PAPER ID-310075

Roll No:

B-TECH
(SEM -VII) THEORY EXAMINATION 2020-21
UTILIZATION OF ELECTRICAL ENERGY & ELECTRIC TRACTION

Time: 3 Hours   *Total Marks: 70*

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1.   **Attempt *all* questions in brief.**   **2 x 7 = 14**

a.	Mention the advantages of dielectric heating.
b.	What do you mean by Electrolysis process?
c.	What are the requirements of good welding?
d.	State the laws of illumination
e.	Explain the elements of refrigerator system.
f.	What is a solid angle?
g.	What do you mean by electric traction?

SECTION B

2.   **Attempt any *three* of the following:**   **7 x 3 = 21**

a.	What is dielectric heating? Derive an expression to design of heating element.
b.	What is the fundamental difference between electric arc welding and resistance welding?
c.	Explain the term 'Polarization' and 'electro deposition' in electrolysis process.
d.	Describe in brief the requirement of good lighting. Enumerate the factors to be considered while designing an indoor lighting scheme.
e.	How direction of rotation of a traction motor is reversed? Explain the working principle of metadyne control of traction motor.

SECTION C

3.   **Attempt any *one* part of the following:**   **7 x 1 = 7**

(a)	A slab of insulated material is 130 cm^2 in area and 1 cm thick is to be heated by dielectric heating. The power required is 380W at 30 MHz. Material has a relative permittivity of 5 and p.f.0.05. Absolute permittivity is 8.854×10^{-12} F/m. Determine the necessary voltage.
(b)	Explain the working principle of arc furnace with the help of neat sketch explain its construction.

4.   **Attempt any *one* part of the following:**   **7 x 1 = 7**

(a)	State and explain faradays laws of electrolysis.
(b)	Explain the resistance welding. What are the advantages and applications of resistance welding?

Roll No:

5.   **Attempt any *one* part of the following:**   **7 x 1 = 7**

(a)	A filament lamp of 500 W is suspended at a height of 4.5 meters above the working plane and gives uniform illumination over an area of 6 meter diameter. Assuming an efficiency of reflector as 70% and the efficiency of lamp as 0.8 watts per candle power, find the illumination of the working plane.
(b)	By a neat diagram, describe the electrical circuit of domestic refrigerator.

6.   **Attempt any *one* part of the following:**   **7 x 1 = 7**

(a)	It is required to repair a worn out circular shaft 15 cm in diameter and 32 cm long by coating it with a layer of 1.6 mm of nickel. determine the theoretical value of the quantity of electricity required and time taken if the current density used is 210 A/m^2. Electrochemical equivalent of nickel is 30.4×10^{-8} kg/°C of electricity and density of nickel is 8.9×10^3 kg/m^3.
(b)	What is the tractive efforts of a train and what are its functions? Drive an expression for the tractive efforts developed by a train unit.

7.   **Attempt any *one* part of the following:**   **7 x 1 = 7**

(a)	Explain the important features of traction drives
(b)	What is the specific energy consumption? Enumerate the factors which affects the specific energy consumption of the train operating at a given schedule speed.