

Total No. of Questions : 12]

SEAT No. :

P1086

[Total No. of Pages : 3

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May - June 2012 ✓

T.E. (Electrical)

UTILIZATION OF ELECTRICAL ENERGY

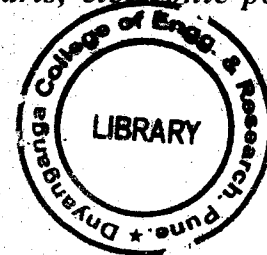
(2008 Pattern) (Sem. - II)

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 Ajax 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 arc furnace with following data - star connected, current drawn = 4500 amp, arc 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]

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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 fluorescent 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 is 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 kmph/s and 3.2 kmph/s 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 trapezoidal 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]

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