Code No: 117JJ

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech IV Year I Semester Examinations, November/December - 2016

UTILIZATION OF ELECTRICAL ENERGY
(Electrical and Electronics Engineering)

Time: 3 Hours   Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART- A
(25 Marks)

1.a) What are the main components in an electric drive?   [2]
   b) List any six applications of electric drives.   [3]
   c) Mention different heating methods.   [2]
   d) What are the main advantages of electric welding?   [3]
   e) Define Luminous flux.   [2]
   f) Define Solid angle and Space height ratio with respect to illumination.   [3]
   g) What is the frequency of electric supply used in traction? Why?   [2]
   h) What are the factors affecting the scheduled speed of a traction service?   [3]
   i) What is braking retardation?   [2]
   j) What is Coefficient of Adhesion?   [3]

PART-B
(50 Marks)

2.a) Compare between DC drives and AC drives.
   b) List and briefly explain the important factors to be considered for the selection of motor for electric drives.   [4+6]

OR

3.a) What do you mean by industrial loads? Explain different types of industrial loads.
   b) Explain the types of motors considered for various electric drives.   [6+4]

4.a) Explain the advantages of electric heating.
   b) With a neat diagram, explain the working of metallic Arc welding.   [4+6]

OR

5.a) Compare between AC welding and DC welding.
   b) Explain the principle of dielectric heating. Also write the applications of Dielectric heating.   [4+6]

6.a) Define inverse square law and cosine cube law of illumination.
   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.   [4+6]

OR

7.a) What is photometry? Explain photovoltaic method of photometry.
  b) A lamp with mean spherical candle power of 1000 is suspended at a height of 1.2m. Determine i) total flux emitted by the lamp ii) the illumination just below the lamp. [4+6]

8.a) Sketch the typical speed-time curves for mainline service and suburban service with electric traction.
  b) Explain Regenerative braking applied to 3-φ Induction motor. Also mention their advantages. [5+5]

OR

9. List and explain different baking schemes used in electric traction drives. Also mention their advantages and disadvantages. [10]

10.a) What is specific energy consumption of a train? Explain various factors affecting it.
   b) A suburban train runs with an average speed of 36 kmph between two stations 1.8 km apart. The values of acceleration and retardation are 1.8 kmphps and 3.6 kmphps. Calculate the maximum speed of the train assuming trapezoidal speed-time curve. [5+5]

OR

11.a) Discuss the effect of varying acceleration and braking retardation on the specific energy consumption.
   b) An electric train has an average speed of 42 km/hr on a level track between stops 1400m apart. It is accelerated at 1.67 km/hr/sec and it is baked at 2.9 km/hr/sec. Estimate the energy consumption at the axle of the train per tone-km. Take tractive resistance constant at 50 Newtons/tonne and allow 10% for rotational inertia. [4+6]

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