Code: 4P6221

M.Tech. II Semester Regular & Supplementary Examinations Aug/Sep 2016

Operation & Control Of Power System

(Common to EPE & EPS)

Max. Marks: 60   Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 12 = 60Marks)

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UNIT–I

1. a) With the help of Flow chart explain Economic dispatch by   Iteration method without loss.   6M

   b) Explain Economic dispatch problem of thermal units by Newton's methd.   6M

OR

2. Explain the Forward Dynamic Programming method of solving unit commitment problem with neat flow chart.   12M

UNIT–II

3. In a two plant operation system, the hydro plant is operation for 10 hrs, during each day and the steam plant is to operate all over the day. The characteristics of the steam and hydro plants are C_T = 0.04 PGT^2 +30 PGT + 10 Rs/hr WH = 0.12 PGT^2+30 PGH m3/ sec When both plants are running, the power flow from steam plant to load is 150 MW and the total quantity of water is used for the hydro plant operation during 10 hrs is 150×106 m3. Determine the generation of hydro plant and cost of water used. Neglect the transmission losses.   12M

OR

4. Explain pumped storage hydro scheduling with a Dynamic programming and linear method.   12M

UNIT–III

5. a) Describe a modeling of LFC of single area system.   6M

   b) Develop the state variable model of a two area system and state the advantages of the model.   6M

OR

6. a) Two synchronous generators operating in parallel. Their capacities are 300MW and 400MW. The droop characteristics of their governors are 4% and 5% from no load to full load. Assuming that the generators are operating at 50HZ at no load, how would be a load of 600MW shared between them. What will be the system frequency at this load? Assume free governor action.   6M

   b) Explain the concept of automatic generation control.   6M

UNIT–IV

7. a) Discuss various factors affecting the economic interchange between interconnected utilities.   6M

   b) Describe various methods of power interchange methods.   6M

OR

8. a) Briefly describe about power pools.   6M

   b) Explain Wheeling in interconnected utilities.   6M

UNIT–V

9. a) Explain the network topology determination method with the factors involved in it.   6M

   b) Explain the power system security and control with neat flow chart.   6M

OR

10. a) List the various contingencies that are generally considered for steady sate security analysis. Explain the major functions of system security control.   6M

    b) Explain the Interior point algorithm of state estimate.   6M

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Code: 4P6222

M.Tech. II Semester Regular & Supplementary Examinations Aug / Sep 2016
Flexible AC Transmission System
(Common to EPE& EPS)

Max. Marks: 60   Time: 3 Hours
Answer *all five* units by choosing one question from each unit (5 x 12 = 60Marks)
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UNIT–I

1. a) List and explain the different kinds of loading capability limits   6M

    b) Discuss different types of shunt connected controllers   6M

OR

2. a) Explain the relative importance of controllable parameters   6M

    b) Discuss various possible benefits from FACTS technology   6M

UNIT–II

3. a) Describe the principle of operation of 3-phase full wave bridge converter   10M
        with necessary waveforms
    b) Draw the schematic diagram of one phase-leg of a 3-level converter   2M

OR

4. a) Explain the transformer connections for 12-pulse operation with necessary   10M
        waveforms
    b) Draw the circuit diagram of 24-pulse transformer connection.   2M

UNIT–III

5.   Discuss the objectives of shunt compensation   12M

OR

6. a) Explain the principle of operation of TCR   8M

    b) Write short notes on hybrid Var generators   4M

UNIT–IV

7. a) Draw and explain v-i characteristics of the SVC and STATCOM   6M

    b) Draw and explain an implementation of power oscillation damping by   6M
        modulating the reference voltage according to power flow variation.

OR

8. a) Draw and obtain the basic transfer function of the STATCOM   6M

    b) Explain operating point control with necessary diagrams.   6M

UNIT–V

9.   Explain the principle of operation of GCSC   12M

OR

10.   Explain the principle of operation of TCSC   12M

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M.Tech. II Semester Regular & Supplementary Examinations Aug / Sep 2016
Advanced Power System Protection
(Common to EPE & EPS)

Max. Marks: 60   Time: 3 Hours
Answer *all five* units by choosing one question from each unit (5 x 12 = 60Marks)
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UNIT–I

1. a) What are different advantages of static relays   6M
   b) Explain the operation of level detector used in static relays   6M

OR

2. a) Explain the concept of missing circuit   6M
   b) Explain about two input phase comparator   6M

UNIT–II

3. Explain Rectifier vector type phase comparators   12M

OR

4. a) Explain the principle of static instantaneous over current relay   6M
   b) Explain the principle of static time over current relay   6M

UNIT–III

5. Explain the analysis of static differential relays   12M

OR

6. a) Explain the significance of static harmonic restraint relay   6M
   b) Explain the principle and operation of MHO relay   6M

UNIT–IV

7. a) Explain three input amplitude comparator   6M
   b) Explain the concept of hybrid comparator   6M

OR

8. Explain the effects of power swings on the performance of Distance relays 12M

UNIT–V

9. a) Explain the flow chart for the Microprocessors based impedance relay   6M
   b) Explain the block diagram of the Microprocessors based Directional relay 6M

OR

10. a) Explain the flow chart for the Microprocessors based Reactance   relay   6M
    b) Explain the principle of digital computer relaying   6M

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Code: 4P7221

M.Tech. II Semester Regular & Supplementary Examinations Aug/Sep 2016

Energy Conversion Systems

(Electrical Power Systems)

Max. Marks: 60   Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 12 = 60Marks)

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UNIT–I

1. a) Explain spectral distribution of energy in solar radiation.   6M
    b) Explain briefly the applications of super conducting materials in electrical equipment systems.   6M

OR

2. a) Explain how voltage is developed by solar cell in detail.   6M
    b) Draw the equivalent circuit of a typical solar cell and derive the expressions for Isc and Voc.   6M

UNIT–II

3. a) Explain the principle of MHD power generation with neat sketch.   6M
    b) Explain wind energy conversion.   6M

OR

4. a) Explain MHD technology.   6M
    b) Explain operating characteristics of wind turbines.   6M

UNIT–III

5. Explain in detail tides and Tidal power station.   12M

OR

6. a) Give the properties of wave turbines and power content.   6M
    b) Describe the closed cycle OTEC systems.   6M

UNIT–IV

7. a) Describe the Fischter – Tropsch process for coal liquefaction.   6M
    b) Classify Bio-mass conversion technologies and explain them.   6M

OR

8. Explain the working of cogeneration plant and discuss its merits and demerits.   12M

UNIT–V

9. a) What are the types of fuel cells, discuss any one of them.   6M
    b) Explain about the battery applications in large power systems networks.   6M

OR

10. a) Give description of batteries in detail.   6M
    b) Explain pollution free energy systems in detail.   6M

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Code: 4P6225

M.Tech. II Semester Regular & Supplementary Examinations Aug/Sep 2016
Power System Reliability
(Common to EPE & EPS)

Max. Marks: 60   Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 12 = 60Marks)
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UNIT-I

1. a) Write short notes on combined Generation capacity model.   4M

   b) A generation system contains three 25MW generating units each of 4% forced outage rate. If the peak load for a 100 days period is 75MW, What is loss of load expectation and expected index of reliability for this period? Assume that the appropriate load characteristic is a straight line from the 100% to 60% points.   8M

OR

2. A generating station consists of two 8MW units and one 6MW unit with forced outage rates of 0.07 and 0.04 respectively. Determine

   a) The capacity outage cumulative Probability Table.
   b) Use sequential Addition Method to obtain cumulative probabilities.
   c) If the unit of 6MW capacity at the end of (ii) is deleted, obtain the cumulative probabilities.   12M

UNIT-II

3. a) Explain how combined generation load model is developed and hence develop the expressions for cumulative probability and cumulative frequency of various combined capacity states.   6M

   b) Explain the two-level daily load representation of a generation system   6M

OR

4. A generating station has three generators 2 rated for 15MW and third one for 25MW. The failure and repair rates of each unit are 0.35 f/yr and 0.05 f/yr. Obtain the state space diagram and mark the various transition rates. Hence evaluate cumulative probability and cumulative frequencies of various combined states.   12M

UNIT-III

5. a) Explain the weighted average rate model and two weather markov model of transmission lines.   6M

   b) Explain the load point and system reliability indices of bulk power system.   6M

OR

6. a) Explain the basic concept and risk indices of operating Reserve Evaluation.   6M

   b) Explain how rapid start and hot reserve units are modeled with the help of various state models?   6M

UNIT-IV

7. a) What are the various assumptions to be made in interconnected systems? 4M

   b) Give the state space diagram of two interconnected system with limited tie-line capacity? 8M

OR

8. a) Discuss about the basic and performance reliability indices that are used in distribution system. 5M

   b) Consider a 2-load point radial distribution system shown in Fig.1
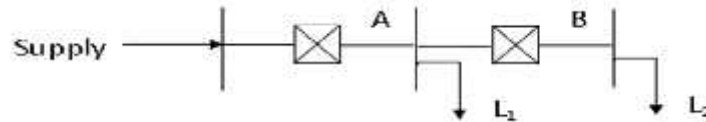
| Line No.	f /yr	R (hrs)	No. of customers	Avg demand(kw)	Load points
A	0.12	4	175	750	L_1
B	0.25	7	225	550	L_2

   i. Evaluate the load Point Reliability Indices.
   ii. Obtain Performance Indices. 7M

UNIT-V

9. Write short notes on

   a) Circuit Breakers Failure Modes
   b) Active and Passive Failures 12M

OR

10. Consider the system shown in Fig. below in which 1,2 represents transmission lines, 3,4 transformers, 5,6 buses, 7 to 10 are circuit breakers with the following data:
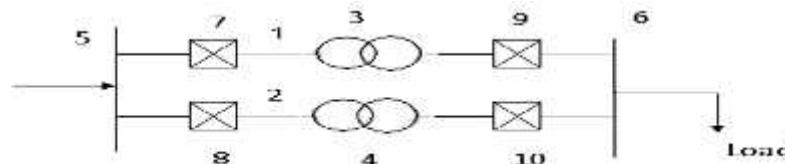
Evaluate the basic reliability indices of the distribution system using

   1. Network Reduction Technique.
   2. Cut-set Approach.

The reliability data of the system is

Component	f /yr	R (hrs)
1	0.5	10
2	0.5	10
3	0.01	100
4	0.01	100
5	0.01	5
6	0.02	2

12M

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Code: 4P6228

M.Tech. II Semester Regular & Supplementary Examinations Aug / Sep 2016

Electrical Power Distribution & Automation

(Common to EPE& EPS)

Max. Marks: 60   Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 12 = 60Marks)

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UNIT–I

1. a) How the loads are classified? And explain the types of loads and their characteristics. 6M

   b) Annual peak load input to a primary feeder is 1500 kW. The voltage drop and losses shows that the total loss at the time of peak load is 100 kW. The total annual energy supplied to the sending end of the feeder is 5.5 x 10^6 kWh. **(i)** Determine the annual loss factor **(ii)** Calculate the total annual energy loss and the annual cost if the unit charge is Rs. 2.5. 6M

OR

2. a) Explain the requirements and design features of Distribution system. 6M

   b) A 120 MW substation delivers 120 MW for 4 Hrs, 60 MW for 10 Hrs and shut down for rest of each day. It is also shut down for the maintenance for 30 days each year. Calculate its annual load factor. 6M

UNIT–II

3. a) Explain the design consideration of radial type distribution feeder with neat diagrams in detail. 6M

   b) Explain the principle of operation of **(i)** Fuses **(ii)** Line sectionalizers 6M

OR

4. a) Write down the general coordination procedure and explain the type of fuse to fuse coordination. 6M

   b) Write down the factors that influence the voltage levels in the design and operation of distribution system. 6M

UNIT–III

5. a) Explain the role of SCADA in Distribution Automation. 6M

   b) With neat diagram explain the concept of DAS. 6M

OR

6. a) What are the basic architectures of Distribution Automation? 6M

   b) Discuss in detail about various functions of DAS. 6M

UNIT–IV

7. a) What are the functionalities of DMS? 6M

   b) Write short notes on Outage management 6M

OR

8. a) Briefly explain the real time control in DMS 6M

   b) Write short notes on decision support applications in DMS 6M

UNIT–V

9. a) Write short notes on Restoration function 6M

   b) Write short notes on Fault detection in Distribution system 6M

OR

10. a) Explain briefly the reconfiguration of distribution systems 6M

    b) What is power quality? Explain with respect to distribution system. 6M

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