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**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR**  
(AUTONOMOUS)

B.Tech IV Year I Semester Regular Examinations November/December-2022

**UTILIZATION OF ELECTRICAL ENERGY**

(Electrical and Electronics Engineering)

Time: 3 hours

Max. Marks: 60

(Answer all Five Units 5 x 12 = 60 Marks)

**UNIT-I**

- 1 a State and Explain Laws of Illumination. L1 6M  
 b If a lamp of 200cp is placed 1m below a plane mirror which reflects 90% of light falling on it. Determine illumination at a point 3m away from the foot of the lamp which is hung 4m above ground. L3 6M

OR

- 2 a Explain with sketch the principle and operation of fluorescent lamp. L3 6M  
 b Write short notes on flood lighting. L2 6M

**UNIT-II**

- 3 a Describe direct and indirect core type furnace with neat sketches. L2 6M  
 b Explain application of induction heating. L3 6M

OR

- 4 Explain the different methods of electric welding and their relative advantages. L3 12M

**UNIT-III**

- 5 a What is the Classification of Electrical Drives? L2 6M  
 b What are the advantages and disadvantages of Electric drives? L3 6M

OR

- 6 What is temperature rise in motor? Derive the equation for Heating of Motor. L2 12M

**UNIT-IV**

- 7 a Explain about the different methods of electric braking systems in the case of traction. L3 6M  
 b A goods trains weighing 300 tonnes is to be hauled by a locomotive up a gradient of 2% with an acceleration of 1 kmph/s. Coefficient of adhesion is 20%. Track resistance = 45 W/Ton and effect of rotational masses is 15% of dead weight. If axle load is not to exceed by 20 tonnes, determine the weight of locomotive and number of axles. L3 6M

OR

- 8 Describe how Plugging, Rheostatic braking and Regenerative braking are employed with DC series motor. L2 12M

**UNIT-V**

- 9 a What is the tractive effort for propulsion of a train on level track? L1 6M  
 b What is the tractive effort for propulsion of a train up and down a gradient? L1 6M

OR

- 10 An electric train has quadrilateral speed-time curve as follows: 1. Uniform acceleration from rest 2 kmphs for 30 s. 2. Coasting for 40 s. 3. Braking period of 25 s. The train is moving a uniform down gradient of 1% and the tractive resistance of 50 N/ton. The rotational resistance is 10% of the dead weight, the duration of the stop is 20 s and the overall efficiency of the transmission the gear and the motor as 80%. Calculate its schedule speed and specific energy consumption. L3 12M

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