



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

(An Autonomous Institution affiliated to VTU, Belagavi)

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

Semester End Examination; February - 2022

Utilization of Electrical Power

Time: 3 hrs

Max. Marks: 100

## Course Outcomes

The Students will be able to:

CO1: To get the knowledge of different of heating and welding.

CO2: To get the knowledge of different Lighting scheme and types of lamps.

CO3: Learn about different schemes, types and applications of Electric traction.

CO4: Analyze the speed-time characteristics of Electric train.

CO5: Study the different traction motors and their applications.

**Note:** I) PART - A is compulsory. Two marks for each question.

II) PART - B: Answer any Two sub questions (from a, b, c) for Maximum of 18 marks from each unit.

Q. No.	Questions	Marks	BLs	COs	POs
<b>I : PART - A</b>		<b>10</b>			
I a.	Mention any two applications of Dielectric heating.	2	L1	CO1	PO3
b.	Define solid angle, lumens.	2	L1	CO2	PO3
c.	What are the demerits of DC system of traction?	2	L1	CO3	PO3
d.	What are the different types of railway systems?	2	L1	CO4	PO3
e.	Mention the different types of electric braking system.	2	L1	CO5	PO3
<b>II : PART - B</b>		<b>90</b>			
<b>UNIT - I</b>		<b>18</b>			
1 a.	Explain briefly the different modes of heat transfer.	9	L2	CO1	PO3
b.	Describe the construction and working principle of coreless induction furnace.	9	L2	CO1	PO3
c.	A single phase 220 V, 15 kW 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 the wire. Assuming radiating efficiency to be 0.6, and emissivity as 0.9 for nickel chrome, resistivity is $1.016 \times 10^{-6} \Omega\text{-m}$ . Determine the temperature of wire, when the charge is cold?	9	L2	CO1	PO3
<b>UNIT - II</b>		<b>18</b>			
2 a.	Explain briefly the different types of light schemes.	9	L2	CO2	PO3

b. I) A lamp of 600 watt and having a MSPC of 1200 is suspended at a height of 3 m above the ground. Find;				
i) The illumination at a point on the ground directly below the lamp	4	L2	CO2	PO3
ii) Illumination at a point 3m away from the point which is directly below the lamp				
iii) Luminous efficiency of the lamp				
II) Explain the laws of illumination.	5	L2	CO2	PO3
c. Explain the construction and working principle of Fluorescent lamp.	9	L2	CO2	PO3
<b>UNIT - III</b>				
<b>18</b>				
3 a. Describe briefly an ideal traction system scheme of traction and mention its merits and demerits	9	L2	CO3	PO3
b. Explain clearly the systems of railway electrification.	9	L2	CO3	PO3
c. Explain the following:				
i) Electric trains	9	L2	CO3	PO3
ii) Tramways				
iii) Trolley buses				
<b>UNIT - IV</b>				
<b>18</b>				
4 a. Explain Electric traction speed time curve and mechanism of train movement.	9	L2	CO4	PO3
b. Describe briefly the various factors affecting energy consumption.	9	L2	CO4	PO3
c. A train is required to run between two steps which one 4 km apart with a schedule speed of 45 kmph and the duration of stops being 30 sec. The braking retardation is 3 kmphs. Calculate the acceleration, if the ratio of maximum speed to average speed is 1.25. Assume trapezoidal speed-time curve.	9	L2	CO4	PO3
<b>UNIT - V</b>				
<b>18</b>				
5 a. Explain briefly the plugging and regenerative braking as applied to the traction motor.	9	L2	CO5	PO3
b. Describe briefly the desirable properties of traction motors.	9	L2	CO5	PO3
c. Explain briefly the regenerative braking of an AC motor.	9	L2	CO5	PO3

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