EE73

Seventh Semester B.E. Degree Examination, Dec. 07 / Jan. 08
Electrical Power Utilization

Time: 3 hrs. Max. Marks:100

Note : *Answer any FIVE full questions.*

1 a. Discuss methods of temperature control of resistance oven. (06 Marks)

b. Discuss the following applications in dielectric heating.
i) Heating of raw plastics, ii) Gluing of wood. (04 Marks)

c. A cubic water tank has surface area of 5.4 mt^2 and is filled to 92% capacity five times daily. The water is heated form 15^0C to 60^0 C. The losses per square meter of tank per 1^0C temperature difference are 5.9 watts. Calculate –
i) Loading in kW
ii) Efficiency of tank. Assume specific heat of water = 4.186 kJ /kg^0C. (10 Marks)

2 a. Define the term welding. What is resistance welding? What are its limitations? (06 Marks)

b. Compare A.C and D.C welding. (04 Marks)

c. Explain the terms –
i) ANODIZING
ii) POLARIZATION with respect to electrolytic process. (10 Marks)

3 a. Describe the equipment and process used for chromium plating. What is the composition of electrolyte used? (10 Marks)

b. What current will be required to produce 10 grams of caustic soda in 5 minutes from a solution of sodium chloride given that ECE of sodium is 0.0002388g/ c and atomic weights of sodium, oxygen and Hydrogen are 23, 16, 1 respectively? (10 Marks)

4 a. State and prove
i) Inverse square law
ii) Lamberts cosine law with respect to Illumination. (10 Marks)

b. A 60 watts, 110 V lamp is connected in series with a 75 W, 110 volts lamp across 220 volts supply. Assuming constant resistance and luminous intensity (cd) proportional to the fourth power of current calculate the luminous intensity of each lamp as percentage of luminous intensity at 110 volts. (10 Marks)

5 a. Explain the working of fluorescent lamp with the help of circuit diagram. (08 Marks)

b. Compare the D.C and A.C systems of railway electrification from the point of main line and sub-urban line railway services. (06 Marks)

c. Classify and Explain types of railway services in India. (06 Marks)

6 a. What are different methods of approximation of speed–time curves? Derive an expression for distance traveled using quadrilateral approximation method curve. (10 Marks)

b. An electric train is to have acceleration and braking retardation of 0.8 kmph ps and 3.2 kmph ps respectively. If the ratio of maximum to average speed is 1.3 and time for stop is 26 seconds find the schedule speed from a run of 1.5km. Assume simplified trapezoidal speed time curve. (10 Marks)

7 a. Derive an expression for total tractive effort for propulsion of a train. (10 Marks)

b. Explain the working of Linear Induction motor and uses of Linear Induction motor in traction. (10 Marks)

8 a. State the causes for poor power factor. Explain the necessity of improving power factor. Also state disadvantages of poor power factor. (10 Marks)

b. A single phase motor takes a current of 12 amperes at P.F of 0.8 lagging from 230 volts, 50 Hz supply. Find out the capacitance of condenser to improve P.F to 0.95 lagging when connected across the load. (10 Marks)

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