R-14

Code: 4P6221

M. Tech. II-Semester Regular Examinations Oct/Nov 2015

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) Explain with a neat flowchart the procedure for finding the solution for unit Commitment problems using **DP** method. 8M

   b) The fuel costs of three units are given below
   $F_1(P_1)=561+7.92P_1+0.001562P_1^2$ RS/hr
   $F_2(P_2)=310+7.85P_2+0.00194P_2^2$ RS/hr
   $F_3(P_3)=78+7.97P_3+0.00482P_3^2$ RS/hr
   The total demand is 850MW obtain the economical load dispatch. 4M

OR

2. a) Explain unit commitment problem solution by priority-list method. 7M

   b) What do you mean by Economic Load Dispatch, explain it? 5M

UNIT-II

3. a) Discuss briefly about hydroelectric plant models. 6M

   b) Discuss briefly hydrothermal scheduling 6M

OR

4. Formulate a short term hydrothermal scheduling problem by gradient method. Also explain with flowchart, the solution of this problem by this method 12M

UNIT-III

5. a) What is AGC? 4M

   b) Sketch and explain the modeling of LFC of single area system 8M

OR

6. a) Explain the steady state response of a controlled two area system 8M

   b) How AGC implementation is done 4M

UNIT-IV

7. a) Explain the Interchange of Power and Energy-Economic interchange between interconnected utilities 8M

   b) Write the short notes on Power pools 4M

OR

8. a) Briefly discuss about the Inter utility energy evaluation 8M

   b) Write the short notes on Wheeling 4M

UNIT-V

9. a) Explain the power flow security analysis with contingency case selection. 6M

   b) Write the short notes on Decomposition state estimation method 6M

OR

10. a) List the factors that affect the power system security. 4M

    b) Explain the Interior point algorithm for security constrained optimal power flow 8M

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Mr. C. Ganesh

Code: 4P6222

R-14

M. Tech. II-Semester Regular Examinations Oct/Nov 2015

Flexible AC Transmission System

(Common to EPS & EPE)

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) Discuss about the dynamic stability considerations of FACTS devices. 6M
   b) List out the possible benefits from FACTS Controllers. 6M

OR

2. a) Explain the factors which are limiting the loading capability of a transmission system. 6M
   b) Explain the importance of controllable parameters on study of stability. 6M

UNIT-II

3. a) Explain the comparison between voltages sourced converters and current sourced converters. 6M
   b) Explain the operation of PWM voltage sourced converter. 6M

OR

4. a) Explain the operation of 3 level voltage sourced converter and draw the wave forms. 6M
   b Comment on the Harmonic presence in 12, 24 and 48 pulse operation. 6M

UNIT-III

5. a) Explain in brief the objectives of shunt compensation 6M
   b) Explain different methods of controllable VAR generation 6M

OR

6. a) Explain how improvement in transient stability limit can be obtained by providing shunt compensation to two machines, two line power system. 6M
   b) Explain the effect of shunt compensation at the end of a radial line on voltage stability. 6M

UNIT-IV

7. Explain in detail principle of working of STATCOM with neat sketches. 12M

OR

8. Explain about the implementation of Regulation slope to a static var generator with the help of neat block diagram. 12M

UNIT-V

9. Explain the operation and characteristics of thyristor switched series Capacitor and thyristor controlled series capacitor. 12M

OR

10. How the series compensators are used for improvement of transient stability and power oscillation damping? Explain. 12M

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R-14

Code: 4P6223

M. Tech. II-Semester Regular Examinations Oct/Nov 2015

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) Explain the operation of Level Detector
   b) Derive the Generalized equation for phase or amplitude comparator

OR

2. a) Explain the Replica Impedance with respect to Transactor
   b) Explain integrating type phase comparator with rectifier type AND gate

UNIT-II

3. a) Explain static definite time over current relay
   b) Explain basic principle of time over current relays?

OR

4. a) Explain coincidence circuit type block spike phase comparator
   b) Explain integrating type phase comparators

UNIT-III

5. a) Explain Duo bias transformer differential protection
   b) Explain different types harmonic restraint differential relays for transformer protection

OR

6. a) Explain the realization of the MHO relay with sampling comparator
   b) Explain angle impedance relay with sampling comparator

UNIT-IV

7. a) Explain about three input comparator & hybrid comparator
   b) What are the switched distance relaying schemes. Explain them in detail

OR

8. a) Explain about effect of power swings on the performance of distance relays
   b) Explain principle of out of step tripping and blocking relays

UNIT-V

9. a) Explain microprocessor based directional relays
   b) Explain the Block diagram and flow chart approach of reactance relay

OR

10. a) Explain about generalized expression for distance relays
    b) Describe realization of MHO characteristics

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Hall Ticket Number :

R-14

Code: 4P7221

M. Tech. II-Semester Regular Examinations Oct/Nov 2015

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) Describe the voltage developed by the solar cell. 4M

   b) Explain the physical properties of the materials on which the super conductivity applications of electrical apparatus depend. 8M

OR

2. Explain photo current and load current concepts in solar power radiation. 12M

UNIT-II

3. Explain the principle of practical MHD generator with Faraday and Hall configurations. 12M

OR

4. An MHD duct consists of gas (with electrons) of velocity u=600i+100j+0k. A magnetic field B=3.2T is applied in the k-direction. The gas conductivity is σ=60mho/m. the mean collision time of the electrons with neutral atoms in gas is $T=10^{-10}$sec. The coefficient of performance in Hall configuration is $K_h=0.65$. Calculate

   a) The cyclotron frequency b)Hall Parameter

   c) Hall current density J_x d) Power density delivered to load at $K_h=0.65$

   e) Short circuit current density f) Open circuit voltage gradient

   g) comparison with faraday configuration 12M

UNIT-III

5. a) Explain the types of ocean thermal energy conversion (OTEC) systems with neat sketches 8M

   b) Brief the applications of OTEC systems. 4M

OR

6. Explain the types of generators for tidal power generation. 12M

UNIT-IV

7. a) Explain the thermo-chemical conversion of Biomass. 6M

   b) Discuss the principle and types of Geothermal energy power generation. 6M

OR

8. Derive the following expression of thermo-electric generator.

   a) Power output 8M

   b) Thermal efficiency. 4M

UNIT-V

9. a) Describe the types of fuel cells. 6M

   b) Explain the types of batteries. 6M

OR

10. a) Explain the preventive measures in controlling the pollution from coal. 6M

    b) Discuss the pollution of steam stations. 6M

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Hall Ticket Number :

R-14

Code: 4P6225

M. Tech. II-Semester Regular Examinations Oct/Nov 2015

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 sequential addition method. 4M

   b) A generating station consists of two 5MW units and one 7MW unit each having a forced outage rate of 0.04.

      i. Formulate the capacity outage cumulative probability table.

      ii. Obtain the cumulative probabilities using sequential addition method 8M

OR

2. a) Explain how loss of energy indices is computed for generation system reliability analysis. 4M

   b) A generating station consists of three generators of 10MW, 20MW & 30MW units respectively and one 40MW unit and each unit having forced outage rate of 0.08.calculate the loss of load expectation for this system with a single - peak load of 60MW. 8M

UNIT-II

3. a) Write short notes on two - level representation of the daily load. 6M

   b) Explain how load model and generation system combined states are merged to estimate LOLP. 6M

OR

4. A generating system consists of two units of 10MW each and third one of 15MW having failure rate of 0.02 and repair rate of 0.98. Develop the state space diagram and evaluate the equivalent transitional rates of various capacity states. 12M

UNIT-III

5. a) Explain what is meant by operating reserve. Explain how rapid start and hot reserve units are modeled with the help of various state models. 8M

   b) Explain the concept of PJM methods. 4M

OR

6. a) Explain the conditional probability approach of composite generation and transmission system reliability analysis. 6M

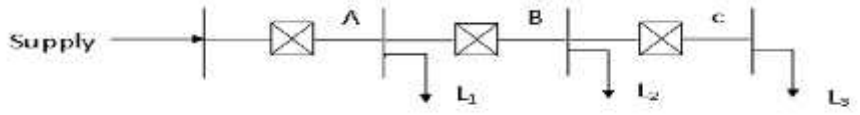
   b) Explain what is meant by 'Common mode failure' and how it is used to consider the weather effects of transmission system reliability analysis. 6M

UNIT-IV

7. Develop the expressions for probability and frequency of failures of a two area inter connected system.
   (i) With independent loads.
   (ii) With correlated loads
   Considering limited tie-line capacity 12M

OR

8. Consider a 3 - load point radial system shown in fig.



The system data is given as

Line No.	λ f /yr	R (hrs)	No. of customers	Avg. load demand(kw)	Load points
A	0.2	6	200	1000	L_1
B	0.1	5	150	700	L_2
C	0.15	8	100	400	L_3

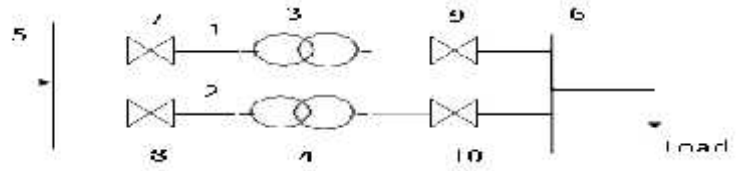
Evaluate (a) load point reliability indices
(b) customer-oriented, load and energy oriented indices of the above system 12M

UNIT-V

9. a) Distinguish between active and passive failures and hence develop the expressions for limiting state probabilities of active failures. 6M
   b) Give the state space diagrams of two-components A and B with switching after faults. 6M

OR

10. Consider the system show in fig. below and consider that (i)each component is removed for the scheduled maintenance once a year for a period of 24 hours (ii) Each branch is under maintenance once in a year for a period of 24 hours.



Where 1,2 transmission lines, 3,4 transformers, 5,6 buses, 7 to 10 circuit breakers. Evaluate the reliability indices of the system with the following data:

Component	**λ f /yr**	**R (hrs)**
1	1	20
2	1	20
3	0.1	120
4	0.1	120

12M

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Hall Ticket Number :

R-14

Code: 4P6228

M. Tech. II-Semester Regular Examinations Oct/Nov 2015

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) Discuss various types of loads and their characteristics? 6M

   b) Annual peak load input to a primary feeder is 2000kW at which the power loss is total copper loss at the time of peak load is ΣI^2R =100 kW. The total annual energy supplied to the sending of feeder is 5.61×10^6 kWh. Determine the i) annual loss factor ii) total annual copper loss energy and its value at Rs.1.5/kWh 6M

OR

2. a) What is the importance of planning technique in distribution system? 6M

   b) A distribution substation supplying a small town has an annual peak load of 3,500 kW, the total annual energy supplied to the primary feeder is 10,000 MWh, the peak demand occurs in July. Determine the annual average power demand and annual load factor? 6M

UNIT-II

3. a) Explain about automatic line sectionalizers 6M

   b) Write the different secondary voltage levels in India and explain about secondary banking? 6M

OR

4. a) What is primary feeder loading? Explain the factors affecting design loading of a feeder? 6M

   b) Explain about recloser-to-fuse coordination of protective devices? 6M

UNIT-III

5. a) Write the benefits of distribution automation (DA)? List out the functions of DA 6M

   b) Explain the functions of SCADA 6M

OR

6. a) Describe about **i)** load reconfiguration **ii)** transformer load management **iii)** voltage regulation functions of DA 6M

   b) Explain the basic architecture of DAS 6M

UNIT-IV

7. a) Explain the decision support applications of DMS? 6M

   b) Explain about database structures and interfaces of DMS 6M

OR

8. a) Explain about outage management in DMS 6M

   b) Describe the functions of DMS 6M

UNIT-V

9. a) Explain the effects of harmonics in distribution systems 6M

   b) Explain about volt/var control and fault detection functions 6M

OR

10. a) Explain about various power quality problems in distribution systems 6M

    b) Write short notes on restoration function, demand side management functions 6M

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