CBCS SCHEME

17EE742

Seventh Semester B.E. Degree Examination, June/July 2023
Utilization of Electrical Power

Time: 3 hrs.   Max. Marks: 100

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

Module-1

1 a. What are the advantages of Electrical heating? (06 Marks)
   b. With a neat diagram, explain Spot Wetting. (06 Marks)
   c. A 20 cm long portion of a circular shaft 10 cm diameter is to be coated with a layer of 1.5 mm nickel. Determine the quantity of electricity in Ah and the time taken for the process. Assume a current density of 195 A/sq.m and a current efficiency of 92 percent. Specific gravity of nickel is 8.9. (08 Marks)

OR

2 a. What is electrodeposition? Discuss the factors that influence electrodeposition. (08 Marks)
   b. Explain the terms (i) ece   (ii) Current efficiency   (iii) Energy efficiency. (06 Marks)
   c. State & explain Faraday's laws of electrolyse. (06 Marks)

Module-2

3 a. State and explain the laws of illumination. (08 Marks)
   b. Explain Factory lighting in detail. (06 Marks)
   c. A lamp having a uniform CP of 200 in all directions is provided with a reflector, which 60% of the total light output of the lamp on to a circular area 10 m in diameter 8 m below it. Calculate the illumination at the centre ; and at the edge of the area, with and without the reflector. (06 Marks)

OR

4 a. Discuss the advantages of good lighting. (06 Marks)
   b. With a neat sketch, explain the working of a sodium vapour lamp. (06 Marks)
   c. A lamp emitting 900 lumens is placed inside a globe of frosted glass having a diameter of 30.5 cm. The globe has a uniform brightness of 250 milli-lamberts in all directions. Calculate the C_P of the globe and estimate the percentage of light emitted by the lamp that is absorbed by the globe. (08 Marks)

Module-3

5 a. What is electric traction system? What are the requirements of an ideal traction system? (08 Marks)
   b. Discuss the direct steam engine system along with its advantages and disadvantages. (08 Marks)
   c. Define the following terms : (i) Crest speed   (ii) Schedule speed. (04 Marks)

OR

6 a. Assuming a trapezoidal speed-time curve, derive an expression for the maximum speed. (08 Marks)
   b. Discuss the linear induction motor, along with its advantages and disadvantages. Mention its applications. (08 Marks)
   c. Write a note on train lighting systems. (04 Marks)

Module-4

7   a. Explain the plugging and Regenerative braking as applied to traction motors.   (10 Marks)
    b. Derive an expression for specific energy output using simplified speed-time curve. (10 Marks)

OR

8   a. Define tractive effort. Derive an expression for tractive effort and train considering its movement on an upward gradient and having brake resistance.   (10 Marks)
    b. Explain shunt transition and bridge transition applied to series-parallel starting of DC motor with neat diagram.   (10 Marks)

Module-5

9   a. With a neat diagram, explain in detail the configuration of electric vehicles.   (10 Marks)
    b. Compare electric vehicles over conventional internal combustion engine vehicles.   (04 Marks)
    c. Mention and explain the traction motor characteristics.   (06 Marks)

OR

10 a. What is hybrid vehicle? With a neat diagram, explain the configuration of hybrid vehicles.   (10 Marks)
    b. Mention the advantages and limitation of Electric Vehicles.   (06 Marks)
    c. Write a note on performance of electric vehicles.   (04 Marks)

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