

Code No: RT32023

R13**SET - 1****III B. Tech II Semester Supplementary Examinations, November - 2017****UTILIZATION OF ELECTRICAL ENERGY**

(Electrical and Electronics Engineering)

Time: 3 hours

Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)2. Answering the question in **Part-A** is compulsory3. Answer any **THREE** Questions from **Part-B**

PART -A

- 1 a) List the advantages and disadvantages of electric drive over other drives. [4M]
- b) Give some applications of induction heating. [4M]
- c) Define Illumination? [3M]
- d) What are the advantages of coiled coil filament gas filled lamp? [4M]
- e) What are the disadvantages of diesel electric traction? [4M]
- f) Define Dead weight, Accelerating weight, Adhesive weight. [3M]

PART -B

- 2 a) Discuss the terms 'continuous', 'intermittent' and 'variable' loads with examples. [4M]
- b) What is meant by load equalization? Derive the expression for instantaneous motor torque, M.O.I of the fly wheel and the motor slip. State any assumptions made. [8M]
- c) DC compound motor is selected for the operation of a lift. The operating cycle is repeated continuously throughout the day. Load going up for 1 minute: 7.5hp, loading period at the top 2 minutes: 5hp, load going down 1 minute: 60 hp, loading period at the bottom 3 minutes: 5hp. Select the smallest size of the motor suitable for the above load cycle [4M]
- 3 a) Describe with neat sketches various methods of electric resistance welding. Give its merits and demerits with respect to arc welding. [3M]
- b) With a neat sketch explain the working principle of core type and coreless type induction furnace. [8M]
- c) A slab of insulating material 150 cm² in area and 1cm thick is to be heated by dielectric heating. The power required is 400 W at 30 MHz. Material has relative permittivity of 5 and p.f. of 0.05. Absolute permittivity is 8.854×10^{-12} F/m. Determine the necessary voltage. [5M]
- 4 a) Discuss inverse square law & cosine law of Illumination. [8M]
- b) Explain how will you measure the candle power of a source of light? [8M]

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SET - 2

- 5
 - a) Explain the construction and working of a mercury vapor lamp. [8M]
 - b) A hall 30 m long and 15 m wide with a ceiling height of 5 metres is to be provided with a general illumination of 120 lumens/m². Taking a coefficient of utilization of 0.5 and depreciation factor of 1.42, determine the number of fluorescent tubes required, their spacing, mounting height and total wattage. Taking luminous efficiency of fluorescent tube as 40 lumens/watt for 80 w tube [8M]
- 6
 - a) Discuss the main features of various train services. What type of train services corresponds to trapezoidal and quadrilateral speed time curves? [8M]
 - b) A train has a schedule speed of 40 kmph between two stops which are 4 km apart. Determine the crest speed over the run if duration of stops is 60 sec and acceleration and retardation are both equal to 2 kmphs. Assume trapezoidal speed time curve. [4M]
 - c) Discuss why a D.C series motor is ideally suited for traction services. [4M]
- 7
 - a) Show that if the speed-time curves are similar, Specific Energy Consumption are equal. [8M]
 - b) An electric train has an average speed of 42 km/h on a level track between stops 1.4 km apart. It is accelerated at 1.7 km/h/s and is braked at 3.3 km/h/s. Assuming tractive resistance as 50 N/t. allowing 10% for rotational inertia, and efficiency to motors 85%. Estimate the specific energy consumption. [8M]
