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**M. Tech. 1st Semester Electrical Power System
Examination, May-2015**

**ELECTRICAL DISTRIBUTION SYSTEMS ELECTIVE-I
Paper-MTEPS-105**

Time allowed : 3 hours]

[Maximum marks : 100

Note : Attempt any five questions. Each question carries equal marks.

1. (a) Explain the significance of the load factor and the diversity factor. 8
- (b) Calculate the annual load factor and diversity factor of a generating station that supplies the following loads to various consumers as : Industries : 2000 KW, Domestic Load = 300 KW, Commercial load : 700 KW, Agriculture = 100 KW. The maximum demand on the power station is 2700 KW and the number of units produced per year is 50×10^5 . 12
2. (a) A load of 10000 KW at a power factor of 0.8 lagging is supplied by a 3- Φ line whose voltage has to be maintained at 33 kV at each end. If the line resistance and reactance per phase are 5 Ω and 10 Ω respectively, calculate the capacity of the synchronous condenser to be installed for the purpose. Comment on the result. 12
- (b) Describe the economics of capacitor installation on the consumer premises. 8

3. (a) What strategies can be adopted for the voltage control in an electrical distribution system ? 12
- (b) Describe the function of Automatic Voltage Booster. 8
4. (a) What is a circuit breaker ? Explain its function in a primary distribution system. 8
- (b) Explain in detail the protective devices used for the protection of a (i) primary distribution system and (ii) secondary distribution system. 12
5. (a) State the objectives and functions of distribution system protection. 10
- (b) Describe the procedure for a line to ground fault calculation in a secondary power distribution system. 10
6. (a) Explain 33/11 KV substation design and describe the function of each component used in 33/11 KV substation. 10
- (b) Explain radial and loop type of primary feeders. Also list the advantages and disadvantages of radial and loop types of primary feeders. 10

7. (a) List five criteria that must be considered in the substation design of secondary distribution system. 10
- (b) Discuss the benefits derived through optimal location of substations in secondary distribution system. 10
8. (a) Derive the power loss calculations in primary distribution lines. 8
- (b) A single phase Ac distributor AB 300 metres long is fed from end A and is loaded as : (i) 100 A at 0.707 p.f. lagging 200 m from point A (ii) 200 A at 0.8 p.f. lagging 300 m from point A. The load resistance and reactance of the distributor is 0.2Ω and 0.1Ω per km. Calculate the total voltage drop in the distributor. The load power factors refer to the voltage at the far end. 12