PVP 12

Code: EE7T3

IV B.Tech - I Semester – Regular Examinations - November 2015

UTILIZATION OF ELECTRICAL ENERGY
(ELECTRICAL & ELECTRONICS ENGINEERING)

Duration: 3 hours Max. Marks: 70

Answer any FIVE questions. All questions carry equal marks

1 a) Derive an expression for the time-dependent temperature as the electrical apparatus cools, in terms of the cooling time constant. 7 M

b) What do you understand by load equalization? 7 M

2 a) What are the characteristics of heating element? Explain the design of heating element in resistance heating. 7 M

b) Explain the principle of dielectric heating and applications. 7 M

3 a) Describe: 6 M

i) Seam welding ii) Butt welding iii) Projection welding.

b) Compare the AC and DC systems of welding methods. 8 M

4 a) Define and explain the following

i) Plane and solid angle 2 M

ii) Luminous Intensity 2 M

iii) Polar curve 3 M

b) A lamp of 100 CP is suspended 3 meters above horizontal plane. Calculate the illumination at a point
(i) on the horizontal plane directly below the lamp and
(ii) 3 meters away from the vertical axis.

7 M

5 a) Discuss the operation of mercury vapour lamp. 7 M

b) An area 300m X 45m has to be illuminated by projector lamps 1000W each. Illumination level required is 8 lux. Efficiency of lamps is 18 lm/watt, beam factor of 0.4, maintenance factor of 0.67 and waste light factor of 1.2. Find the number of projectors required. 7 M

6 a) Explain the method of rheostatic braking. 7 M

b) Discuss the characteristic features of a traction motor for effective traction systems. 7 M

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

7 M

b) Derive expression for the tractive effort for a train on a level track. 7 M

8 a) An electric train has an average speed of 42 km/hr on a level track between stops 1400m apart. It is accelerated at 1.7 km/hr/sec and it is braked at 3.3km/hr/sec. Draw the Speed-Time curve and estimate the specific energy consumption. Assume tractive resistance as 50 NW/Tonne and allow 10% rotational inertia. 7 M

b) A goods train weighing 600 tonnes is to be hauled by a locomotive up a gradient of 1.7% with an acceleration of 1.5 kmphps. Coefficient of adhesion is 10%. Track resistance =60 W/Ton and effect of rotational masses is 8% of dead weight. If axle load is not to exceed by 25 tonnes, determine the weight of locomotive and number of axles. 7 M