

**Code : 1P6223**

***M.Tech. II Semester Regular Examinations, July/August 2014***

**ADVANCED POWER SYSTEM PROTECTION**

( Common to EPE & EPS )

**Time: 3 hours**

**Max Marks: 60**

*Answer any FIVE of the following  
All questions carry equal marks (12 Marks each)*

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|----|----|--|-----|
| 1. | a) | Write the merits and demerits of static relays.  | 6M  |
|    | b) | Explain the duality between amplitude and phase comparator.  | 6M  |
| 2. |    | Explain the circulating type amplitude comparator and Integrating type phase comparator.                       | 12M |
| 3. |    | Explain various types of static over current relays with vector diagram and applications.                      | 12M |
| 4. | a) | Explain about harmonic restraint relay   | 6M  |
|    | b) | Explain the realization of the MHO relay with sampling comparator  | 6M  |
| 5. | a) | Explain the Coinc-section characteristics of Three input amplitude Comparator.                                 | 6M  |
|    | b) | What are the switched distance relaying schemes. Explain them in detail.                                       | 6M  |
| 6. |    | Explain the effect of power swings on distance relays. Analyze the power swings for reactance relay in detail. | 12M |
| 7. |    | Draw the block diagram and flow chart for microprocessor based impedance relay.                                | 12M |
| 8. | a) | Draw the flow chart for realization of OFFSET MHO relay using microprocessor.                                  | 6M  |
|    | b) | Explain digital computer relaying using microprocessors  | 6M  |

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**Code : 1P6224**

***M.Tech. II Semester Regular Examinations, July/August 2014***  
***Energy Conversion Systems***  
**( EPE )**

**Time: 3 hours**

**Max Marks: 60**

*Answer any FIVE of the following*  
*All questions carry equal marks (12 Marks each)*

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1. a) Describe the principle of solar PV energy conversion? 6M  
b) State the applications of solar PV systems? 6M
2. a) State and explain the principle of MHD generator? 6M  
b) Explain Hall effect in MHD generator and methods adopted to overcome the limitations? 6M
3. a) State the essential features of a probable site for a wind farm? 6M  
b) Describe the construction of a typical three blade horizontal shaft wind turbine generator unit? 6M
4. a) State the meaning of the following terms  
Tidal range.  
Head of water in tidal scheme.  
Explain the difference between the two terms. 6M  
b) Describe wave motion in ocean and motion of particles in ocean waves? 6M
5. a) What are the types of geothermal fluids? What is the temperature range? 6M  
b) What are the end/energy products of the following biomass energy conversion processes  
Incineration  
Anaerobic fermentation  
Ethanol fermentation 6M
6. What are the cogeneration and energy storage techniques? Explain in detail? 12M
7. a) What are the applications of fuel cells? 6M  
b) Explain the application of battery for large power requirements? 6M
8. a) State the various significant routes of biomass energy conversion to useful energy? 6M  
b) Explain the coal conversion processes? 6M

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**M.Tech.. II Semester Regular Examinations, July/August 2014**  
**Energy Auditing, Conservation & Management**  
**( Common to EPE & EPS )**

Max. Marks: 60

Time: 03 Hours

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Answer any five questions

All Questions carry equal marks (12 Marks each)

1. a. Distinguish between 'preliminary energy audit' and 'detailed energy audit'. 6M
- b. What are the steps involved in Energy management Strategy, Explain them. 6M
2. Explain energy audit of a steam power plant and mention the measures to conserve energy with an example. 12M
3. Explain the importance and role of training and awareness in energy management programme. 12M
4. Define Motor efficiency? Why it is difficult to measure the motor efficiency at site? Describe the various methods by which the motor loading can be calculated. A 20 kW rated motor is drawing actual measured power of 14 kW. If the rated efficiency is 92%, determine the motor loading. 12M
5. a. How the effects of non-linear loads and harmonics on industrial drives are eliminated, Explain. 6M
- b. Discuss the steps in the design and practice of energy efficient lighting system. 6M
6. a. List out the various instruments that are used for energy auditing purpose. 6M
- b. What are the base line data which an auditor should collect for conducting a detailed energy audit? 6M
7. a. Explain the life cycle costing analysis of an energy efficient lighting system. 6M
- b. Discuss time value of money and rate of return with an example. 6M
8. Explain the various methods of financial analysis and enumerate their advantages and disadvantages. 12M

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**Code : 1P6228**

***M.Tech. II Semester Regular Examinations, July/August 2014***

***Electrical Power Distribution & Automation***

**( Common to EPE & EPS )**

**Time: 3 hours**

**Max Marks: 60**

*Answer any FIVE of the following  
All questions carry equal marks (12 Marks each)*

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1. a) Explain the different types of loads in distribution system with their characteristics.  
b) Annual peak load input to a primary feeder is 2000 KW at which the power loss is total copper loss at the time of peak load is 100 KW. The total annual energy supplied to the sending end of feeders is  $5.16 \times 10^6$  KWH. Determine (i) Annual loss factor, (ii) Total annual copper loss energy and its value at Rs. 1.50/KWh.
2. a) Explain the features of a typical distribution system with neat diagram  
b) Compare the major advantages and disadvantages of AC and DC distribution systems.
3. a) Derive the expression for voltage drop and power loss for uniformly radial type distribution load.  
b) A single phase AC distribution AC of 300KM long is feed from end A and is loaded as follows
  - i) 100A, at 0.707 pf lagging 200m from point A.
  - ii) 200A, at 0.8 pf lagging 300m from point AThe load resistance and the reactance of the distribution is 0.2 and 0.1 ohm/km. Calculate the total voltage drop in the distributor.
4. a) What are the various effects of shunt and series capacitors in distribution systems?  
b) A 3 phase, 50 Hz, 400V motor develops 100HP, the power factor being 0.75 lagging and efficiency 93%. A bank of capacitor is connected in delta across the supply terminals and the power factor raised to 0.95 lagging. Each of the capacitance unit is built of 4 similar 100V capacitors. Determine the capacitance of each capacitor.
5. a) Explain in detail how the coordination of various protective devices helps in improving the system performance.  
b) Explain the fuse and reclosed coordination.
6. a) Write in detail about the objective of Distribution Automation.  
b) Illustrate the control hierarchy diagrams of Distribution Automation.
7. Explain the different functions of Distribution Management Systems.
8. a) Discuss briefly about the data actuation and control function.  
b) Write about power quality, voltage/var control in distribution system.

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***M.Tech. II Semester Regular Examinations, July/August 2014***

***FLEXIBLE AC TRANSMISSION SYSTEM***

**( Common to EPE & EPS )**

**Time: 3 hours**

**Max Marks: 60**

*Answer any FIVE of the following  
All questions carry equal marks (12 Marks each)*

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1. a) Why there is a need of interconnection in electrical power systems? 6M  
b) What are the conventional methods used for compensation in power systems? 6M
2. a) Explain how different converter topologies work? Explain how VSC will act as an inverter or a rectifier in inductive or capacitive mode? 6M  
b) Explain with the help of circuit diagram and waveforms single-phase leg operation of a VSC. ? 6M
3. a) Give Comparison of Voltage Sourced and Current Sourced converters? 6M  
b) What is PWM converter & what are its advantages? 6M
4. a) What are the objectives of shunt compensation? 6M  
b) Explain Power oscillation damping? 6M
5. a) Explain Methods of controllable var generation? 6M  
b) Explain switching converter type var generators? 6M
6. a) Compare STATCOM with SVS? 6M  
b) Explain the working principle & V – I char. Of STATCOM? 6M
7. a) Explain how series compensation can be used for power oscillation damping? 6M  
b) How voltage stability at load bus can be achieved using series compensation? 6M
8. a) Explain with a neat sketch and waveforms the TCSC type of series controller? 6M  
b) With the help of power angle curve explain how transient stability is improved with the help of series controllers? 6M

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**Code : 1P6221**

***M.Tech. II Semester Regular Examinations, July/August 2014***

***Operation & Control of Power Systems***

**( Common to EPE & EPS )**

**Time: 3 hours**

**Max Marks: 60**

*Answer any FIVE of the following  
All questions carry equal marks (12 Marks each)*

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1. a) Explain with the help of flow chart the forward dynamic programming solution for solving unit commitment problem.  
b) Consider the data of a system having four generating units with the parameters listed in table. Find the most economical units to be committed for a load of 6 Mw with the load changes in steps of 1.5 Mw.
2. Write Short notes on:
  - a. Interchange evaluation with unit commitment
  - b. Advantages of DP methods over priority list scheme
  - c. Hydro constraints.
3. a) Explain with the help of a schematic diagram of load frequency and excitation voltage regulators, the basic control strategies of a turbo generator.  
b) Explain with the help of a block diagram, the economic dispatch control problem of a control area.
4. a) What are the advantages of DP method over priority list scheme?  
b) With the help of a flowchart, explain the DP programming solution procedure for the unit commitment problem.
5. a) What is meant by multiple interchange contacts?  
b) Explain the centralized economic dispatch of a power pool.
6. Develop the block diagram representation of two area control system with integral control.
7. a) Explain the gradient search method based on simple search with the help of a block diagram.  
b) Discuss about hard limits and slack variables that are to be necessarily used in composite generation cost function
8. Develop the state space model for optimal control of a two area system and hence derive the expression for performance index.

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