$\boxed{\text{R13}}$ $\boxed{\text{SET - 1}}$

III B. Tech II Semester Supplementary Examinations, November/December-2016
UTILIZATION OF ELECTRICAL ENERGY
(Electrical and Electronics Engineering)

Time: 3 hours   Maximum Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**
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PART –A

1 a)   Explain various characteristics to be considered for selection of electric drive.   [4M]
   b)   Explain about dielectric heating.   [4M]
   c)   List out the properties of heating element.   [4M]
   d)   What is the difference between plastic welding &fusion welding?   [3M]
   e)   Define (i) waste light factor (ii) depreciation factor (iii) coefficient of utilization.   [3M]
   f)   Define (i) Average speed, (ii) crest speed,   (iii) scheduled speed.   [4M]

PART -B

2 a)   Explain in detail the general consideration in selecting motor   power ratings.   [8M]

   b)   A motor fitted with a fly wheel that supplies a load of torque 500m for 33 sec. during no load   [8M]
        period the fly wheel regains its original speed. The motor torque is required to be limited to
        400n-m. The no load speed of the motor is 800 rpm and its full load slip is 10% determine the
        moment of inertia of the fly wheel.

3 a)   Explain the principal of dielectric heating also write advantages and its applications.   [8M]
   b)   Explain in detail about resistance and arc welding.   [8M]

4 a)   State and explain laws of illumination.   [4M]

   b)   Define i) candle power ii) luminous intensity iii) illumination iv) luminous efficiency.   [4M]

   c)   Two similar lamps having uniform intensity of 500 candle power in all directions below the   [8M]
        horizontal are mounted at a height of 4 meters. What must be the maximum spacing   between
        the lamps so that the illumination   on the ground midway between the lamps shall be at least
        one half the illuminations directly under the lamps?

5 a)   Describe the construction and working principal of   (i) sodium vapour lamp (ii) mercury   [10M]
        vapour lamp.

   b)   A hall measuring 20mx50m is to be illuminated by suitable lamps to give an average   [6M]
        illumination of 45 lux. The following data may be used :
        Mounting height from the working plane =3m
        Utilisation factor   =0.65
        Depreciation factor   =1.3
        The lamps are to be chosen from the following groups:

Rating in watts	75	100	150	200
Total lumens	800	1,200	2,000	2,800

        Calculate the number of lamps of each type.

6 a) From the simplified speed- time curve, determine the maximum speed, when the actual time   [5M]
        of run, values of acceleration, retardation and the distance between stops are given.

   b) An electric train is to have acceleration and breaking retardation of 0.8 Km/h/s and 3.2 Km/h/s   [8M]
        respectively. If the ratio of maximum to average speed is 1.3   and time for stops 26 seconds,
        find schedule speed for a run of 1.5 km. Assume simplified trapezoidal speed-time curve.

   c) List out the factors effecting scheduled speed.   [3M]

7 a) Derives the expression for the tractive effort for train on a level track.   [4M]

   b) Define(i) dead weight (ii) accelerating weight (iii) adhesive weight.   [8M]

   c) 400 tonne goods train is to be hauled by a locomotive up a gradient of 2% with an acceleration   [4M]
        of 1 km/h/s, coefficient of adhesion is 20%, track resistance 40N/tonnes and effective rotating
        masses 10% of the dead weight. Find the weight of locomotive and the number of axis, if the
        axle load is not to increase beyond 22 tones.

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