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P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belagavi)

Eighth Semester, B.E. - Electrical and Electronics Engineering

Semester End Examination; May/June - 2019

Utilization of Electric Power

Time: 3 hrs *Max. Marks: 100*

Note: *Answer FIVE full questions, selecting ONE full question from each unit.*

UNIT - I

1 a. Explain with the help of a neat sketch the working of Ajax Wyatt furnace. 10

b. A 20 kW single phase 220 V resistance oven employs circular nickel chrome wire for its heating elements. If the wire temperature is not exceed 1170°C and the temperature of the charge is to be 500°C, calculate the length and size of the wire required. Take radiating efficiency = 0.6, emissivity = 0.9 and specific resistance of the element = $101.6\times10^{-6}\ \Omega$-cm. 10

2 a. What are the advantages of Electric heating when compound to other means of heating? 6

b. With neat sketch, explain the various methods of resistance welding. 10

c. Find the current in the line in a 3-phase arc furnace to melt 5 metric ton of steel in one hour at an overall efficiency of 50%, if the arc voltage is 115 V, initial temperature 18°C, melting point of steel 1370°C, specific heat of steel 0.12 and latent heat of steel is 8.890 kcal/kg. 4

UNIT - II

3 a. State and explain laws of illumination. 6

b. Explain the principle and operation of sodium vapour lamp giving its neat sketch. 10

c. What are the different lighting schemes? Explain them briefly. 4

4 a. What are the factors to be considered in factor lighting design? 7

b. Give the list of flood schemes and discuss. 5

c. Two lamps of 250 candle powers and 400 candle powers are on two lamp posts 100 m apart. The posts have different heights of 15 m and 30 m. Calculate the illumination mid-way between the lamp posts. 8

UNIT - III

5 a. Explain the following;

i) Direct steam engine system 10

ii) Direct internal combustion engine system of traction with merits and demerits.

b. Explain the different systems of Traction and mention its advantages and disadvantages. 10

6 a. What is meant by composite system of track electrification? Briefly explain. 7

b. Explain the necessary qualities of an ideal traction system. 8

c. Explain the Battery-Electric drive system of traction with merits and demerits. 5

Contd…2

UNIT - IV

7	a.	Draw and explain typical time curve for an electric train movement.	7
	b.	Derive the expression for maximum speed assuming Trapezoidal speed time curve.	8
	c.	Write a note on coefficient of adhesion.	5
8	a.	Define the following : i) Crest speed ii) Schedule speed	4
	b.	Derive the expression for Tractive effort.	8
	c.	A train has a scheduled speed of 65 km/hr between the stops which are 6 km apart. Determine the maximum speed over the run, if the duration of the stop is of 30 s. The values of acceleration and retardation are 2 km/hr/s and 3 km/hr/s respectively. Assume simplified trapezoidal speed time curve.	8

UNIT - V

9	a.	Explain how energy saving is achieved by series parallel control?	10
	b.	Give the explanation regarding AC series motor with its vector diagram.	10
10	a.	Give the constructional features and its speed thrust graph for a Linear Induction Motor.	10
	b.	Explain the following : i) Plugging ii) Rheostatic braking	10

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