Total No. of Questions : 12]

SEAT No. :

P1086

[Total No. of Pages : 3

[4163] - 258

May - June 2012

T.E. (Electrical)

UTILIZATION OF ELECTRICAL ENERGY

(2008 Pattern) (Sem. - II)

Time :3 Hours] *[Max. Marks :100*

Instructions to the candidates:-

1) ***Answers to the two sections should be written in separate answer books.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.***
5) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) State the advantages of electric heating. **[6]**

b) With a neat diagram explain Ajex Wyatt induction furnace. **[6]**

c) A resistance oven employing nichrome wire is to be heated from 220 volt, 1 phase. Supply is rated 16 kW. If temperature of element is to be limited to 1170°C and average temperature of charge is 500°C. Find length and diameter of wire. The radiating efficiency is 0.57, emissivity is 0.9 and specific resistance of nichrome is 109×10^{-6} ohm cm. **[6]**

OR

Q2) a) Calculate kVA and kW drawn from supply, p.f., electrical efficiency for an 3 phase electric are furnace with following data - star connected, current drawn = 4500 amp, are voltage = 50 volt, resistance of transformer referred to secondary = 0.002 ohm reactance of transformer referred to secondary = 0.004 ohm. **[6]**

b) Explain dielectric heating with suitable diagram. State the applications of dielectric heating. **[6]**

c) With a suitable diagram explain ultrasonic welding. **[6]**

Q3) a) State principle of anodising and state its applications. **[8]**

b) With a suitable diagram explain electric circuit used in refrigerator. **[8]**

P.T.O.

OR

Q4) a) With a suitable diagram explain electric circuit used in water cooler. **[8]**

b) Write a short note on electroplating. **[8]**

Q5) a) Define following terms - solid angle, luminous efficiency, coefficient of utilization, reflection factor. **[8]**

b) Explain metal halide lamp with a suitable diagram. **[8]**

OR

Q6) a) Elaborate the steps involved in design of illumination scheme for indoor installation. **[8]**

b) Explain construction and working of compact flourocent lamp with a suitable diagram. **[8]**

SECTION - II

Q7) a) Draw block diagram of AC locomotive & explain it. **[8]**

b) Compare steam engine drive with electric drive. **[8]**

OR

Q8) a) What are various systems of electric traction? Discuss any one in brief. **[8]**

b) What is collector for over head system? Explain pantograph current collector system. **[8]**

Q9) a) Draw and explain speed time curve for urban, suburban & main line service. **[9]**

b) A suburban electric train has maximum speed of 70 km/hr. The schedule speed including a stop of 30 sec in 45 km/hr. If acceleration is 1.5 kmphps, find the value of retardation when average distance between stops is 4 km. **[9]**

OR

Q10) a) Derive the expression for coasting time, braking time in terms of maximum speeds during acceleration & retardation in case of quadrilateral speed - time curve. **[9]**

b) An electric train is to have acceleration & braking retardation of 0.8 kmphps and 3.2 kmphps respectively. If the ratio of maximum to average speed 1.3 and time for stop is 26 seconds. Find schedule speed for a run of 1.5 km. Assume simplified trupezoidal speed time curve. **[9]**

Q11)a) Explain desired electrical & mechanical characteristics of electric motors for traction work. **[8]**

b) Explain suitability of dc series motor for traction service. **[8]**

OR

Q12)a) Compare shunt transition & bridge transition. **[8]**

b) Explain how regenerative braking is used in electric traction. **[8]**