

Code No: R194102A

R19

Set No. 1

IV B.Tech I Semester Advance Supplementary Examinations, March – 2023

UTILIZATION OF ELECTRICAL ENERGY

(Electrical and Electronics Engineering)

Time: 3 hours

Max. Marks: 75

*Answer any FIVE Questions
ONE Question from Each unit
All Questions Carry Equal Marks*

UNIT I

- 1 a) What are Polar curves and explain the significance of it? [7]
b) A room with an area of 8 x 10 meters is illuminated by twenty 80 W lamps. The luminous efficiency of the lamp is 80 lumens / watt and the coefficient of utilization is 0.72. Find the average illumination [8]
(OR)
- 2 a) List the materials that are commonly used as filament and explain the properties that need to be possessed by the filaments of the incandescent lamp [7]
b) A room 30 × 15 metre is illuminated by 100 W incandescent lamps of lumen output of 1000 lumens. The average illumination required at the workplace is 300 lux. Calculate the number of lamps required to be fitted in the room. Assume utilization and depreciation factors as 0.6 and 0.9, respectively. [8]

UNIT II

- 3 A 50-kW, 230-V, and single-phase resistance oven employs nickel—chrome strip 30-mm thick is used, for its heating elements. If the wire temperature is not to exceed 1,400°C and the temperature of the charge is to be 800°C. Calculate the width and length of the wire. Assume the radiating efficiency as 0.7 and emissivity as 0.85. Determine also the temperature of the wire when the charge is cold [15]
(OR)
- 4 a) Explain the various reasons for failure of heating elements [7]
b) Explain in detail about the Resistance Welding and also the different types of resistance welding. [8]



UNIT III

- 5 a) Explain the various characteristics that need to be considered for DC Motor while using as Electric drives [7]
- b) For selecting a motor for a particular drive application based on the size of the motor Explain how the following factors are important i.e i)maximum temperature raise for a given load and ii)maximum torque required. [8]

(OR)

- 6 a) Explain in detail about the Group drives and also list its advantages and disadvantages [7]
- b) Explain the following types of loads in detail:
i) Continuous and constant loads ii) continuous and variable loads
iii) Pulsating loads iv) impact loads [8]

UNIT IV

- 7 a) List the various advantages and disadvantages of Electric traction [7]
- b) Explain the mechanics of train movement [8]

(OR)

- 8 a) Explain the following terms w.r.t speed – time curves and Electric traction :
i) Crest speed ii)Average speed iii)Schedule speed [5]
- b) What is Specific energy consumption? Derive the equation for the specific energy output from simplified speed – time curve. [10]

UNIT V

- 9 a) Explain the types of energy storage systems that are suitable for peak shaving in electrical utility? [7]
- b) List the advantages of storage batteries. [8]

(OR)

- 10 a) Explain the basic principle of superconducting magnetic energy storage. What are the possible superconducting materials for this system at present? [7]
- b) What is a Super capacitor and how it can be used as an Energy storage device [8]

