

**B.TECH.****THEORY EXAMINATION (SEM-VIII) 2016-17****UTILIZATION OF ELECTRICAL ENERGY & TRACTION****Time : 3 Hours****Max. Marks : 100****Note : Be precise in your answer. In case of numerical problem assume data wherever not provided.****SECTION – A****1. Attempt the following:****10 x 2 = 20**

- What are the advantages of electric heating ?
- Write the Stefan's law of heat radiation and label all constants.
- Why alternating current is found most suitable for resistance welding ?
- What is meant by welding electrode.
- The flux emitted by a lamp in all directions is 1000 lumens. Calculate its MSCP.
- What is flood lighting ?
- Why single phase system is preferred for main line railway service ?
- What is meant by speed-time curve ?
- Why a d.c series motor is ideally suited for traction purposes?
- Traction motors are given one-hour rating as well as continuous rating ?

SECTION – B**2. Attempt any five parts of the following question:****5 x 10 = 50**

- Explain the role of ignition contractor in welding process. What are its advantages over mechanical switches ?
- Describe the principle of electro deposition in electrolyte process.
- A worn out shaft of 10 cm. diameter and 25 cm. long is to be coated with 2 mm thick layer of nickel. Determine the quantity of electricity required and time taken if current density of 160 amp./sq. meter is adopted. Assume current efficiency of 90%. Density of nickel may be taken as 8.9 gm/c.c.
- Draw and explain general speed-time curve of a train running between two stations. How can this curve be approximated for (a) main line service (b) suburban service ?
- Explain various functions Traffic effort exerted by traction unit is supposed to perform and derive and expression for total tractive effort.
- A locomotive of 100 tonnes can just accelerate train of 500 tonnes with an acceleration of 1 kmphps up gradient of 10%. Adhesive weight of locomotive is 70% of total dead weight, tractive resistance 45 newtons/tonne and inertia 10%. If this locomotive is helped by another locomotive of 130 tonnes with 100% adhesive weight, find out :
 - Trailing weight that can be hauled up the same gradient under same conditions.
 - The maximum gradient, trailing hauled load remaining unchanged.
- Explain laws of illumination and also describe various factors to be considered for good lighting.
- Describe in detail functioning of window air conditioner



**Attempt any two questions of the following:****2 x 15 = 30**

3. Discuss various features of the electric supply system which have bearing on the drive.
4. Explain working of a Diesel Engine Driven d.c. Generating Feeding d.c. series motors system.
5. An electric train weighing 500 tonnes climbs up-gradient with $G = 8$ and following speed-time curve :
 - (i) uniform acceleration of 2.5 km/hr/sec. for 60 sec.
 - (ii) Constant speed for 5 min.
 - (iii) Coasting speed for 3 min.
 - (iv) Dynamic breaking at 3 kmphs to rest.

The train resistance is 25 N/tonne, rotational inertia effect 10% and combined efficiency of transmission and motor is 80%. Calculate the specific energy consumption.

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