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P.E.S. College of Engineering, Mandya - 571 401
(An Autonomous Institution affiliated to VTU, Belgaum)
Seventh Semester, B.E. - Electrical and Electronics Engineering
Semester End Examination; Dec. - 2015
Utilization of Electrical Power

Time: 3 hrs   *Max. Marks: 100*

*Note: Answer any **FIVE** full questions, selecting at least **TWO** full questions from each **part**.*

PART - A

1. a.	Explain the modes of heat transfer.	4
b.	Explain the design procedure for a circular heating element.	6
c.	Explain the principle of Induction heating and factors influencing induction heating. Also explain the function of AJAX Wyatt Induction furnace.	10
2 a.	Explain the different mechanisms used for controlled resistance welding.	8
b.	What are different types of arc welding and explain each one of them?	6
c.	Find the current in the line in a 3 phase arc furnace to melt 5 metric tonnes of steel in one hour at an overall efficiency of 50 %, if the arc voltage is 115 V, initial temperature 18ºC, Melting point of steel 1370ºC, Specific heat of steel 0.12 and latent heat of steels 8.89 k cal./kg.	6
3 a.	Define the following terms used in illumination, phase angle, solid angle, Illumination.	6
b.	State and explain inverse square law of illumination.	8
c.	Two lamps of 250 candle power and 400 candle power 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.	6
4 a.	Explain the following :	
	i) Factory lighting ii) Street lighting.	10
	Give the requirement of good lighting scheme in general.	
b.	Explain the principle, construction and working of the following lamps:	
	i) Sodium Vapour Lamp ii) C.F.L.	10

PART - B

5. a.	With their merits and demerits explain any two types of traction systems.	10
b.	Explain the necessary qualities of an ideal traction system.	5
c.	A train has a schedule speed of 60 km per hour between the stops which are 6 km apart. Determine the crest speed over the run, assuming:	
	i) Duration of stops as 60 seconds ii) Acceleration as 2 km	5
	iii) Retardation as 3 km per hour per second iv) Sanctified trapezoidal speed – time curve.	

6 a. What do you understand by speed - time curve? What is its importance?   5

  b. Compare d.c. and a.c. system of railway electrification from the point of main line, suburban line railway services.   15

7 a. Explain the following terms :

Regenerative breaking and Rheostatic breaking.   8

  b. Explain the method of series parallel system used for d.c. motor.   7

  c. Define specific energy consumption. Mention the factors which affect specific energy consumption.   5

8 a. What is the meaning of series parallel transition? Explain each step during bridge transition.   8

  b. Define tractive effect and derive an expression for the same in terms of acceleration, resistance to motion and gradient.   12

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