

**ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES :: RAJAMPET  
(AUTONOMOUS)**

*M.Tech. II-Semester Regular Examinations, November 2012*

***Advanced Power System protection***

**( 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. Write the differences between static relays and electromagnetic relays. [6M]
- b. Derive the General Equation of Amplitude comparator. [6M]
2. Explain about coincidence type phase comparator with diagram also explain the method of measurement of period of coincidence. [12M]
3. a. What are the various types of static over current relays? Explain their area of applications. [6M]
- b. The current rating of an over current relay is 5 A. PSM=2, TMS= 0.3, CT ratio= 400/5. Fault current= 4000 A. Determine the operating time of relay. At TMS= 1, operating time at various PSM are: [6M]

PSM	2	4	5	8	10	20
operating time (sec)	10	5	4	3	2.8	2.4

4. Explain the principle and operation of static impedance relay with circuit diagram. [12M]
5. a. Explain the Coinc-section characteristics of Three input amplitude Comparator. [6M]
- b. What are the switched distance relaying schemes. Describe them in brief. [6M]
6. Explain the effect of power swings on the performance of distance relays. [12M]
7. Draw the basic block schematic diagram of interface for directional relay and also draw the flow chart for the microprocessor based directional relay [12M]
8. Explain the microprocessor implementation of digital distance relaying algorithm and draw its schematic diagram. [12M]

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**ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES :: RAJAMPET  
(AUTONOMOUS)**

**M.Tech. II-Semester Regular Examinations, November 2012**

**Electrical Power Distribution & Automation**

**( 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. Define load factor and loss factor. And also derive the relation between load factor and loss factor. 6M
- b. How the loads are grouped? Write short notes on the load modeling and explain the characteristics. 6M
2. a. Make a comparison between DC vs AC distribution system and underground vs overhead distribution system. 6M
- b. Briefly explain ring main distributor with neat diagram. 6M
3. a. Explain the basic design practice of secondary distribution system. 6M
- b. Consider the three-phase three-wire 240 v secondary system with balanced loads at A, B, and C as shown in fig.1 Determine the following: 6M
  - (a) Calculate the reactive power per phase for each load.
  - (b) Calculate the kilo volt ampere output and load power factor of the distribution transformer.

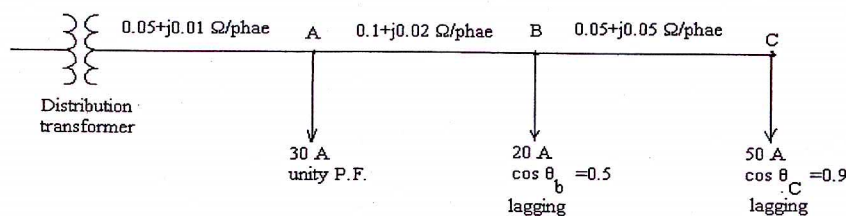


Fig. 1

4. a. Explain the various methods for voltage control. 6M
- b. A synchronous motor improves the power factor of a load of 250 kW from 0.8 lagging to 0.9 lagging, simultaneously the motor carries a load of 100 kW. Determine: (i) the leading kVAR taken by the motor (ii) kVA rating of the motor (iii) power factor at which the motor operates. 6M
5. a. Explain the difference between fuse and circuit breaker, mentioning the advantages of each of them. 6M
- b. What are the types of common faults that occur in a distribution system? Explain them with proper line diagram. 6M
6. a. Explain the basic architectures and implementation strategies for distribution automation. 8M
- b. What are the objectives of distribution automation? 4M
7. a. Write short notes on operation environment of distribution networks. 6M
- b. Explain the functions of distribution management systems. 6M
8. a. Write short notes on voltage/VAR control 6M
- b. Write short notes on reconfiguration of distribution systems 6M



**ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES :: RAJAMPET  
(AUTONOMOUS)**

**M.Tech. II-Semester Regular Examinations, November 2012  
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. Explain step wise procedure to carryout detailed energy audit 6M  
 b. Explain the following techniques with their use for energy analysis: 6M  
 (i) Sankey diagram (ii)load profiles
2. a. What are the various steps involved in the implementation of energy management in an organization? 6M  
 b. Explain the importance of energy management programs in industries to improve energy utilization 6M
3. a. What are the managerial functions involved in energy management? Explain in detail 6M  
 b. Explain the duties of energy manager 6M
4. a. Explain the constructional features of energy efficient motors taking into consideration of loss distribution 6M  
 b. Discuss the effect of the following on efficiency of a given motor 6M  
 (i) variable duty cycle systems (ii) voltage unbalance
5. a. In general the location of capacitors will be at load side rather than supply side, explain. 6M  
 b. Explain the effects of harmonics on power factor 6M
6. Explain the working of the following instruments 12M  
 (i) Data logger (ii) lux meter (iii) thermocouple
7. a. What is time value of money and rate of return concepts? 6M  
 b. Explain replacement analysis 6M
8. a. Explain the following financial analysis techniques with advantages and disadvantages 6M  
 (i) Simple pay back method (ii) Net present worth method  
 b. The maximum demand of a factory is 3000KVA at a power factor of 0.7 lagging and tariff is Rs 60/annum/KVA of maximum demand. Determine the KVAR rating of capacitors which would result in maximum economy if the capital cost is Rs 100/KVAR and interest charges are at the rate of 10% per annum. What would be annual saving in electrical charges when the capacitors are installed? 6M

**ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES :: RAJAMPET  
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**M.Tech. II-Semester *Regular Examinations, November 2012***

***Energy Conversion Systems***

**( EPE )**

**Max. Marks: 60**

**Time: 03 Hours**

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**Answer *any five* questions**

**All Questions carry equal marks (12 Marks each)**

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|----|---|-----|
| 1. | Write the list of 20 test specifications for PV systems and explain any three in detail                     | 12M |
| 2. | a. Explain the ideal MHD generator performance  | 6M  |
|    | b. Write short notes on MHD technology  | 6M  |
| 3. | a. What are the various characteristics of the wind? Discuss them   | 6M  |
|    | b. Prove that the maximum power coefficient ( $C_p$ ) for a wind mill is $16/27$                            | 6M  |
| 4. | a. What is the principle of tidal power generation?   | 6M  |
|    | b. Describe the closed cycle OTEC system  | 6M  |
| 5. | a. Explain different types of geothermal resources  | 6M  |
|    | b. Explain the process of coal gasification   | 6M  |
| 6. | Explain the working of cogeneration plant and discuss its merits and demerits.                              | 12M |
| 7. | a. How many Types of fuel cells are there? Explain the design and construction of $H_2$ - $O_2$ Fuel cells. | 6M  |
|    | b. Discuss battery applications for large power   | 6M  |
| 8. | a. Discuss the environmental effects of energy conversion systems   | 6M  |
|    | b. Write short notes on Pollution free energy systems   | 6M  |

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES :: RAJAMPET  
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M.Tech. II-Semester Regular Examinations, November 2012

**FLEXIBLE AC TRANSMISSION SYSTEMS**

*(common to EPE and 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. Explain the basic types of FACTS Controllers  
b. Explain various benefits from the FACTS Controllers
2. a. Explain the concept of single phase full wave voltage sourced converter with necessary waveforms and also explain relation ship between current and voltage  
b. Explain the operation of single phase leg (Pole) operation with circuit diagram
3. a. Explain the concept of Fundamental and Harmonic voltages for a Three-Level Voltage Sourced Converters.  
b. Explain the operation of Pulse Width Modulation (PWM) Converter.
4. Explain the objectives of Shunt Compensation.
5. a. Explain the operation of TCR and TSR with their characteristics.  
b. Explain how the TCR and TSR can eliminate the harmonics in the system.
6. Explain the comparison between STATCOM and SVC.
7. How the series compensators are used for improvement of transient stability and power oscillation damping? Explain.
8. Explain the operation of TCSC with its characteristics

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ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES :: RAJAMPET  
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**M.Tech. II-Semester Regular Examinations, November 2012**  
**OPERATION & CONTROL OF POWER SYSTEM**  
( Common to EPE and EPS)

Max. Marks: 60

Time: 03 Hours

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Answer *any five* questions

All Questions carry equal marks (12 Marks each)

1. Discuss load dispatch problem using gradient and Newton's methods. 12 M
2. Explain Dynamic programming solution of unit commitment problem with flow chart. 12M
3. Discuss and derive mathematical formulation of Hydro-thermal system. 12M
4. Discuss static and dynamic response of two area controlled system. 12M
5. a. Explain briefly the basic concepts LFC. 6M  
b. Discuss flat frequency control of EDC. 6M
6. Discuss (a) Inter utility energy evaluation (b) Transmission effects in inter change of power. 12M
7. Discuss basic concepts of power system security. 12M
8. Discuss state estimation of power systems using Weighted LSE with example. 12M

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