Printed Pages : 2 **Roll No.** | | | | | | | | | | | **EEE801**

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**

a) What are the advantages of electric heating ?

b) Write the Stefan's law of heat radiation and label all constants.

c) Why alternating current is found most suitable for resistance welding ?

d) What is meant by welding electrode.

e) The flux emitted by a lamp in all directions is 1000 lumens. Calculate its MSCP.

f) What is flood lighting ?

g) Why single phase system is preferred for main line railway service ?

h) What is meant by speed-time curve ?

i) Why a d.c series motor is ideally suited for traction purposes?

j) 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**

a) Explain the role of ignition contractor **in** welding process. What are its advantages over mechanical switches ?

b) Describe the principle of electro deposition in electrolyte process.

c) 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.

d) 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 ?

e) Explain various functions Traffic effort exerted by traction unit is supposed to perform and derive and expression for total tractive effort.

f) 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 :

(i) Trailing weight that can be hauled up the same gradient under same conditions.

(ii) The maximum gradient,trailing hauled load remaining unchanged.

g) Explain laws of illumination and also describe various factors to be considered for good lighting.

h) Describe in detail functioning of window air conditioner

SECTION – C

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 kmphps 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.