

B.Tech IV Year I Semester (R13) Supplementary Examinations June 2017

**UTILIZATION OF ELECTRICAL ENERGY**

(Electrical and Electronics Engineering)

Time: 3 hours

Max. Marks: 70

**PART – A**

(Compulsory Question)

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- 1 Answer the following: (10 X 02 = 20 Marks)
- Define: (i) Luminous flux. (ii) Luminous intensity.
  - Draw the circuit diagram of fluorescent lamp with glow type starter.
  - Write any two advantages of electrical heating.
  - Mention the applications of electrolysis.
  - Give the comparison between AC & DC traction.
  - List the advantages of electrical drive used on traction.
  - What are the different types of train services?
  - Define tractive effort.
  - What is load factor? On what factors it depends?
  - Discuss about pit head generation.

**PART – B**

(Answer all five units, 5 X 10 = 50 Marks)

**UNIT – I**

- 2 (a) State and explain laws of illumination.  
 (b) If a lamp of 75 W, emitting 950 lumens is placed in a frosted globe of 30 cm diameter and gives uniform brightness of 250 mililamberts in all directions, calculate candle power of globe & percentage of light absorbed by the globe.

**OR**

- 3 (a) Explain in detail about the good lighting scheme.  
 (b) In a street light scheme, lamps having uniform candle power of 500 are hung at a height of 6 meters. The distance between consecutive lamp posts is 8 meters. Find the illumination under lamp at center in between lamp posts.

**UNIT – II**

- 4 Explain about induction heating in detail.

**OR**

- 5 (a) What are different types of welding methods? Explain briefly.  
 (b) Discuss about Faraday's laws of electrolysis.

**UNIT – III**

- 6 Explain the various systems of traction in detail.

**OR**

- 7 Explain the different methods of electrical braking.

**UNIT – IV**

- 8 (a) What is speed-time curve? Explain in detail.  
 (b) What is coefficient of adhesion? Also discuss the factors affecting coefficient of adhesion.

**OR**

- 9 (a) What are the various factors affecting specific energy consumption?  
 (b) A train runs with average speed of 40 kmph, distance between stations is 2 km. The values of acceleration and retardation are 1.5 kmphs & 2.5 kmphs respectively. Find the maximum speed of the train assuming trapezoidal speed time curve.

**UNIT – V**

- 10 (a) Explain the various methods for improvement of power factor.  
(b) A 37 kW motor is required to drive a pump which has to be in operation on full load for 3000 hours per year. Two motors of similar reliability and maintenance requirements are available, viz:  
Motor A: Cost Rs. 1440, efficiency : 88%  
Motor B: Cost Rs. 1920, efficiency : 89%  
The unit cost of energy is 6 paise per kWh and interest and depreciation may be taken as 10% per year. Which motor will give the lower yearly cost?

**OR**

- 11 (a) State various reasons for the choice of private generation over the public supply.  
(b) A consumer requires 10,00,000 units per year and the yearly load factor is 30%. The tariff in force is Rs.120 per kW per year plus 5 paise per unit. Estimate the savings in energy costs, which would result if the load factor is improved to 100%.

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