CBCS SCHEME

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17EE742

Seventh Semester B.E. Degree Examination, July/August 2022
Utilization of Electrical Energy

Time: 3 hrs. Max. Marks: 100

Note: ***Answer any FIVE full questions, choosing ONE full question from each module.***

Module-1

1 a. Discuss the Principle of Induction Heating. With a neat diagram, explain AJAX WYATT Furnace. **(08 Marks)**

b. Mention the advantages of Electric Heating. **(06 Marks)**

c. Write a short notes on Modern Welding Techniques. **(06 Marks)**

OR

2 a. Define the following terms respect to Electrolytic Process as :
i) Current efficiency ii) Energy efficiency iii) Electrode potential. **(06 Marks)**

b. State and explain Faraday's laws of Electrolysis. **(07 Marks)**

c. What is Dielectric Heating? Explain clearly about the choice of frequency and voltage required for Dielectric Heating. **(07 Marks)**

Module-2

3 a. Define the following terms with respect to Illumination :
i) Light ii) Luminous Flux iii) Luminous Intensity iv) MSCP. **(10 Marks)**

b. Explain the concept of measurement of Mean spherical candle power by Integrating sphere. **(10 Marks)**

OR

4 a. Write a short notes on Light fittings. **(07 Marks)**

b. It is desired to illuminate drawing hall with an average illumination of 200 lux. The hall of dimension $(30 \times 20)m^2$. The lamps are fitted 4m from ground. Find the number of lamps and watt/lamp. Take efficiency of lamp = 25 lumen/watt. Depreciation factor = 0.8 , Co-efficient of utilization = 0.75. Use 500W lamps for connecting. **(07 Marks)**

c. Compare the performance of Fluorescent lamp and CFL lamp. **(06 Marks)**

Module-3

5 a. What you meant by Electric Traction? Explain the Electric Train used in the system of Electric Traction. **(10 Marks)**

b. Considering trapezoidal speed – time curve approximation, prove that crest speed is given as

$$V_m = \frac{T}{K} - \sqrt{\left(\frac{T}{K}\right)^2 - \frac{7200D}{K}}, \text{ where } K = \frac{1}{\alpha} + \frac{1}{\beta}. \quad \textbf{(10 Marks)}$$

OR

6 a. A 250 tonne motor coach has 4 motors each developing a 6000 Newton – mt torque during acceleration starting from rest. If gradient is 40 in 1000. Gear ratio = 4 , Efficiency of gear transmission = 87% , Wheel diameter = 80 cm , Train resistance = 50 NW/tonne. Calculate time taken to attain 50 kmph. Allow 12% for additional rotational Inertia. If line voltage is 3000V. Dc and efficiency = 85%. Find current drawn during notch period. **(08 Marks)**

b. Explain the construction and working of AC series motor used for Electric Traction, with any two operating characteristics. **(06 Marks)**

c. Explain Tapped field control or control by field weakening method of controlling of motors in Electric Traction. **(06 Marks)**

Module-4

7 a. Explain how Regenerative Braking and Rheostatic Braking is obtained with single phase AC series motor. Three Phase Induction motor. **(10 Marks)**

b. Describe the concept of Electrolysis by current through Earth. **(06 Marks)**

c. Explain the function of a negative booster in a tramway system. **(04 Marks)**

OR

8 a. Explain Feeding and distributing system on AC Traction and DC Tramways. **(10 Marks)**

b. Discuss the problems associated with Diesel Electric Traction and indicate how these are overcome in practice. **(10 Marks)**

Module-5

9 a. What are the advantages of Electrical Vehicles over the internal combustion Engine Vehicles? **(10 Marks)**

b. Explain the conceptual illustration of Hybrid Electric Drive Train. **(10 Marks)**

OR

10 a. Write a note on Energy Consumption in Hybrid Vehicles. **(10 Marks)**

b. With a neat diagram, explain series Hybrid Electric drive train (Electric coupling). Mention the advantages of it. **(10 Marks)**

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