



IV B.Tech I Sem Regular End Examination, Nov/Dec 2022

Utilization of Electrical Energy

(CIVIL)

Time: 3 Hours.**Max. Marks: 70**

Note: 1. Question paper consists: Part-A and Part-B.

2. In Part - A, answer all questions which carries 20 marks.

3. In Part - B, answer any one question from each unit.

Each question carries 10 marks and may have a, b as sub questions.

PART- A**(10*2 Marks = 20 Marks)**

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|-------|---|----|-----|-----|
| 1. a) | Give the classification of electric heating methods. | 2M | C01 | BL1 |
| b) | List out the properties of heating element. | 2M | C01 | BL1 |
| c) | What type of electric supply is suitable for electric arc welding? | 2M | C02 | BL1 |
| d) | Describe the principle of electrolysis. | 2M | C02 | BL2 |
| e) | Define Illumination? | 2M | C03 | BL1 |
| f) | What is Lamp Efficiency? | 2M | C03 | BL1 |
| g) | What are the factors governing the selection of motors? | 2M | C04 | BL1 |
| h) | Explain in detail the general consideration in selecting motor power ratings. | 2M | C04 | BL4 |
| i) | What are the different methods of obtaining unidirectional polarity constant output in single battery system? | 2M | C05 | BL1 |
| j) | Describe how 25KV AC supply is used for lighting. | 2M | C05 | BL2 |

PART- B**(10*5 Marks = 50 Marks)**

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|-----------|--|----|-----|-----|
| 2. a) | Distinguish in detail between Direct Resistance heating and Indirect resistance heating. | 5M | C01 | BL2 |
| b) | Discuss about the criteria to select frequency for heating processes. | 5M | C01 | BL2 |
| OR | | | | |
| 3. a) | List out the advantages and explain about the applications of dielectric heating. | 5M | C01 | BL1 |
| b) | A slab of insulating material 150 cm ² in area and 1cm thick is to be heated by dielectric heating. The power required is 400 W at 30 MHz. Material has relative permittivity of 5 and p.f. of 0.05. Absolute permittivity is 8.854×10^{-12} F/m. Determine the necessary voltage. | 5M | C01 | BL3 |
| 4. a) | What are the types of electrodes used for welding operation? Give the advantages of coated electrodes. | 5M | C02 | BL1 |
| b) | Explain in detail about resistance and arc welding. | 5M | C02 | BL4 |

OR

- 5 a) What is electroplating and electromagnetic strips? 5M C02 BL1
 b) Discuss about metal extraction and metal processing. 5M C02 BL2
- 6 a) Why tungsten is selected as filament material and on what factors its life depend? 5M C03 BL1
 b) A minimum illumination of 100 lumens/m² is required in the factory shed of 60 m x 15 m. calculate the number, the location and wattage of the units to be used. Assume that the depreciation factor is 0.76, coefficient of utilization is 0.54 and efficiency of the lamp units is 20 lumens/ watt. 5M C03 BL3

OR

- 7 a) Explain the construction and working of Sodium vapor lamp. 5M C03 BL4
 b) A 100 candle power lamp is hung 2m above the centre of a circular area of 3m diameter. Determine the illumination at i) The centre of the area ii) A point on the circumference of the area iii) Average illumination. Find also the average illumination of a reflector of 50% efficiency is used. 5M C03 BL3
- 8 a) Explain the typical speed - time curve for electric train operating on passenger services. 5M C04 BL4
 b) The distance between two stops is 1.6 km. A schedule speed of 50 kmph is required to cover that distance. The stop is of 20 seconds duration. The values of the acceleration and retardation are 4 km/h/s and 6 km/h/s, respectively. Then, determine the maximum speed over the run. Assume a simplified trapezoidal speed-time curve. 5M C04 BL3

OR

- 9 a) Explain the following terms: 5M C04 BL4
 (i) Adhesive Weight (ii) Dead weight (iii) Coefficient of adhesion
 b) What are the requirements of an ideal traction system? How are they met in an electric traction System? 5M C04 BL1
- 10 a) Describe about the double battery parallel block system. 5M C05 BL2
 b) What are the requirements of the train lighting? 5M C05 BL1
- 11 a) Describe the different methods of obtaining unidirectional polarity constant output in single battery system. 5M C05 BL2
 b) Write a note on coach wiring. 5M C05 BL1

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