

Code No: 117JJ

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**B. Tech IV Year I Semester Examinations, January/February - 2023****UTILIZATION OF ELECTRICAL ENERGY****(Electrical and Electronics Engineering)****Time: 3 Hours****Max. Marks: 75****Note:** i) Question paper consists of Part A, Part B.

ii) Part A is compulsory, which carries 25 marks. In Part A, Answer all questions.

iii) 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**(25 Marks)**

- 1.a) What is load equalization? [2]
- b) What is R.M.S h.p rating of an elective drive? [3]
- c) What is the principle of operation of induction heating? [2]
- d) Compare A.C and D.C. welding. [3]
- e) Define illumination. [2]
- f) State and explain laws of illumination. [3]
- g) Define schedule speed of a electric train. [2]
- h) What are the special features of traction motor? [3]
- i) What is adhesive weight of an electric locomotive? [2]
- j) What is specific energy consumption for a given run of a locomotive? [3]

PART – B**(50 Marks)**

- 2.a) Explain the various factors which decide the choice of an electric drive for Industrial Applications.
- b) Explain different classes of motor duty cycles. Give industrial application for each class of duty cycle. [5+5]

OR

- 3.a) State the advantages and disadvantages of electric drive over mechanical drive?
 - b) Explain different speed control methods of A.C motor drives. [5+5]
- 4.a) What are main advantages of electric heating? List different methods of electric heating.
 - b) With a neat diagram, explain the process of Dielectric heating. [5+5]

OR

- 5.a) Differentiate between carbon and metallic arc welding. Also give their relative merits and demerits.
- b) Discuss the advantages and disadvantages of electric welding. [6+4]



6.a) Define and explain the following terms:

- i) Luminous Intensity
- ii) Maintenance Factor
- iii) Mean Horizontal Candle power
- iv) Waste Light Factor.

b) What is photometry? Explain photometric method of photometry. [6+4]

OR

7.a) Explain the working of Fluorescent tube with a neat sketch.

b) A lamp giving 300 C.P in all directions below horizontal is suspended 2m above the centre of a square table of 1m side. Calculate the maximum and minimum illumination on the surface of the table. [5+5]

8.a) Discuss the various systems of track electrification in India.

b) Explain the advantages of electric braking used in traction. [6+4]

OR

9.a) Sketch the typical speed-time curves for suburban service with electric traction. Hence, explain what is meant by a speed-time curve?

b) A train is required to run between stations 1.5km apart a scheduled speed of 30 kmph, the duration of stops being 15 seconds. The braking retardation is 3.5 kmphs. Assuming a trapezoidal speed-time curve, calculate the acceleration, if the ratio of maximum speed to average speed is to be 1.3. [5+5]

10. Briefly explain the tractive effort required while the train is moving up the gradient and down the gradient also derive the equation. [10]

OR

11. An electric train while going down an incline of 1 in 100 has the following speed-time curve.

(a) Starting from rest a uniform acceleration of 2 kmphs for 25 sec (b) Steady speed for 45 sec (with mechanical braking), (c) Coasting for 55 sec and (d) Braking at a rate of 3.5 kmphs. Assume the track resistance as 45 Nw per tonne, allowance for rotational inertia 9%, overall efficiency 70%, calculate the specific energy consumption. [10]

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