	B <sub>ij</sub>
1	1	0.0015
1	2	-0.0005
2	2	0.0025

And the incremental costs of two stations are:

$$dC_1 / dP_1 = 0.01 P_1 + 2.0$$

$$dC_2 / dP_2 = 0.01 P_2 + 1.5$$

Calculate the economic output of the generating stations P1 and P2 for  $\lambda = 2.6$ .

Also calculate the transmission losses and the load demand for this value of  $\lambda$ .

### UNIT - II

- Q.2 (a) What are power angle curves, how would you explain its function in steady state and transient conditions. [8]
- (b) A 4- pole, 50 Hz turbo alternator is rated 45 MW 0.8 pf lag and has inertia of 25000 kg-m<sup>2</sup>. It is connected through a transmission line to another set whose corresponding data is 2-pole, 60 MW, 50 Hz, 0.75pf lag, 3000 kg-m<sup>2</sup>. Find inertia constant of each machine on its own rating and that of single equivalent set connected to an infinite bus and a base of 100 MVA. [8]

#### OR

- Q.2 (a) Derive the formula of synchronizing power coefficient. [8]
- (b) Find out the coherent condition and non-coherent condition in swing equation for a group. [8]

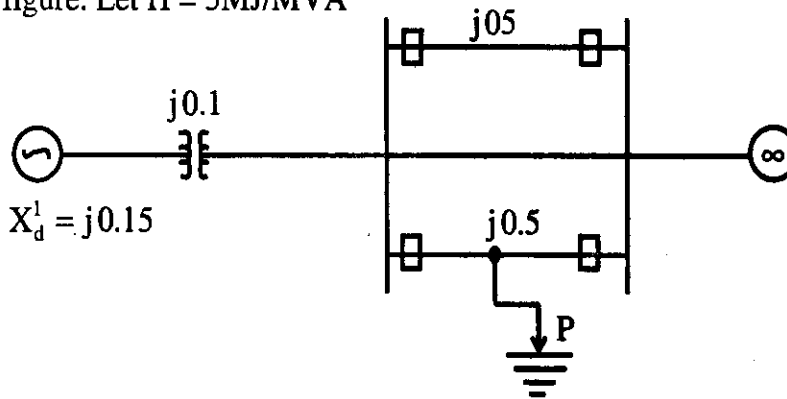
### UNIT - III

- Q.3 (a) Explain the equal area criteria, also illustrate by help of suitable diagram application of equal area criterion to study transient for the sudden increase in input of the generator. [8]
- (b) What are the factors which affects power system stability and methods to improve stability? [8]

#### OR

- Q.3 (a) Find out equation for critical clearing angle if an auto reclose circuit breaker is used in a system having two transmission in parallel and a fault occurs at the mid point of one of the parallel lines. [8]

- (b) For the system shown in figure, both the terminal voltage and infinite bus voltage are 1.0 pu and the generator is delivering 1.0 pu power. Calculate the critical clearing angle and the critical clearing time when the system is subjected to a 3-phase fault at point p (middle of the line) as shown in figure. Let  $H = 5 \text{ MJ/MVA}$  [8]



### UNIT - IV

- Q.4 (a) Explain use and working of excitation system in synchronous machines. [8]  
 (b) Describe briefly about brushless excitation system in electrical machine. [8]

OR

- Q.4 (a) What are the spinning and maintenance reserve capacities? Explain how the reserve capacity of power station is decided. [8]  
 (b) Explain the rotating thyristor excitation scheme with its block diagram. [8]

### UNIT - V

- Q.5 (a) Explain the phase angle control and phase shifting transformers with their application. [8]  
 (b) What is the protection of series capacitors? Explain advantages and related with it. [8]

OR

- Q.5 Write notes on following: [5+5+6=16]  
 (a) Power System security.  
 (b) Voltage instability.  
 (c) Series compensation.

<b>7E7132</b>	Roll No. _____	Total No of Pages: <b>3</b>
<b>7E7132</b>		
<b>B. Tech. VII Sem. (Main/Back) Exam., Nov.-Dec.-2016</b>		
<b>Electrical Engineering</b>		
<b>7EE6.3A Economic Operation of Power Systems</b>		

**Time: 3 Hours****Maximum Marks: 80****Min. Passing Marks Main: 26****Min. Passing Marks Back: 24***Instructions to Candidates:*

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1. NIL2. NIL

### UNIT – I

Q.1 (a) A power plant has an initial cost of Rs.  $2 \times 10^8$ . Assuming a salvage value of 15% & useful life of 25 years - [8]

(i) Find rate of depreciation by fixed percentage method.

(ii) Also find accumulated depreciation at the end of 10<sup>th</sup> year.

(b) Write a short note on the following - [8]

(i) Effect of load factor on unit energy cost

(ii) Annual fixed cost.

**OR**

- Q.1 (a) Discuss the selection of power plant equipments. What are the selection criterion for selection them? [8]
- (b) Enumerate & explain briefly various methods used to calculate the depreciation cost. [8]

**UNIT - II**

- Q.2 (a) Two generating units of a thermal station have cost characteristics as under:  
 $C_1 = 561 + 7.92P_1 + 0.001562P_1^2$  Rs./hr  
 $C_2 = 310 + 7.85P_2 + 0.00194P_2^2$  Rs. / hr  
 Obtain the cost characteristic of the composite unit for a total demand  $P_T$ . [8]
- (b) How is the sequence of adding units in thermal plant decided? [8]

**OR**

- Q.2 (a) Explain the equal incremental cost criteria for optimum scheduling in power plants. [8]
- (b) Discuss the input, out put & incremental fuel rate characteristics of thermal power plants. [8]

**UNIT - III**

- Q.3 (a) Explain the advantage of operating a hydro plant & thermal plant in coordination. [8]
- (b) For a hydro-thermal plant the total load is a constant of 90 MW for a month of 30 days. Find the running time of the thermal plant if the maximum hydro energy is 50,000 MW hr. The cost function of thermal power plant is given by  $(F_C = 54 + 11 P_{th} + 0.02 P_{th}^2)$  unit of cost/hr. [8]

**OR**

- Q.3 (a) Discuss the importance of short term hydro thermal scheduling. [8]
- (b) Describe how the plant capacity of a run off river plant is found when it works in combination with a steam plant. [8]



### UNIT - IV

- Q.4 (a) The balanced e.m.f. of two single phase alternators running in parallel are  $3000\angle 120^\circ$  &  $2900\angle 10^\circ$  Volts. Their synchronous impedances are  $2 + j20$  &  $2.5 + j30$  ohm. The load impedance is  $10 + j4$  ohm. Determine the circulating current. [8]
- (b) Discuss the condition necessary for parallel operation of alternators. [8]

#### OR

- Q.4 (a) Deduce the expression for circulating current for two alternators in parallel sharing of load current. [8]
- (b) Two alternators working in parallel supply a load of 3000 kW & a motor load aggregating to 5000 kW at a p.f. 0.72, one machine is loaded up to 5000 kW at 0.8 p.f. lagging. What is the load & p.f. of the other machine? [8]

### UNIT - V

- Q.5 (a) Describe the break even & minimum cost analysis. What is meant by linear & non linear break even? [10]
- (b) Explain Supply & Demand relationship. [6]

#### OR

- Q.5 (a) Describe the concepts of financial efficiencies of electrical goods & services as well as the supply & the demands. [10]
- (b) Explain the law of Supply & Demand. [6]

<b>7E4171</b>	Roll No. _____	Total No of Pages: <b>3</b>
	<b>7E4171</b> <b>B. Tech. VII Sem. (Back) Exam., Nov.-Dec.-2016</b> <b>Electrical Engineering</b> <b>7EE1(O) Data Base Management System</b>	

**Time: 3 Hours**

**Maximum Marks: 80**

**Min. Passing Marks Main: 26**

**Min. Passing Marks Back: 24**

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*(Mentioned in form No. 205)*

1. NIL

2. NIL

### UNIT - I

- Q.1 (a) What is DBMS? Describe need, purpose and goals of DBMS. [8]  
 (b) Explain different kind of data models of DBMS. [8]

OR

- Q.1 (a) Explain the distinctions among the terms Primary Key, Candidate Key & Super Key. [4]  
 (b) Construct an ER Diagram for a hospital with a set of patients and a set of medical doctors. Associate with each patient a log of the various tests and examination conducted. Also design generalization-specialization hierarchy for the same example. [8]  
 (c) Explain Relational Algebra in detail. [4]

**UNIT - II**

- Q.2 (a) In what sense does relational calculus differ from relational algebra, and in what sense they are similar? [8]
- (b) How does tuple relational calculus differ from domain relational calculus. [8]

**OR**

- Q.2 What is normalization? Explain about 3<sup>rd</sup> BCNF, 4<sup>th</sup> normal forms in detail by taking examples. Highlight the concept of various dependencies. [16]

**UNIT - III**

- Q.3 Write the SQL queries for the following : the tables are EMP (empno, ename, job, mgr, hiredate, sal, comm, deptno); Dept (Dept no, dname, loc); Salgrade (grade, losal, hisal)

- (a) Find the employees who earn the highest salary in each job type, sort in descending salary order. [4]
- (b) Find the most recently hired employees in each department order by hire date. [4]
- (c) Show (ename, sal, deptno) details of any employee who earns a salary greater than the average salary for their dept, sort in deptno. [4]
- (d) Display the 5<sup>th</sup> row of the emp. Table [4]

**OR**

- Q.3 (a) Explain stored procedures and triggers in SQL with suitable example. [8]
- (b) Explain embedded SQL and dynamic SQL programming in detail. [8]

**UNIT - IV**

- Q.4 (a) What do you understand by schedule in the context of concurrent execution of transactions in RDBMS? Describe physical data organization in sequential, indexed, random and hashed files. [16]

**OR**

- Q.4 (a) Explain the difference between inverted, and multilist structures in detail. [8]  
(b) Describe organizations of physical data in random, sequential and indexed files with suitable examples. [8]

**UNIT - V**

- Q.5 (a) What is a system crash? Write the various causes for it. [8]  
(b) Write about log-based recovery and shadow paging. [8]

**OR**

- Q.5 (a) What is meant by the concurrent executions of database transactions in a multiuser system? Explain in detail. [8]  
(b) Discuss why concurrency control is needed. Give suitable example. [8]
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7E4174

Roll No. \_\_\_\_\_

Total No of Pages: **3****7E4174****B. Tech. VII Sem. (Back) Exam., Nov.-Dec.-2016****Electrical & Electronics Engineering****7EX4 (O) Utilization of Electrical Power****Time: 3 Hours****Maximum Marks: 80****Min. Passing Marks Main: 26****Min. Passing Marks Back: 24***Instructions to Candidates:*

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*Use of following supporting material is permitted during examination.*

*(Mentioned in form No. 205)*

1. NIL2. NIL**UNIT - I**

Q.1 (a) Explain spot welding with neat and clean diagram. [10]

(b) Why the electric heating is better than other types of heating? [6]

**OR**

Q.1 (a) Explain the vertical core type induction furnace with neat and clean diagram. [10]

(b) Compare electric arc welding and resistance welding. [6]

**UNIT - II**

Q.2 (a) Discuss the important terms used in illumination. [8]

(b) What do you mean by polar curve? Explain briefly. [8]

**OR**

- Q.2 (a) A 250 V lamp has a total flux of 3000 lumens and takes a current of 0.8 A.  
Calculate - [10]
- (i) Lumens per watt, and
  - (ii) MSCP per watt
- (b) Discuss the various methods employed for lighting calculation. [6]

**UNIT - III**

- Q.3 (a) Explain the Faraday laws of electro - deposition. [6]
- (b) Describe the extraction process of aluminum with neat and clean diagram. [10]

**OR**

- Q.3 (a) Why it is preferred to supply large chemical work from hydroelectric or atomic power stations? [10]
- (b) Explain anodizing and electro cleaning in detail. [6]

**UNIT - IV**

- Q.4 (a) What is the requirement of an ideal traction system? [6]
- (b) State and explain the track electrification system generally employed for the following services: [10]
- (i) Tramway service in a busy town area.
  - (ii) Electric suburban railway service.
  - (iii) Main line service.

**OR**

- Q.4 (a) Write short note on Pantograph. [8]
- (b) Discuss merit and demerit of the single phase A.C. system for main and suburban line electrification of the railway. [8]

**UNIT - V**

- Q.5 (a) Draw a main line speed time curve and label its various parts. [8]
- (b) What is the general feature of electric traction motors? [8]

**OR**

- Q.5 (a) What are the relative advantages and disadvantages of electric traction over other types of traction systems? [8]
- (b) An electric train has an average speed of 42 kmph on a level track between stops 1400 m apart. It is accelerated at 1.7 kmphs and it is braked at 3.3kmphs. Draw the speed time curve for the run. [8]

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