Code: 9A02802

R09

B.Tech IV Year II Semester (R09) Regular & Supplementary Examinations April 2016
UTILIZATION OF ELECTRICAL ENERGY
(Electrical and Electronics Engineering)

Time: 3 hours

Max. Marks: 70

Answer any FIVE questions
All questions carry equal marks
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1   (a)   Draw and explain the operation of sodium vapour lamp with neat diagram.
     (b)   A lamp having a uniform cp of 100 in all directions is provided with a reflector which directs 60% of the light uniformly on to a circular area of 10 m diameter. The lamp is hung 5 m above the area. Calculate the illustration at the centre.

2   (a)   What are the different types of heating? Write advantages of electric heating.
     (b)   A low frequency induction furnace whose secondary voltage is maintained constant at 10 volts, takes 400 kW at 0.6 pf, when the hearth is full. Assuming the resistance of the secondary to vary inversely as the height of the charge and reactance to remain constant, height up to which the hearth should be filled to obtain maximum heat.

3   (a)   Write briefly about Ultrasonic welding and defects in welding process.
     (b)   Explain the following resistance welding process:
           (i) Spot welding.
           (ii) Seam welding.
           (iii) Butt welding.
           (iv) Projection welding.

4   (a)   Describe briefly the process of Electrolysis and Power supply for electrolysis.
     (b)   Discuss about Faradays laws of electrolytic process.

5   (a)   Explain how speed control is achieved in the case of A.C and D.C motors.
     (b)   Explain about the various factors that affect the final temperature rise of a motor on the load.

6   Discuss in detail about different types of electric braking system.

7   Derive the relationship between acceleration, retardation, maximum speed, running time and distance between two stops assuming a trapezoidal speed-time curve.

8   (a)   Write a short note on specific energy consumption.
     (b)   A goods trains weighing 300 tonnes is to be hauled by a locomotive up a gradient of 2% with an acceleration of 1 kmphps. Coefficient of adhesion is 20%. Track resistance = 45 W/Ton and effect of rotational masses is 15% of dead weight. If axle load is not to exceed by 20 tonnes, determine the weight of locomotive and number of axles.

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