



# CBBCS SCHEME

15EE742

## Seventh Semester B.E. Degree Examination, June/July 2019 Utilization of Electrical Power

Time: 3 hrs.

Max. Marks: 80

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

### Module-1

- 1 a. Mention the various advantages of electric heating. (05 Marks)  
b. Discuss the principle of induction heating. With a neat diagram explain AJAX WYATT furnace. (07 Marks)  
c. Add a note on modern welding techniques. (04 Marks)

OR

- 2 a. State and explain Faraday's laws of electrolysis. (05 Marks)  
b. Define the following terms respect to electrolytic process as,  
i) current efficiency ii) energy efficiency iii) electrode potential. (05 Marks)  
c. What is dielectric heating? Explain clearly about the choice of frequency and voltage required for dielectric heating. (06 Marks)

### Module-2

- 3 a. Define the following terms with respect to illumination.  
i) Light ii) Luminous flux iii) Luminous intensity iv) MSCP. (08 Marks)  
b. Explain the concept of measurement of mean spherical candle power by integrating sphere. (08 Marks)

OR

- 4 a. Add a note on lighting fittings. (06 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. (05 Marks)  
c. Compare the performance of florescent lamp and CFL lamp. (05 Marks)

### Module-3

- 5 a. What you meant by electric traction? Explain the electric trains used in the system of electric traction. (08 Marks)  
b. Considering trapezoidal speed time – curve approximation, prove that creast speed is given

$$\text{as, } V_m = \frac{T}{K} - \sqrt{\left(\frac{T}{K}\right)^2 - \frac{7200D}{K}} \text{ where, } K = \frac{1}{\alpha} + \frac{1}{\beta} \quad (08 \text{ Marks})$$

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Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

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 = 80cm, train resistance = 50 NW/tonne, calculate time taken to attain 50kmph. Allow 12% for additional rotational inertia. If line volt age is 3000V, DC and motor efficiency = 85%. Find current drawn during notching period. (06 Marks)
- b. Explain the construction and working of AC series motor used for electric traction, with any two operating characteristics. (05 Marks)
- c. Explain Tapped field control or control by field Weakening method of controlling of motors in electric traction. (05 Marks)

Module-4

- 7 a. Explain how Regenerative and Rheostatic braking is obtained with single – phase AC series motors? Three phase induction motor. (10 Marks)
- b. Describe the concept of electrolysis by currents through earth. (06 Marks)

OR

- 8 a. Explain feeding and distributing system on AC traction and for DC tram ways. (08 Marks)
- b. Discuss the problems associated with diesel electric traction and indicate how these are overcome in practice. (08 Marks)

Module-5

- 9 a. What are the advantages of electrical vehicles over the internal combustion engine vehicles? With a block diagram, explain the working principle of hybrid vehicles. (08 Marks)
- b. Explain the conceptual illustration of hybrid electric drive train. (08 Marks)

OR

- 10 a. Write a note on energy consumption in hybrid vehicles. (08 Marks)
- b. With a neat diagram explain series hybrid electric drive trains (electic coupling). Mention the advantages of it. (08 Marks)

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