

Total No. of Questions : 12]

SEAT No. :

P3295

[Total No. of Pages : 3

[5353]-168

T.E. (Electrical) (Semester - II)
UTILIZATION OF ELECTRICAL ENERGY
(2012 Pattern)

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8, Q.9 or Q.10, or Q11 or Q12.*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Use of scientific calculator is allowed.*
- 4) *Assume suitable data if necessary'*

- Q1)** a) Define electric heating. State any three advantages of electric heating. [4]
b) A 15 kW, 220 V, single phase, resistance oven employs Nickel-Chrome wire for its heating elements. If the wire temperature is not to exceed 1000° C and the temperature of the charge is to be 600° C, calculate the diameter and length of wire. Assume radiating efficiency to be 0.6 and emmissivity as 0.9. For Nickel-Chrome, resistivity is 1.016×10^{-6} ohm-meter. [8]

OR

- Q2)** a) Differentiate between Direct and indirect arc heating. [4]
b) The power required for dielectric heating of a slab of resin 150 cm² in area and 2cm thick is 220 watts, frequency of 32 MHz. The material has relative permittivity of 5 and pf of 0.06 Determine the voltage necessary and current flowing through the material. If the voltage is limited to 620V, what will be the value of the frequency to obtain the same heating? [8]
- Q3)** a) State the need of electro-deposition. State the factors on which quality of electro- deposition depends. [4]
b) Explain the construction and working of- [8]
i) Relays.
ii) Contactors.

P.T.O

OR

- Q4)** a) Draw the electrical circuit used in window air conditioner. [4]
b) Explain the construction & working of Automatic water level controller using pilot & control devices. [8]

- Q5)** a) Define following terms w.r.t. illumination:- [5]
i) Depreciation factor,
ii) Coefficient of utilization,
iii) Space to Height ratio,
iv) Reflection factor
v) solid angle,
- b) A drawing hall of 40 m × 25 m × 6 m is to be illuminated with metal filament gas filled lamps to an average illumination of 90 lm / m², on a working plane 1 meter above the floor. Estimate suitable number, size and mounting height of lamps. Assume coefficient of utilization of 0.5, depreciation factor of 1.2 and space to height ratio of 1.2. [6]

Lamps wattage(watts)	200	300	500
Luminous Efficiency (Lm/w)	16	18	20

OR

- Q6)** a) Compare between Incandescent lamp & fluorescent lamp. [5]
b) A hall 30 m long and 12 m wide is to be illuminated and illumination required is 52 meter candles. Three types of lamps having outputs, as given below, are available: [6]

Lamps wattage(watts)	100	200	300
Lumens	1600	3600	4800

Calculate the number of lamps needed in each case to produce required illumination. Take a depreciation factor of 1.3 and coefficient of utilization 0.5. Assume a suitable mounting height and calculate space-height ratio of lamps.

- Q7)** a) State any four advantages of electric traction. [4]
b) Explain 3 phase low frequency A.C. systems & composite systems - Kando systems for electric traction. [8]

OR

- Q8)** a) Explain the working of pantograph. [4]
b) Draw a general block diagram for electric locomotive and explain the function of each part. [8]

- Q9)** a) Differentiate between Urban, Sub-urban, Main line services. [4]
b) An electric train has quadrilateral speed time curve with uniform acceleration from rest at 2 kmphps for 30 seconds, coasting for 50 seconds, braking period of 20 seconds. The train is moving with a uniform down gradient of 1% tractive resistance 40 newtons per ton, rotational inertia effect 10% of dead weight, Duration of stop 15 seconds and overall efficiency of transmission gear and motor as 75%. Calculate the specific energy consumption of run. [8]

OR

- Q10)** a) Compare between trapezoidal and quadrilateral speed-time curves. [4]
b) A speed time curve of a train consists of uniform acceleration of 6 kmphps for 21 sec, free running for 10 min. and uniform retardation of 6 kmphps for stopping the train. The stop time is 5 min. Calculate distance between the two stations, Average speed, and Schedule speed. [8]

- Q11)** a) Explain how DC series motor is suitable for traction. [5]
b) Explain how regenerative braking is used in electric traction. [6]

OR

- Q12)** a) What is transition? State different methods of transition. Explain bridge transition [5]
b) What is meant by route relay interlock? How it is achieved? [6]

