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**B TECH****(SEM VIII) THEORY EXAMINATION 2017-18  
UTILIZATION OF ELECTRICAL ENERGY AND TRACTION****Time: 3 Hours****Total Marks: 100****Note: 1.** Attempt all Sections. If require any missing data; then choose suitably.**SECTION A**

- 1. Attempt all questions in brief. 2 x 10 = 20**
- a) What are the applications of high frequency eddy current heating?
  - b) How is control of power affected in electric air arc furnaces?
  - c) What is welding?
  - d) What is main drawback of electron beam process?
  - e) Why is tungsten selected as the filament material?
  - f) Why does the efficiency of a filament lamp increase with the increase in operating voltage?
  - g) Why the magnetic circuit of a traction motor is not made of cast iron?
  - h) What is meant by the term adhesive weight?
  - i) What is meant by schedule speed of a train?
  - j) What are the most important requirements of suburban line railway service?

**SECTION B**

- 2. Attempt any three of the following: 10 x 3 = 30**
- a) What are the advantages and disadvantages of dielectric heating?
  - b) Draw a neat sketch of a spot welding machine and describe its construction and working in detail.
  - c) What is a polar curve? How is it useful to an illumination engineer?
  - d) What are the main characteristics of diesel engine with special reference to its application for traction purposes?
  - e) Explain the factors that determine the choice of supply system for main line traction and give voltage and frequency of the supply as adopted by Indian Railways.

**SECTION C**

- 3. Attempt any one part of the following: 10 x 1 = 10**
- a) Derive an expression for the heat produced in a dielectric material.
  - b) Explain the method of induction heating and describe coreless type of induction furnace.
- 4. Attempt any one part of the following: 10 x 1 = 10**
- a) Describe with relevant diagrams, the three different types of resistance welding.
  - b) Describe the various types of arc welding processes used in industry.

5. **Attempt any *one* part of the following:** **10 x 1 = 10**
- a) What do you understand by discharge lamp? Explain the construction and working of high pressure mercury vapour lamp.
  - b) Explain the working of a fluorescent tube with the help of the circuit diagram giving the function of various parts.
6. **Attempt any *one* part of the following:** **10 x 1 = 10**
- a) What is tractive effort of a train and what are its functions? Derive an expression for the tractive effort developed by a train unit.
  - b) What is specific energy consumption of a train? Discuss various factors affecting it.
7. **Attempt any *one* part of the following:** **10 x 1 = 10**
- a) Compare the use of DC series motor and AC series motor in electric traction.
  - b) Explain the theory, working and characteristics of linear induction motor for traction purposes.