

8E8044

Roll No. 15E503E038

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B.Tech. VIII - Semester (Main & Back) Examination, April-2019
 Electrical & Electronics Engg.
 8EX4.1A Utilization of Electrical Power
 (Common with EE, EX)

Time : 3 Hours

Maximum Marks : 80
 Min. Passing Marks : 26

Instructions to Candidates:

Attempt any Five questions, selecting One question from each unit. All Questions carry equal marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly).

Unit - I

1. a) Describe with the help of neat sketch, the working of a vertical core type Induction furnace. Give the applications of high frequency Eddy current heating. (08)

b) Compare in detail, electric arc welding with resistance welding. Explain with the help of a neat sketch the process of spot welding. (08)

(OR)

1. a) Calculate the efficiency of a high frequency induction furnace which takes 15 minutes to melt 2kg of aluminium. Input to the furnace using 5kW and initial temperature 20°C. Specific heat of aluminium = 0.88 kJ/kg°C;

Melting point of aluminium = 660°C;

Latent heat of fusion of aluminium = 32kJ/kg;

1kJ = 2.78 × 10⁻⁴ kWh. (08)

b) Explain welding transformer with a suitable diagram. (08)

Unit - II

2. a) Discuss the law of illumination and its Limitations. (08)

b) Describe with the help of a neat diagram the construction and working of a high pressure mercury vapour lamp. (08)

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(1)

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- (OR)
2. a) What is photometry? Describe photovoltaic method of photometry and discuss its limitations. (08)
- b) Write a short note on street lighting and flood lighting. (08)

Unit - III

3. a) Explain the extraction process of Aluminium with a suitable diagram. (08)
- b) What is meant by 'anodizing'? Explain process of 'anodizing' and describe the equipments used for it. (08)

(OR)

3. a) Explain "reverse current process" in electroplating? Discuss its advantages. (08)
- b) Calculate ampere-hours required to deposit a coating of silver 0.06mm thick on a sphere of 10cm radius. Assume electrochemical equivalent of Silver = 0.001118 and density of Silver to be 10.5. (08)

Unit - IV

4. a) Compare DC and AC system of railway electrification from the point of main line and suburban line railway service. (08)
- b) Write a short note on overhead equipment including current collectors for overhead systems and conductor rail system. (08)

(OR)

4. a) Discuss Merits and Demerits of DC system track electrification. (08)
- b) Describe the suitability of DC series Motor for its application in electric locomotive for traction duty. (08)

Unit - V

5. a) What is tractive effort of a train and what are its functions? Derive an expression for tractive effort developed by a train unit. (08)
- b) Discuss the advantage of series-parallel starting against the ordinary rheostatic for a pair of DC traction motors. (08)

(OR)

5. a) What are the advantages and disadvantages of the regenerative braking of electric traction Motor? (08)
- b) Explain the terms 'adhesive weight' and coefficient of adhesion and what do you understand by train resistance? (08)