CBCS SCHEME

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15EE742

Seventh Semester B.E. Degree Examination, Feb./Mar. 2022
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. State the advantage of electric heating over the other forms of heating. **(04 Marks)**

b. With neat diagram, explain the working of direct arc furnace. **(04 Marks)**

c. A 15KW, 220V, single phase resistance oven employs Nickle – Chrome wire for its heating elements. If the wire temperature is not to exceed 1000°C and the temperature of charges is to be 600°C ; calculate the diameter and length of the wire. Assume radiating efficiency as 0.6 and emmissivity as 0.9. **(08 Marks)**

OR

2 a. With a neat diagram; explain Butt welding and mention its uses. **(04 Marks)**

b. State and explain Faraday's law of electrolysis. **(04 Marks)**

c. Discuss factors affecting electrodeposition. **(08 Marks)**

Module-2

3 a. Define the following terms :
i) Luminious flux
ii) Luminious intensity
iii) Illumination
iv) Mean horizontal candle power
v) Mean spherical candle power. **(05 Marks)**

b. State and explain laws of illumination. **(06 Marks)**

c. Write a note on flood lighting. **(05 Marks)**

OR

4 a. What are the factors ; which have to be taken into consideration for requirement of good lighting. **(08 Marks)**

b. Write a note on factory lighting and street lighting. **(08 Marks)**

Module-3

5 a. Considering trapezoidal speed-time curve approximation ; show that crest speed is given as :

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

b. A train is required to run between two stations 2km apart at an average speed of 40km/hr. The run is to be made according to a simplified quadrilateral speed-Time curve. If maximum speed is to be limited to 60km/hr ; acceleration to 2 km/hr/sec ; coasting retardation to 0.15kmphps and braking retardation to 3kmphps. Determine duration of acceleration, coasting and braking periods. **(08 Marks)**

OR

6 a. Define specific energy output and specific energy consumption. Derive the expression of specific energy output and specific energy consumption using simplified speed time curve. **(08 Marks)**

b. Explain with the help of suitable circuit diagram :
i) Shunt transition
ii) Bridge transition as applied to a pair of DC traction motors. **(08 Marks)**

Module-4

7 a. Explain regenerative braking with reference to DC motors. **(08 Marks)**

b. Explain :
i) Plugging
ii) Rheostatic braking as applied to traction motor. **(08 Marks)**

OR

8 a. Write note on tramway and trolley – bus. **(08 Marks)**

b. Sketch a various arrangements of current collection used in electric traction. **(08 Marks)**

Module-5

9 a. Write a note on electric vehicles. **(08 Marks)**

b. Explain the tractive effort and discuss the performance characteristics of electric vehicles. **(08 Marks)**

OR

10 a. What is hybrid vehicle? Explain configuration and performance of hybrid vehicle. **(08 Marks)**

b. Explain the hybrid electric vehicles. **(08 Marks)**

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