

**DIPLOMA IN ELECTRICAL ENGINEERING  
(DELVI)**

**Term-End Examination**

**June, 2014**

**BIEEE-005 : UTILIZATION OF ELECTRICAL  
ENGINEERING**

*Time : 2 hours*

*Maximum Marks : 70*

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- Note : (i) Question No. 1 is compulsory.  
(ii) Answer any four question from Q.No.2 to Q.No.7.  
(iii) Use of scientific calculator is allowed.*
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1. Choose the correct answer from the given alternatives : **7x2=14**
- (a) The luminous intensity is defined as :
- (i) Lumen per square meter.
  - (ii) Luminous flux per unit solid angle.
  - (iii) Illumination per square meter.
  - (iv) Candela per unit solid angle.
- (b) When the light distribution from a lamp or a lamp and fitting is non-uniform, the correct value of luminous intensity in the particular direction is :
- (i) given by inverse law
  - (ii) given by sine law
  - (iii) given by average law
  - (iv) taken from the polar curve

- (c) Which component is not the main part of the desert cooler ?
- (i) Blower
  - (ii) Fan
  - (iii) Compressor
  - (iv) Water circulating pump
- (d) On which effect thermoelectric refrigeration system work ?
- (i) Seabek effect
  - (ii) Peltier effect
  - (iii) Thomson effect
  - (iv) None of the above
- (e) DC motors are still preferred for use in :
- (i) Electric excavators, steel mills and cranes
  - (ii) Lathes and machine tools
  - (iii) Flour mills and jaw crushers
  - (iv) Paper industry
- (f) The following type of DC generator is used in electric arc welding :
- (i) Cumulatively compound DC generator
  - (ii) DC series generator
  - (iii) Differential compound DC generator
  - (iv) All of the above
- (g) Traction motor must be capable of developing \_\_\_\_\_ starting torque.
- (i) High
  - (ii) Low
  - (iii) Very low
  - (iv) Medium

2. (a) Describe the working of fluorescent tube with the help of neat circuit diagram. What are the functions of starter and choke ? **2x7=14**
- (b) A Lamp of 500 W having a Mean Spherical Candle Power (MSCP) of 1250 is suspended 2.7 meter above the working plane. Calculate :
- (i) Illumination directly below the lamp on the working plane.
- (ii) Lamp efficiency.
- (iii) Illumination at a point 3 m away on the horizontal plane from vertically below the lamp.
3. (a) Explain different methods of induction heating. Give some applications of induction heating. **2x7=14**
- (b) Discuss the merits and demerits of electric resistance and arc welding. Also write the applications of above welding methods.
4. (a) What are the main factors which decide the choice of electrical drive for a given application ? **2x7=14**
- (b) Draw and explain a typical speed-time curve for an electric train and explain what do you understand by crest speed, average speed and schedule speed.

5. An electric train weighing 200 tonnes runs a uniform upgradient of 1% with the following speed-time curve : 14

- (a) Uniform acceleration of 2 kmphs for 30 seconds.
- (b) Constant speed for 40 seconds.
- (c) Coasting for 30 seconds.
- (d) Braking at 2.5 kmphs to rest.
- (e) Stop at station 15 seconds.

If the tractive resistance is 40 N/tonne rotational inertia effect 10% of dead weight and over all efficiency of transmission and motor is 75% determine :

- (i) Schedule speed
- (ii) Specific energy consumption
- (iii) Total energy consumption
- (iv) Distance between two stations

6. Discuss the detail the vapour compression refrigeration system with the help of block diagram. 14

7. Write short notes on **any two** of the following :

- (a) Space heating system 2x7=14
- (b) Coreless induction furnace
- (c) Working principle of Domestic Refrigerator with wiring diagram
- (d) Lamberts cosine law