

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech. IV Year I Semester Regular & Supplementary Examinations October/November-2025

UTILIZATION OF ELECTRICAL ENERGY

(Electrical and Electronics Engineering)

Time: 3 Hours

Max. Marks: 60

(Answer all Five Units 5 x 12 = 60 Marks)

UNIT-I

- 1 a State and explain laws of illumination.
b Briefly explain the requirement of good lighting scheme.
- 2 a Write short notes on polar curves and explain the Rousseau's construction for calculating MSCP of lamp.
b A machine shop 40m×20m is to have an illumination of 160 lux on working plane. The lamps are mounted on 6 m above the working plane. Give the layout of suitable installation. i) Using filament lamp. ii) Using 50watts fluorescent lamp. Assume necessary data.

UNIT-II

- 3 a Differentiate between A.C and D.C welding. Discuss about the techniques used for arc welding.
b A low frequency induction furnace whose secondary voltage is maintained constant at 10 volts, takes 400 kW at 0.6 pf, when the hearth is full. Assuming the resistance of the secondary to vary inversely as the height of the charge and reactance to remain constant, height up to which the hearth should be filled to obtain maximum heat.

OR

- 4 a Briefly discuss the method of Dielectric heating used in the electric heating.
b A slab of insulating material 150 sq cm in area and 1 cm thick is to be heated by dielectric heating. The power required is 400 W at 30 × 106 cps. Materials haspermittivity of 5 and power factor of 0.05. Determine voltage necessary.

UNIT-III

- 5 a What is the Classification of Electrical Drives?
b What is load equalization?

OR

- 6 a How do you select a motor for an industrial application?
b what are the advantages of group drive?

UNIT-IV

- 7 a Compare A.C traction with D.C traction with necessary examples.
b A goods trains weighing 300 tonnes is to be hauled by a locomotive up a gradient of 2% with an acceleration of 1 kmph/s. Coefficient of adhesion is 20%. Track resistance = 45 W/Ton and effect of rotational masses is 15% of dead weight. If axle load is not to exceed by 20 tonnes, determine the weight of locomotive and number of axles.

OR

- 8 a Discuss the speed-time curves for urban service.
b A train has schedule speed of 60 km/hr between the stops which are 6 km apart. Determine the crest speed over the run assuming trapezoidal speed time curve. The train accelerates at 2 km/hr/sec and retards at 3 km/hr/sec. Duration of stops is 60s.

UNIT-V

- 9 a Explain the calculations of tractive effort required for train propulsion.
b A train is to run between two stations 1.6 km apart at an average speed of 40 kmph, the run is to be made to a quadrilateral N-T curve. Maximum speed is to be limited to 64 kmph, acceleration, to 2 kmphs, coasting retardation to 0.16, and braking retardation to 3.2, determine the duration of a acceleration, coasting and braking periods.

OR

- 10 What is coefficient of adhesion? How the value of coefficient of adhesion affects the slipping and skidding of the driving wheels of traction unit?

*** END ***

