Code No: 117JJ **R13**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**
**B. Tech IV Year I Semester Examinations, April/May - 2018**
**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 advantages of electric drives? [2]
b) What types of motors are used in electric traction? [3]
c) What are the advantages of electrical heating? [2]
d) List advantages of electric welding. [3]
e) Define Space height Ratio. [2]
f) Define Absorption factor and Refection factor. [3]
g) Why DC series motor was preferred for electric traction? [2]
h) Draw the trapezoidal speed time curve of a train. [3]
i) What factors affect specific energy consumption? [2]
j) Define Coefficient of Adhesion. [3]

**PART-B** **(50 Marks)**

2.a) What are the advantages of AC drives over DC drives.
b) How are the electrical loads classified according to their duty? Explain with examples. [4+6]

**OR**

3.a) What is the need for speed control of electric drives? Explain the scheme used for the speed control of induction motor.
b) What is meant by load equalization? Explain. [6+4]

4. Explain the various methods of electric resistance welding with neat sketches. [10]

**OR**

5.a) Differentiate between AC welding and DC welding.
b) With a neat diagram, explain the working of metallic Arc welding. [4+6]

6.a) Explain with a neat diagram the principle of operation of a sodium vapour lamp and mention its use.
b) A lamp with a reflector is mounted 12 m above the centre of a circular area of 24 meters diameter. If the combination of the lamp and reflector gives a uniform Candle Power of 1000 over the circular area, determine the maximum and minimum illumination produced on the area. [4+6]

**OR**

7.a) What is the difference between direct lighting and indirect lighting.

b) Two lamps are 16m apart and are fitted with a 100 candle power lamp each at a height of 6m above the ground. Calculate the illumination on the ground i) under each lamp ii) mid-way between the lamps. [4+6]

8.a) Explain how plugging and rheostatic braking are employed with dc motors.

b) What is Regenerative braking? Discuss their advantages. [5+5]

**OR**

9. Derive the equation of the crest speed for an approximate trapezoidal speed –time curve. [10]

10. A locomotive accelerates a 300 tonne train up a gradient of 1 in 100 at 0.9 km/hr/sec. Assuming the coefficient of adhesion to be 0.25, determine the minimum adhesive weight of the locomotive. Assume train resistance 40 newtons/tonne and allow 10% for the effect of rotational inertia. [10]

**OR**

11. Obtain the expression for tractive effort required in an electric train. [10]

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