

Code No: **R32023****R10****Set No. 1****III B.Tech II Semester Supplementary Examinations, November - 2017****UTILIZATION OF ELECTRICAL ENERGY**

(Electrical and Electronics Engineering)

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

**Answer any FIVE Questions**  
**All Questions carry equal marks**

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- 1 a) Compare a group of drive and individual drive. [8M]  
b) What do you understand by load equalization? [7M]
- 2 a) What do you mean by resistance heating and classify them and explain the each type. [7M]  
b) The power required for dielectric heating of a slab of resin 150sq cm in area and 2 cm thick is 200 watts at a frequency of 30 MHZ. The material has relative permittivity of 5 and a p.f 0.05. Determine the voltage necessary and current owing through the material. If the voltage is limited to 600V, what will be the value of the frequency to obtain the same heating? [8M]
- 3 a) What is fundamental difference between electric arc welding and resistance welding? [7M]  
b) What are the advantages of coated electrodes in welding process? [8M]
- 4 a) Define : [8M]  
(a) Mean spherical Candlepower  
(b) Mean horizontal Candlepower  
b) A lamp of 100 CP is suspended 3 meters above horizontal plane. Calculate the illumination at a point on the horizontal plane [7M]  
(i) directly below the lamp  
(ii) 3 meters away from the vertical axis
- 5 a) Discuss the operation of mercury vapour lamp. [7M]  
b) Explain the design considerations followed for flood lighting installation. [8M]
- 6 a) Deduce equation for acceleration and retardation from the trapezoidal speed time curves. [7M]  
b) A 400 tonne goods train is to be hauled by a locomotive up a gradient of 20% with acceleration of 1.5 kmphs. Coefficient of adhesion is 20%, track resistance 40N/tone and effective rotating masses 10% of dead weight. Find the weight of locomotive and number of axles, if the axle load is not to increase beyond 20 tonne. [8M]

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- 7 a) Define coefficient of adhesion. Explain the factors which influence the value of coefficient of adhesion. [7M]
- b) Calculate the specific energy consumption if a maximum speed of 12.2m/s and for a given run of 1525 meters an acceleration of 0.366 m/s<sup>2</sup> are desired. Train resistance during acceleration is 52.6 Newtons/1000kg and during coasting is 6.12 Newtons/1000kg, 10% being allowable for rotational inertia. The efficiency of the equipment during the acceleration period is 50%. Assume a quadrilateral speed time curve. [8M]
- 8 Discuss the significance of energy star rating of the equipment. Explain various energy efficiency techniques. [15M]

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