

7E4174

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B.Tech. (Sem.VII) (Main/Back) Examination- Dec. 2013
Electrical Engineering
7EE4 Utilization of Electrical Power

Time : 3 Hours

Total Marks : 80
Min. Passing Marks : 24

Instructions to Candidates :

Attempt any five questions selecting one question from each unit. All questions carry equal marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

UNIT-I

1. (a) Explain the principle of 'dielectric heating'. Derive the mathematical expression of power consumed in such process. State important applications of dielectric heating. (8)
- (b) What are the requirements of good heating elements? Discuss the causes of its failures. (8)

OR

1. (a) What is electric welding? Also explain about welding transformer and its effective use? (8)
- (b) Explain Construction, Operation performance and application of induction furnace. (8)

<http://questionpaperresult.com>

UNIT-II

2. (a) A hall 30 m long and 15 m wide with a ceiling height of 5 meters is to be provided with a general illumination of 120 lumens/m². Taking a coefficient of utilization of 0.5 and depreciation factor of 1.42. Determine the number of fluorescent tube required, their spacing, mounting height and total wattage. Take luminous efficiency of fluorescent tube as 40 lumens/watt for 80% tube.
- (b) Compare the metal filament lamp with discharge lamp. What is the advantage of coiled coil? Describe principle of operation, construction and working of mercury vapour lamp.

OR

2. (a) What is polar curves? Explain it, also compare fluorescent and incandescent lamp.
- (b) The front of a building 45 m × 20 m is illuminated by 1000 W lamp arranged so that uniform illumination on the surface is obtained. Assuming a luminous efficiency of 18 lumen/watt, coefficient of utilization 0.4, waste light factor 1.2 and depreciation factor 1.3. Determine the illumination on the surface.

UNIT-III

3. (a) State various types of power supplies used for electrolytic process. Discuss any one in detail.
- (b) Explain electroextraction and electro plating, how its performed?

OR

3. (a) What is the principle of electrodeposition? State and explain the factors on which the quantity of electrodeposition depends.
- (b) Explain manufactures of chemicals and anodizing in electrolytic process.

UNIT-IV

4. (a) Discuss merits and demerits of the single phase AC system for main and suburban line electrification of the railways.
- (b) Discuss the suitability of DC series motor for its application in electric locomotive for traction duty.

OR

4. (a) Compare the speed-torque characteristics of cumulatively-compounded D.C. motor and a 3-phase slipring induction motor.
- (b) Explain briefly about sub-station equipment and layout, also describe pantograph.

UNIT-V

5. (a) Enlist the major components of electric locomotive and state their functions.
- (b) A schedule speed of 45 km/h is required between two stop 1.5 km apart. Find the max speed over the run if the stop is of 2 sec duration. The values of acceleration and retardation are 2.4 km/h/s and 3.2 km/h/s respectively. Assume a simplified trapezoidal speed-time curve.

OR

5. (a) Discuss various method of electric braking of traction motors.
- (b) An electric train has an average speed of 42 km/h on a level track between stop 1400 apart. Its accelerated at 1.7 km/h/s and is braked at 3.3 km/h/s. Draw the speed time curve for the run.