

**DIPLOMA IN ELECTRICAL ENGINEERING
(DELVI)**

00234

Term-End Examination

June, 2014

**BIEE-034 : ELECTRICAL POWER TRANSMISSION
AND DISTRIBUTION**

Time : 2 hours

Maximum Marks : 70

Note : *Question no. 1 is compulsory. Attempt any four questions out of questions no. 2 to 8. All questions carry equal marks.*

1. (a) The skin effect of a conductor will reduce as the _____ of the conductor material increases. $7 \times 2 = 14$
- (b) For 66 kV lines the number of insulator discs used is
- (i) 3
 - (ii) 5
 - (iii) 8
 - (iv) 12
- (c) What is the surge resistance of transmission lines ?

- (d) The chances of corona are maximum during
- (i) Summer
 - (ii) Winter
 - (iii) Dry weather
 - (iv) Humid weather
- (e) Armour rods on conductors are provided to reduce the amplitude of vibrations. (True/False).
- (f) Under no load conditions, the current in a transmission line is due to
- (i) corona effect
 - (ii) capacitance of the line
 - (iii) back flow from earth
 - (iv) spinning reserve
- (g) In a cable, the voltage stress is maximum at
- (i) core of the conductor
 - (ii) surface of the conductor
 - (iii) sheath
 - (iv) insulator
2. (a) Explain what is meant by surge impedance of line and upon what factors does it depend. 7
- (b) Explain the mechanism of the lightning discharge. What are direct and indirect strokes? 7

3. Explain the occurrence of corona on H.V. lines. What is meant by the terms disruptive critical voltage and the visual critical voltage? What are the advantages and limitations of corona and how can it be minimized?

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4. (a) Define power factor and explain why, in general, it should be kept as high as possible in power systems.

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- (b) The load taken by a factory is 400 kVA at 0.8 p.f. lagging. A synchronous motor is installed to supply 110 kW output at 90% efficiency and to raise the overall power factor to 0.95 lagging. Find the power factor at which the motor must operate.

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5. Determine the generation cost per kWh from the following data :

Installed capacity = 500 MW;

Capital cost = ₹ 35,000 per kW;

Interest and depreciation = 12%;

Fuel consumption = 0.85 kg/kWh;

Fuel cost = ₹ 800 per 1000 kg;

Other operating costs = 25% of fuel cost;

Peak load = 475 MW;

Load factor = 0.82.

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6. (a) Explain the phenomenon of arcing grounds. How does neutral grounding eliminate arcing grounds? 7
- (b) Explain the advantages of grounding power system neutrals. 7
7. (a) Discuss the advantages and limitations of HVDC systems. 7
- (b) Explain the various types of HVDC transmission systems. 7
8. (a) What are the various devices used for overvoltage protection? What are the various types of surge diverters? 7
- (b) Explain the terms critical clearing angle and critical clearing time in connection with the transient stability of a power system. 7
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