

**B.Tech. ELECTRICAL ENGINEERING  
(BTELVI)****Term-End Examination****December, 2013****BIEEE-011 : ELECTRIC ENERGY UTILIZATION***Time : 3 Hours**Maximum Marks : 70*

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*Note : Attempt any five questions. Each question carries equal marks.*

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1. (a) What are the requirements of an ideal traction system? How are traction systems classified? 8
- (b) Explain the basic principle involved in electric braking of traction motors. 6
2. (a) What are the advantages of electric heating? Also, list the properties of a good heating element. 7
- (b) A slab of insulating material 130 cm<sup>2</sup> in area and 1 cm thick is to be heated by dielectric heating. The power required is 380 W at 30 MHz. Material has a relative permittivity of 5 and p.f. of 0.05. Determine the necessary voltage. (Absolute permittivity =  $8.854 \times 10^{-12}$  F/m) 7

3. (a) What is electroplating ? And what for is it done ? 4+3=7
- (b) What is electrolysis ? Explain briefly. 7
4. (a) Define the following terms : 4x2=8
- (i) Luminous flux
- (ii) Lumen
- (iii) Illumination
- (iv) Lamp efficiency.
- (b) State the laws of Illumination. 6
5. (a) Explain the different type of compressor motor used in air--conditioning. 7
- (b) How does an interior lighting design differ from external lighting design? 7
6. Discuss and distinguish between rheostatic and regenerative braking applied in electric traction. Give the advantages of regenerative braking. 9+5=14
7. Write short notes on **any two** of the following :
- (a) Hybrid electric vehicle. 7x2=14
- (b) Eddy current heating.
- (c) Defects in welding.
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