

IV B.Tech I Semester Supplementary Examinations, July/Aug - 2021**UTILIZATION OF ELECTRICAL ENERGY****(Electrical and Electronics Engineering)****Time: 3 hours****Max. Marks: 70***Question paper consists of Part-A and Part-B**Answer ALL sub questions from Part-A**Answer any FOUR questions from Part-B*

PART-A (14 Marks)

1. a) List out the starting methods of Induction motors. [2]
- b) What is dielectric heating? Write its advantages. [2]
- c) A 220V lamp has a total flux of 1660 lumens and takes a current of 0.44A. Calculate M.S.C.P. per watt. [3]
- d) What is the effect of increasing the space height ratio over recommended values of illumination? [2]
- e) List out various traction systems. [2]
- f) What are the factors which affect the specific energy consumption in electric trains? [3]

PART-B (4x14 = 56 Marks)

2. a) How electrical drives are classified? Discuss the factors to be considered in selecting a motor. [7]
- b) A 250 V D.C shunt motor has an armature resistance of 0.5 ohms and field resistance of 250 ohms. When driving a constant torque load at 600 r.p.m, the motor draws 21A. What will be the new speed of the motor if an additional 250 ohms resistance is inserted in the field circuit? [7]
3. a) Why electric heating is preferred over other forms of heating? Explain the requirements of good heating material. [7]
- b) Whit a neat sketch explain the working of resistance arc welding. [7]
4. a) Explain the terms light energy, luminous flux, luminous intensity, MSCP, illumination, luminance and lamp efficiency. [7]
- b) Explain the construction and working of a mercury vapour lamp and state its advantages and disadvantages as source of light. [7]
5. a) Write a brief note on LED lighting. [7]
- b) Discuss the flood lighting with suitable diagrams. [7]
6. a) Draw the speed-time curve of a suburban service train and explain. [7]
- b) A train has schedule speed of 30 kmph over a level track distance between the stations being 1 km. Station stopping time is 20 sec. Assuming breaking retardation of 3 kmphs and maximum speed 25% greater than average speed, calculate acceleration required to run the service if the speed time curve is approximated by a trapezoidal curve. [7]
7. a) Derive the expression for specific energy output from the driving axles using a Simplified speed time curve Assume the necessary initial conditions. [7]
- b) What are energy efficient motors? Explain the principle of modern traction motors. [7]