

MALLA REDDY ENGINEERING COLLEGE (AUTONOMOUS)

(Affiliated to JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD)

GundlapochampALLy (H), Maisammaguda (V), Medchal (M), Medchal-Malkajgiri (Dist), Hyderabad

IV B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, APRIL-2019Subject: High Voltage EngineeringBranch: **EEE****Time: 3 hours****Max. Marks: 75**Answer any **FIVE** Questions of the following**5x15 Marks= 75 Marks**

1. a) Explain the concept of radio interference [7M]
b) With suitable circuit explain measurement of radio interference voltage. [8M]
2. a) State and explain Paschen's law. What are its limitations? [7M]
b) Obtain the expression for current growth in primary irradiation process according to Townsend's mechanism. [8M]
3. a) What do you mean by 'Intrinsic strength' of a solid dielectric? Explain electric breakdown of solid mechanism. [8M]
b) Explain thermal breakdown in solid dielectrics. How this mechanism is more significant than the other mechanisms? [7M]
4. Discuss on
a) Vande Graff generator [7M]
b) Electro static generator [8M]
5. a) Explain with neat diagram of electrostatic voltmeter and its principles of operation also discuss its advantage and limitations for high voltage measurement [10M]
b) Mention various methods of measuring high dc and ac currents and high impulse current [5M]
6. a) Give mathematical models for lightning discharges and explain the phenomenon also
b) Explain about statistical methods for insulation co-ordination. [8M +7M]
7. a) How is a lossy dielectric represented? [8M]
b) Explain how an ideal capacitor in parallel with a resistor can represent a lossy dielectric over a wide range of frequencies [7M]
8. a) Explain the method of impulse testing of high voltage transformers, what is the procedure adopted for locating the failure [8M]
b) What are the tests conducted on isolators and circuit breaker? Explain in detail. [7M]

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Branch: EEE

Time: 3 hours

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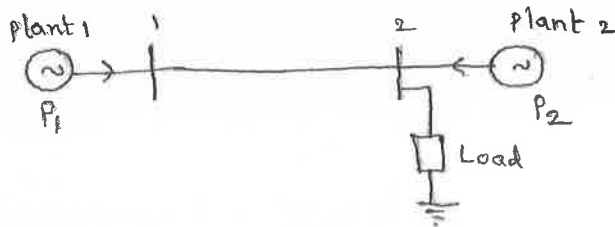
1. a) Explain the following terms with reference to thermal power plants.
i) Heat rate curve ii) Incremental production cost curve.
b) Consider the following incremental cost curves in Rs/M Wh for a plant having 2 generators.

$$IC_1 = 0.20 P_1 + 40 \text{ Rs/MWhr}$$

$$IC_2 = 0.25 P_2 + 30 \text{ Rs/MWhr}$$

Estimate the extra cost incurred in Rs/hr, if a load of 220 MW is scheduled as $P_1 = P_2 = 110 \text{ MW}$

2. a) What is penalty factor? Discuss its significance.
b) A two bus system is shown in fig. If 100 MW is transmitted from plant 1 to the load, a loss of 10 MW is incurred.

Determine the required generation for each plant and the power received by the load when the System λ is Rs.25/MWhr.

The IC's of the two plants are given below:

$$IC_1 = 0.02P_1 + 16 \text{ Rs/MWhr}$$

$$IC_2 = 0.04P_2 + 20 \text{ Rs/MWhr}$$

3. Discuss the necessity of optimal scheduling of hydrothermal power plants. Formulate the mathematical model of hydrothermal system.
4. a) Explain in detail about different types of excitation systems. Also obtain the IEEE Type 1 Model.
b) Obtain the small signal Transfer function of speed governing system. [9M +6M]
5. a) Derive the expression for static frequency drop of an isolated power system (uncontrolled case) [8M+7M]
b) A subgrid has total rated capacity of 3000 MW. It encounters a load increase of 40 MW when the normal operating load is 2000 MW. Assume $H = 5 \text{ Sec}$, and regulating of the generators in the system as 3Hz/PuMW . Find
i) ALFC Loop parameters ii) Static Frequency drop iii) Transient response of ALFC Loop.
6. Discuss about tie-line bias control.
7. Discuss the importance of proportional plus integral control for LFC of an Isolated Power System. How it can improve the steady state response.
8. a) Define Reactive power. Discuss the advantages and disadvantages of different types of compensating equipment for transmission systems. [8M]
b) Discuss the objectives of Line Compensations. [7M]