Code No: **R194202H** **R19** **Set No. 1**

IV B.Tech II Semester Regular Examinations, April – 2023

FUNDAMENTALS OF UTILIZATION OF ELECTRICAL ENERGY

(Open Elective Except for Electrical and Electronics Engineering)

Time: 3 hours **Max. Marks: 75**

Answer any FIVE Questions
ONE Question from Each unit
All Questions Carry Equal Marks
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UNIT I

1 a) Draw the general layout of high head hydroelectric power plant and explain the function of any three components. [7]

b) Explain the construction and working principle of fuel cell with neat sketch. What are the disadvantages of fuel cell? [8]

(OR)

2 a) Brief about the operational and environmental problems of geothermal process. [7]

b) What are the main hurdles in the development of tidal power plants? [8]

UNIT II

3 a) Describe the construction and working of high-pressure mercury vapour lamp. [7]

b) A factory space 33m ×13m is to be illuminated with an average illumination of 72 lumens/ m^2, by 200-watt lamps. The coefficient of utilization is 0.4 and the depreciation factor is 1.4. Calculate the number of lamps required, the lumens output of 200 watt is 2730 lumens. [8]

(OR)

4 a) Define
   i) Luminous intensity.
   ii) Point source
   iii) Lumen and
   iv) Lux meter [7]

b) Describe what do you know about LED light? What are their advantages and disadvantages as light sources? [8]

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UNIT III

5 a) What are the different types of heating? Write advantages of electric heating. [7]

b) Explain the following resistance welding process:
(i) Spot welding.
(ii) Butt welding. [8]

(OR)

6 a) Discuss the advantages, disadvantages, and applications of dielectric heating. [7]

b) Write short notes on hydrogen arc welding. [8]

UNIT IV

7 a) Explain different parts of speed- time characteristics used for urban traction services. [7]

b) Explain the mechanics of Train Movement. [8]

(OR)

8 a) A train maintains the scheduled speed of Vs= 40km/hr while running the distance of 3.2km with 30sec stops. It accelerates at 2.4 km/hr/sec and brakes at 3.6km/hr/sec.
Assuming a simplified trapezoidal speed-time curve, calculate.
i) the maximum speed
ii) average energy output of the motor in watt-hr/tonne-km, if the tractive resistance averages 45newtons/tonne and additional rotational inertia 8%. [7]

b) Derive expression for the specific energy output for a trapezoidal speed-time run of an electric train. Also write the factors affecting specific energy consumption. [8]

UNIT V

9 a) Discuss the advantages of neutral grounding. [7]

b) Explain how the inclusion of a resistance in the neutral earthing circuit of an alternator affects the performance of the differential protection of the three-phase stator. [8]

(OR)

10 a) What are the reasons leading to the general practice of earthing the neutral point of a power system? Explain. [7]

b) Write short notes on the earth testing methodology. [8]