

Utilisation of Electrical Power

(EE-801)

Time: 2 hour

Full Marks:35

Instruction: Answer three questions out of the five questions.

Question 1 is compulsory and any one from 4 and 5 is a must.

1. (a) Justify the choice of lamps for the following applications i) Highway Toll plaza lighting
ii) Shopping Mall Window lighting iii) Cinema projection lighting
(b) What is the nature of the speed-time graph for main line and suburban railway systems?
(c) Write a brief note on application of dielectric heating (2x3+3+2)
2. (a) Derive the expression for Specific Energy Consumption for an Electric locomotive.
(b) An electric train has an average speed of 42KM/hr on a level track between stops 1.4KM apart. It is accelerated at 1.7kmphps and braked at 3.3kmphps. Assuming tractive resistance to be 50N/T, 10% for rotational inertia and efficiency of motors 85%. i) Estimate the Specific energy consumption ii) Draw the speed-time graph. (5+6)
3. (a) What do you mean by a lighting system?
(b) Why is an electronic choke preferred for fluorescent lamp over an electromagnetic one?
(c) A drawing hall $40m \times 25m \times 6m$ is to be illuminated with 90 lux using the following types of lamps. Estimate the suitable number, size and mounting height of lamps to be taken as 5m . Design an energy-efficient and aesthetic layout of lamps with a suitable sketch. Assume co. eff of utilisation 0.5, depreciation factor 1.2 and space-height ratio 1.2.

Size of lamps	200W	300W	500W	
Luminous Efficiency(lm/watt)	16	18	20	(2+3+6)
4. (a) Discuss the failure of heating elements and temperature control of resistance ovens/furnaces.
(b) Write a brief note on arc type furnaces with their advantages and disadvantages. (6+5)
5. (a) Describe with neat sketches the various methods of electric resistance welding. Give its merits and demerits with respect to gas welding.
(b) Write a short note on electric welding equipments and explain their working principle. (6+5)