7E7041

7E7041

B. Tech. VII Sem. (Main/Back) Exam., Nov. – Dec. - 2017
Electrical & Electronics Engineering
7EX1A Power System Planning
EE, EX

Time: 3 Hours   **Maximum Marks: 80**
                                                          Min. Passing Marks: 26

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) Mention and Explain factors affecting the load of utility in forecasting modeling.   [8]

(b) Explain strategic planning, long term planning and short term planning?   [8]

OR

Q.1 (a) Explain Integrated Resource planning with respect to power generation planning.   [8]

(b) Explain the power system planning process. Enumerate the cyclical component of planning.   [8]

UNIT-II

Q.2 (a) Write a note on Reactive load forecast. [8]

(b) Explain the concept of dispatchability in power system planning. [8]

OR

Q.2 (a) Discuss in brief Rational Tariff [8]

(b) Explain the strategies for transmission system Expansion in India [8]

UNIT-III

Q.3 Write down short notes on:

(a) Computerized management [4]

(b) Load prediction [4]

(c) Reactive power balance [4]

(d) Load management [4]

OR

Q.3 Explain Quality of supply for power system planning. [16]

UNIT-IV

Q.4 Explain the green house effect and its technological Impacts. [16]

OR

Q.4 What is Insulation coordination? Explain the principles of Insulation coordination [16]

UNIT-V

Q.5 Explain the strategy for transmission. Expansion in a power system [16]

OR

Q.5 Write short notes on:

    (a)   Operating and maintenance cost of candidate plant [8]

    (b)   Least cost optimization problem for thermal plant [8]

Roll No. _____   Total No of Pages: 8

7E7042

7E7042

B. Tech. VII Sem. (Main/Back) Exam., Nov. – Dec. - 2017
Electrical & Electronics Engineering
7EX2A Power System Analysis
EE, EX

Time: 3 Hours   **Maximum Marks: 80**
                                                Min. Passing Marks: 26

*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) What is per unit system? How are the base quantities selected? Give advantages and disadvantages of per unit system. [6]

(b) Choosing transformer rating as base value, prove that the equivalent impedance of transformer in p. u. referred to LV and HV sides is the same. [4]

(c) For the radial network shown in figure draw the impedance diagram. [6]
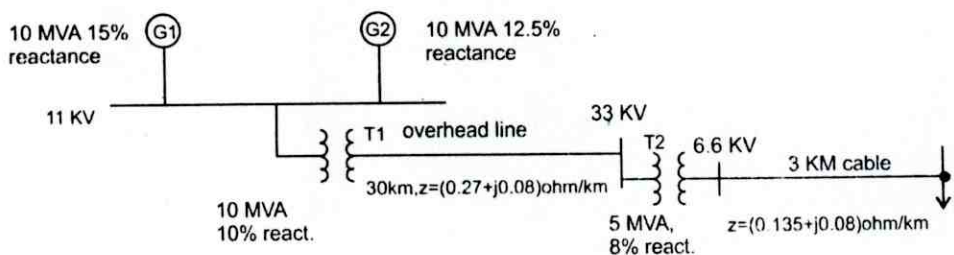
Q.1 (a) Why the admittance metrics is more suitable for load flow study? Explain the procedure for formulation of admittance matrix. Also explain the modification in admittance matrix. [8]

(b) The parameters of a 4 bus system are as under - [8]

Bus Code	Line Impedance (pu)	Charging Admittance (pu)
		$Y_{pq}/2$
1-2	0.2 + j0.8	j0.02
2-3	0.3 + j0.9	j0.03
2-4	0.25 + j1	j0.04
3-4	0.2 + j0.8	j0.02
1-3	0.1 + j0.4	j0.01

Draw the network and find bus admittance matrix.

UNIT-II

Q.2 (a) How is an existing impedance matrix modified? Discuss the possible condition. [8]

(b) Figure 1 shows a system having 4 alternators each rated at 11KV, 50 MVA and each having a sub transient reactance of 15%. Find - [8]

(i) Fault level for a fault on one of the feeder (near the bus) with zero value reactance X.

(ii) The reactance of current limiting reactor X to limit the fault level to 800 MVA for a fault on one of the feeders (near the bus).
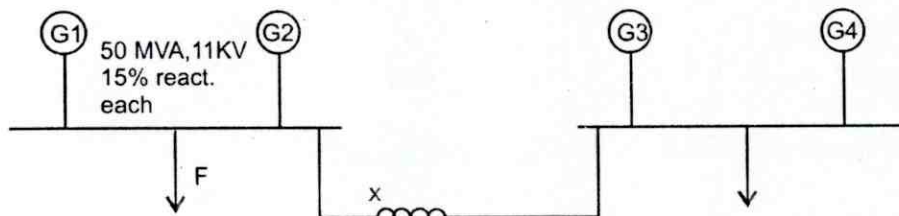

Figure 1

OR

Q.2 (a) What happens when a sudden transient occurs in a transmission line? Discuss the transient on a transmission line and also explain doubling effect. [8]

(b) A synchronous generator and a synchronous motor each rated 25 MVA, 11kV having 15% sub - transient reactance are connected through transformers and a transmission line as shown in figure 2. The transformers are rated 25 MVA, 11/66 kV and 66/11kV with leakage reactance of 10% each. The line has a reactance of 10% on a base of 25 MVA, 66 kV. The motor is drawing 15 MW at 0.8 power factor leading at a terminal voltage of 10.6 KV. When a symmetrical three - phase fault occurs at the motor terminals, find the sub - transient current in the generator, motor and fault. [8]
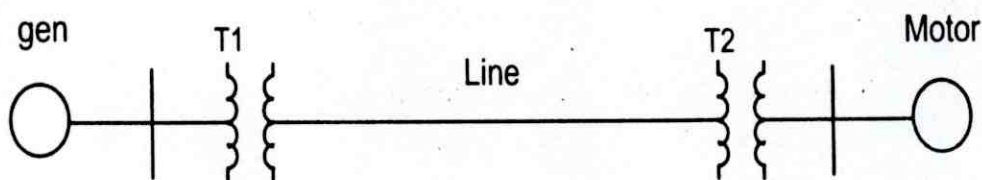

Figure 2

UNIT-III

Q.3 (a) Why the sequence networks are needed in power system? Discuss the Fortescue theorem. Derive the necessary equation to convert. [8]

 (i) Phase quantity in symmetrical components.

 (ii) Symmetrical components in phase quantities.

 (b) A 25 MVA, 11KV, 3 - phase alternator has a sub transient reactance of 20%. The generator supplies to two motors over a transmission line with transformers at both end as shown in one line diagram of fig. 1. The motors have rated inputs of 15 and 7.5 MVA, both 10KV with 25% sub transient reactance. The three phase transformer are both rated 30 MVA, 10.8/121 KV connection delta – star with leakage reactance of 10% each. The series reactance of line is 100 ohm. Draw the positive and negative sequence network of the system with reactance mark with reactance marked in per unit.
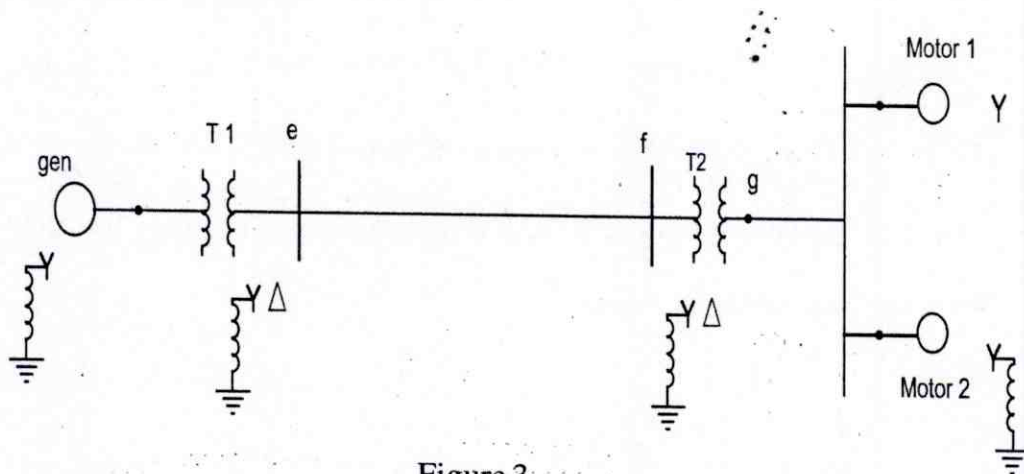

Figure 3

Assume that the negative sequence reactance of each machine is equal to its sub transient reactance. Omit resistances. Select generator rating as in the generator circuit.

[8]

OR

Q.3 (a) Derive the expression for sequence impedances and draw sequence networks of a synchronous machine.

[8]

(b) Two 11KV, 20MVA, three - phase, star connected generators operate in parallel as shown in figure 4, the positive, negative and zero sequence reactance of each being, respectively j0.18, j0.15, j0.10 pu. The star point of one of the generator is isolated and that of the other is earthed through a 2.0 ohm resistor. A single line to ground fault occurs at the terminals of one of the generators. Estimate- [8]

(i) The fault current

(ii) Current in grounding resistor

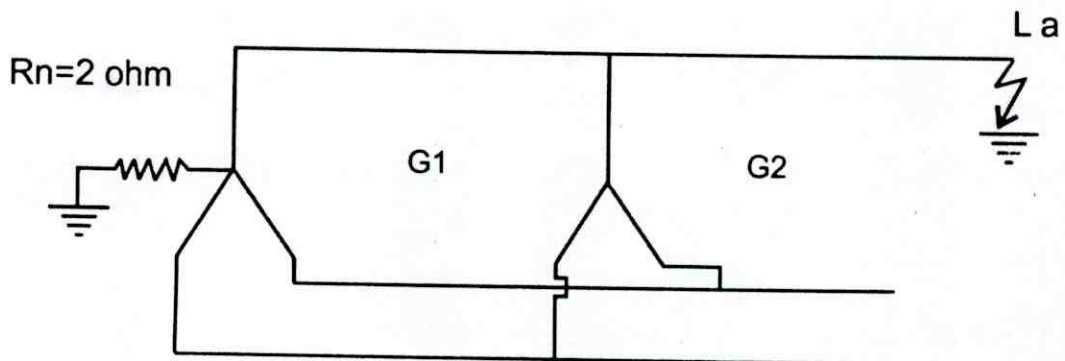(iii) The voltage across grounding resistor

Figure 4

UNIT-IV

Q.4 (a) Derive the necessary equation to determine the fault current for a line to line fault. Draw the diagram showing the inter connection of sequence networks. [8]

(b) A 20 MVA, 3 - phase alternator, having its neutral solidly grounded is operating at no load, its voltage rating 11kV between lines. It has reactance to positive sequence current of 2.5 ohm. The reactances to negative and zero sequence current are 80% and 30% of the positive sequence value respectively. For a double line to ground fault, determine - [8]

(i) The current in the fault lines

(ii) The current through ground

(iii) The voltage of healthy phase to neutral.

OR

Q.4 (a) Give reason: [8]

(i) For a fault at generator terminals, a single line to ground fault is generally more severe than a 3 - phase fault.

(ii) For a fault on transmission line, a 3 - phase fault is more severe than other faults.

(iii) The natural grounding impedance Zn appears as 3Zn in the zero sequence equivalent network.

(b) A 50 MVA, 11kV three phase alternator was subjected to different types of

faults. The fault currents are as under -   [8]

3 - Phase fault = 2000 A,

Line to Line fault = 2600 A

Line to Ground fault = 4200 A

The generator neutral is solidly grounded. Find the value of three sequence

reactances of the alternator. Ignore resistance.

UNIT-V

Q.5 (a) Why the load flow study is needed in power system? Explain the G-S method for

solution of load flow study.   [8]

(b) Discuss the importance of slack bus in load flow study and selection criteria of

slack bus in power system. Give the comparison of the different methods used

for load flow study.   [8]

OR

Q.5 (a) Give reasons: [2+2=4]

(i) A majority of buses in power system are load buses.

(ii) An acceleration factor is commonly used in load flow study.

(b) For a four bus power system the generator are connected at all four busses. While

the load are at busses 2 and 3. Values of real and reactive power are listed in

table 1 and values of impedance between the busses are listed in table 2.

Assuming a flat voltage start, find the voltage and phase angle at the three busses at the end of first GS iteration. The shunt admittance is neglected.   [12]

Table 1

Bus No.	Pi (pu)	Qi (pu)	Vi (pu)	Remark
1	-	-	1.04 Lu	Stack Bus
2	0.5	-0.2	-	PQ Bus
3	-1.0	0.5	-	PQ Bus
4	0.3	-0.1	-	PQ Bus

Table 2

Line Code	Impedance
1 – 2	0.05 + j0.15
1 – 3	0.10 + j0.30
2 – 3	0.15 + j0.45
2 – 4	0.10 + j0.30
3 – 4	0.05 + j0.15

		Total No of Pages: 3

Roll No. _____

7E7043

7E7043

B. Tech. VII Sem. (Main/Back) Exam., Nov. – Dec. - 2017
Electrical & Electronics Engineering
7EX3A Artificial Intelligence Techniques
EE, EX

Time: 3 Hours

Maximum Marks: 80
Min. Passing Marks: 26

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 What is "Artificial Intelligence (AI) and Artificial Technique"? Briefly explain how AI technique can be represented. List out some of the task domain of AI   [16]

OR

Q.1 How AI is related with engineering stream? Justify it with suitable examples. What engineering fields are related with AI and what are their role in AI?   [16]

UNIT-II

Q.2 (a) How to define a problem as state space search? Discuss with the help of an example.   [8]

(b) Discuss the control strategies with example.   [8]

OR

Q.2   Define the following problems:

    (a)   The Monkey & Bananas problem

              [4]

    (b)   7 – Bridges problem

              [4]

    (c)   Cryptarithmatic

              [4]

    (d)   8 – Puzzle problem

              [4]

UNIT-III

Q.3   (a)   Explain the major application areas of neural networks. [8]

    (b)   Explain the different types of artificial neural network of architectures. [8]

OR

Q.3   (a)   Explain the back propagation or error in multilayer neural networks. [8]

    (b)   What is perception differentiate single and multilayer neural network? [8]

UNIT-IV

Q.4   Explain the back propagation algorithm. What are the two different passes of back prorogation algorithm?

              [16]

OR

Q.4   (a)   Describe :

    (i)   Supervised learning

              [4]

    (ii)   Unsupervised learning

              [4]

    (b)   Explain Kohonen's self organizing map in detail.

              [8]

UNIT-V

Q.5 (a) Describe concepts & coding for genetic algorithm. [8]

(b) Write short note (any four) : [2×4=8]

    (i) Scaling & fitness

    (ii) Mutation

    (iii) Reproduction

    (iv) Population

    (v) Crossover

OR

Q.5 Describe fuzzy logic concepts. Also describe fuzzy controllers and discuses various types of membership functions. [16]

Roll No. _____

7E7044

Total No of Pages: 3

B. Tech. VII Sem. (Main/Back) Exam., Nov. – Dec. - 2017
Electrical & Electronics Engineering
7EX4A Non Conventional Energy Sources
EE, EX

Time: 3 Hours

Maximum Marks: 80
Min. Passing Marks: 26

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) List the various non conventional energy resources. Give their availability, relative merits and demerits in Indian context. [12]

(b) What are the limitations of Tidal energy? [4]

OR

Q.1 (a) Explain double basin arrangement in Tidal power plant. [8]

(b) Describe briefly the advantages of non conventional energy resources over conventional energy resources. [8]

UNIT-II

Q.2 (a) What are the advantages and disadvantages of concentrating collectors over flat plate collectors? [8]

(b) Draw and explain the schematic diagram of basic solar power plant. Also write the applications of solar photovoltaic system. [5+3=8]

OR

Q.2 (a) Define beam, diffuse and global radiation? Derive an expression for total radiation on titled surface. [10]

(b) Describe non convective solar pond for solar energy collection and storage. [6]

UNIT-III

Q.3 (a) Explain Wind Energy Conversion System (WECS). What are the basic components of a WECS? [8]

(b) What do you understand by geothermal energy? What are geothermal fields? [8]

OR

Q.3 (a) Explain the working of Binary fluid power plant. [8]

(b) Describe the main consideration in selecting a site for wind generators. [8]

UNIT-IV

Q.4 (a) Explain in detail the working of a Laser Fusion Reactor. [8]

(b) What are the various requirements for a nuclear fusion process to take place? [8]

OR

Q.4 (a) Explain the following terms in reference of nuclear fusion energy:

(i) Magnetic heating [2]

(ii) Pellet fusion reactor [2]

(iii) Plasma heating [2]

(iv) Beam fusion [2]

(b) Explain the fusion hybrid and cold fusion. [8]

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UNIT-V

Q.5 (a) What is the origin of biomass energy? What is the present status of development of biomass energy resources in India? [8]

(b) Explain the operation of biogas plant (any one): [8]

(i) Deen bandhu biogas plant

(ii) Pragati design biogas plant

OR

Q.5 (a) Explain the factors that affect fuel generation of biogas. [8]

(b) Explain the process of ethanol production from cassava. What are the uses of ethanol in power sector? [8]

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7E7045

7E7045

B. Tech. VII Sem. (Main/Back) Exam., Nov. – Dec. - 2017
Electrical & Electronics Engineering
7EX5A Power System Enginering
EE,EX

Time: 3 Hours

Maximum Marks: 80
Min. Passing Marks: 26

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 Incremental fuel cost (λ) in rupees per MWh for a plant consisting of two units are

$$\frac{dC1}{dPG1} = 0.20PG_1 + 40$$

$$\frac{dC2}{dPG2} = 0.25PG_2 + 30$$

Assume both units are operating at all to times and total load varies from 40 MW to 250 MW, and the maximum and minimum load on each units are to be 125MW and 20 MW respectively. How will be the load shared between the two units if the system load varies over the full range? What are the corresponding values of the plant incremental cost?   [16]

OR

Q.1 (a) What do you understand by economics loading of generating units and stations? Explain why the fuel cost is generally taken as the operating cost in economic generation scheduling?

[8]

(b) Define Input –Output curves and Incremental rate curves with the help of neat and clean diagram?

[8]

UNIT-II

Q.2 (a) Explain and derive Swing Equation?

[8]

(b) Explain Steady State stabilities and Steady state stability limits?

[8]

OR

Q.2 (a) A 100MVA, 2 Pole, 60 Hz generator has a moment of inertia 5×10^3 Kg-m^2. Calculate energy stored in rotor at rated speed. Also calculate the inertia constant H and angular momentum of the rotor at rated speed?

[8]

(b) Explain power angle curve under steady state and transient condition, in detail?

[8]

UNIT-III

Q.3 Explain Equal area criterion and its application to transient stability under basic disturbance in detail?

[16]

OR

Q.3 (a) A double circuit three phase feeder connects a single generator to a large network. The power corresponding to the limit of study state stability for each circuit is 100 MW. The line is transmitting 80 MW when one of the circuit is suddenly switch out. Determine with reference to appropriate diagram weather the generation is likely to remain in synchronism?

[8]

(b) Explain the phenomena of Critical clearing angle and critical clearing time with help of suitable example? [8]

UNIT-IV

Q.4 (a) Describe in detail the concept of brushless excitation system. [8]

(b) Explain Reserve Capacity of Power Plant, why is it needed? [8]

OR

Q.4 (a) Explain with help of advantage and disadvantage an Interconnected and Isolated power system. [8]

(b) Describe the phenomena of Excitation system of a synchronous machine? [8]

UNIT-V

Q.5 (a) Explain the concept of Power System Security and explain why in modern era it has become important in power system engineering? [8]

(b) Explain Series compensation of transmission line and its use in power system? [8]

OR

Q.5 (a) Write Short note on Tap Changing Transformer with a suitable diagram? [8]

(b) Explain concept of Location and Protection of series capacitor? [8]

7E7132

7E7132

B. Tech. VII Sem. (Main/Back) Exam., Nov.-Dec. 2017
Electrical Engineering
7EE6.3A Economic Operation of Power Systems

Time: 3 Hours

Maximum Marks: 80
Min. Passing Marks: 26

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) What is depreciation reserve? Discuss the methods to calculate depreciation charges. [8]

(b) Describe how the cost of unit energy generated by a generating unit is estimated. [8]

OR

Q.1 (a) Explain the components which constitute the fixed and operating cost of power plant. [8]

(b) Determine the generation cost per unit of energy from the following plant data-

Installed capacity = 120 MW

Capital cost of plant = ₹ 40,000 per kW

Interest & depreciation = 15%

Fuel consumption = 0.64 kg/kWh

Peak load = 100 MW

Load factor = 60%

Salaries, wages, repairs & other operating costs per annum = ₹ 5,00,00,000 [8]

UNIT-II

Q.2 (a) How is the sequence of adding units in thermal power plant decided? [8]

(b) Discuss input – output curve, heat rate & incremental cost. [8]

OR

Q.2 (a) Explain the "Economic Scheduling" Considering transmission losses. [8]

(b) Two generating units of thermal station have cost characteristics as under-

$C_1 = 561 + 7.92 P_1 + 0.001562 P_1^2$ ₹ /hr

$C_2 = 310 + 7.85 P_2 + 0.00194 P_2^2$ ₹ /hr

Obtain the cost characteristic of the composite unit for a total demand P_T. [8]

UNIT-III

Q.3 (a) What are the advantages of pump storage plant as peak load plant in an interconnected system?

[8]

(b) Explain plant requirements for base load and peak load operation. [8]

OR

Q.3 (a) Explain the advantages of operating a hydro and thermal plant in coordination. [8]

(b) A two plant system is having a steam plant near load centre and a hydro plant at a remote location. The load is 700 MW for 14hrs a day and 500 MW for 10hrs a day. The characteristics of units are-

Loss coefficient , $B_{22} = .0005$

$C_1 = (24 + 0.02P_1) P_1$ ₹ /hr

$W_2 = (6 + .0025 P_2) P_2$ m³/sec.

Find the generation schedule, daily water used by hydro plant and daily operating cost of thermal plant for $Y_2 = 2.5$ ₹ /hour/m³/ sec.

[8]

UNIT-IV

Q.4 (a) What is synchronizing power? How does it help in keeping the machines in step? [8]

(b) Discuss the effect of change in excitation of one of the machines when two alternators are running in parallel. [8]

OR

Q.4 (a) Describe briefly control of active and reactive power. [8]

(b) Discuss the conditions necessary for parallel operation of alternators. [8]

UNIT-V

Q.5 (a) Explain the different methods of minimum cost analysis and discuss about its applications, merits and demerits also. [8]

(b) Explain the basic concepts of physical & financial efficiencies of electrical goods and services. [8]

OR

Q.5 (a) Write short notes on the following- [10]

(i) Linear & non – linear break even

(ii) Break even and minimum cost analysis

(b) Explain supply and demand relationship. [6]

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7E4171

B. Tech. VII Sem. (Back) Exam., Nov. – Dec. - 2017
Electrical & Electronics Engineering
7EX1 (O) Data Base Management Systems
EE, EX

Time: 3 Hours

Maximum Marks: 80
Min. Passing Marks: 26

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) Explain Architecture at DBMS in detail.   [8]

(b) What is ER model? Discuss concept of weak and strong entity sets with suitable example.   [8]

OR

Q.1 (a) Discuss concept of Specialization & Generalization   [8]

(b) Explain concept of primary, candidate, super and foreign key with example.   [8]

UNIT-II

Q.2 What is normalization? Why it is required for database design? Discuss all the normal forms using suitable examples. Compare 4 NF with BCNF.   [16]

OR

Q.2 (a) Explain the difference between logical and physical data independence. [4]

(b) Define relational Algebra? Explain the following operations with respect to relational Algebra- [8]

(i) Natural Join

(ii) Project operation

(iii) Select operation

(c) What are primitive and composite data types? Explain. [4]

UNIT-III

Q.3 Consider the following relation-

Movie (m – id, Name, Director, year)

. Person (Pan – no, Name, Occupation, Age)

Spectator (m – id, Pan - no)

Write SQL queries given below- [8×2=16]

(a) List Name & Director of movie where spectator's occupation is "student"

(b) List Pan – no, Name & age of viewers who are spectator for all movies directed by "Satylit Ray".

OR

Q.3 (a) What are stored procedure? Differentiate between stored procedure and triggers. [8]

(b) What are DDL, DML and DCL? Differentiate between DDL and DML. [8]

UNIT-IV

Q.4 (a) What do you mean by Indexed file organization. Write down its advantages and disadvantages. [8]

(b) What is hashing? Differentiate between closed and open hashing. Discuss the advantages of each technique in database applications. [8]

OR

Q.4 (a) Explain the difference between inverted and multi list structures in detail. [8]

(b) Describe organization of physical data in random, sequential and indexed files with suitable examples. [8]

UNIT-V

Q.5 Write short notes on following- [8×2=16]

(a) Properties of Transaction

(b) Deadlock detection and recovery

OR

Q.5 Write short notes on following- [8×2=16]

(a) Concurrency control

(b) Log based recovery Technique

Roll No. _____

Total No of Pages: 3

7E4174

7E4174

B. Tech. VII Sem. (Back) Exam., Nov. – Dec. - 2017
Electrical & Electronics Engineering
7EX4 (O) Utilization of Electrical Power
EE, EX

Time: 3 Hours

Maximum Marks: 80
Min. Passing Marks: 26

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) Explain different methods of electric heating. [8]

(b) Explain in detail principle and working of Di-electric heating. [8]

OR

Q.1 (a) Explain construction, operation, performance and application of Induction furnace. [10]

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

UNIT-II

Q.2 (a) Explain the laws of illuminations. What is the importance of illumination? [8]

(b) Describe the Sodium Vapour Lamp. [8]

OR

Q.2 (a) What do you mean by polar curve? Explain briefly. [8]

(b) Discuss the various methods employed for lighting calculation. [8]

UNIT-III

Q.3 (a) Describe the extraction process of Aluminum with neat and clean diagram. [10]

(b) Explain anodizing and electro cleaning in detail. [6]

OR

Q.3 (a) Why it is preferred to supply large chemical work from hydroelectric or Atomic

Power Stations? [10]

(b) Explain the Faraday Law of electro-deposition. [6]

UNIT-IV

Q.4 (a) Discuss merits & demerits of the single phase A.C. system for main and

suburban line electrification of the railway. [8]

(b) Write short notes on Electric Traction. [8]

OR

Q.4 (a) Explain in detail "Pantograph". [8]

(b) Explain Electric suburban railway service. [8]

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UNIT-V

Q.5 (a) Explain the method of electric braking of traction motors. [8]

(b) What are the relative advantages and disadvantages of electric traction over other types of traction system? [8]

OR

Q.5 Write short notes on following:

(a) Mechanics of train movement [8]

(b) Speed time and speed distance curves [8]