Total No. of Questions : 12]

SEAT No. :

P2323

[Total No. of Pages : 3

[4758]-58
T.E. (Electrical)
UTILIZATION OF ELECTRICAL ENERGY
(2008 Course) (Semester-II) (303147)

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

Instructions to the candidates:

1) ***Answer any three questions from each section.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Use of logarithmic tables, slide rule, electronic pocket calculator is allowed.***
6) ***Assume suitable data if necessary.***

SECTION-I

Q1) a) Draw equivalent circuit of arc furnace. Derive the expression for maximum output from arc furnace. **[9]**

b) With suitable diagrams explain following methods of controlling temperature of resistance furnace- **[9]**

i) Bucking - boosting voltage by transformer.

ii) Series reactor method.

iii) Variation in 3 phase circuit configuration.

OR

Q2) a) A piece of insulating material with relative permittivity of 5 is heated by dielectric heating. The dimensions of the insulating material is 10cm × 3cm × 3cm. The frequency of supply 20 Megacycles/ second. The power absorbed is 400 watt. The power factor of circuit is 0.05. Find the voltage & current. **[9]**

b) With suitable diagram explain - spot welding and seam welding. State applications of these welding methods. **[9]**

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Q3) a) State and explain Faradays laws of electrolysis. **[8]**

b) With suitable diagram explain working of water level controller. **[8]**

OR

Q4) a) Explain construction and working of - limit switch, float switch. **[8]**

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

Q5) a) Define following terms in case of illumination. **[8]**

i) Depreciation factor.

ii) Coefficient of utilization.

iii) Space to height ratio.

iv) Luminous efficiency.

b) With suitable diagram explain construction and working of compact fluorescent lamp. State its applications. **[8]**

OR

Q6) a) Give comparison between - Incandescent lamp, fluorescent tube and sodium vapour lamp (minimum 4 points). **[8]**

b) A drawing hall of 30 meters length and 13 meters width is to be illuminated. The ceilling height is 5 meters. The required illumination is 120 lux. Taking coefficient of utilization as 0.5 and depreciation factor as 1.4 determine the number of fluorescent tubes required. The luminous efficiency of fluorescent tube is 40 lumens/watt for 80 watt tube. Draw suitable plan and show how the fluorescent tubes are arranged. **[8]**

SECTION-II

Q7) a) Draw a diagram showing details of single catenary construction and compound catenary construction. Describe these two in brief. **[8]**

b) With suitable diagram explain - top contact type and side contact type third rail system of current collection. **[8]**

OR

Q8) a) With suitable diagram explain the working of diesel electric drive for traction. **[8]**

b) Describe any two systems of track electrification. **[8]**

Q9) a) Draw quadrilateral speed - time curve and state the expressions for acceleration, braking retardation, maximum speed at the end of acceleration, maximum speed at the end of coasting. **[8]**

b) A train runs as per trapezoidal speed-time curve. It has uniform acceleration of 5 kmphps for 30 second followed by free running period of 10 minute, uniform braking at 5 kmphps. The stop time of train is 5 minute. Find - **[8]**

i) Distance between the stations.

ii) Average speed.

iii) Schedule speed.

OR

Q10)a) Derive the expression for specific energy consumption using respective notations. **[8]**

b) Compare-urban, suburban, main line traction service and draw speed-time curve for these type of services. **[8]**

Q11)a) State any six desired properties of traction motor. **[6]**

b) Explain working of anticollision system. **[6]**

c) What are the difficulties in case of regenerative braking in case of DC series motor? **[6]**

OR

Q12)a) State limitations of series parallel control in case of traction. **[6]**

b) With suitable diagram explain bridge transition method for DC series motor. **[6]**

c) State the importance of route-relay interlock. Describe any one method of route relay interlock. **[6]**

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