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BIELE-005

01445

DIPLOMA IN ELECTRICAL ENGINEERING (DELVI)

Term-End Examination

June, 2012

BIELE-005 : INDUSTRIAL ELECTRONICS

Time : 2 hours *Maximum Marks : 70*

Note : *(i) Question no.1 is* ***compulsory*** *(objective).*
(ii) Attempt ***any four*** *questions from rest of the questions.*
(iii) Draw neat and clean circuit diagrams if any required

1. Attempt ***all*** objective type questions : **7x2=14**

(a) Power electronic equipments have very high efficiency because :

(i) the device always operative in active region.

(ii) the device never operative in active region.

(iii) devices traverse active region at high speed and stay at the two states of ON/OFF.

(iv) very efficient cooling.

(b) Common emitter current-gain h_{FE} of a BJT is :

(i) Depends on collector emitter voltage v_{CE}

(ii) Depends on base emitter voltage v_{BE}

(iii) Dependent on collector current I_C

(iv) Always constant

(c) TRIAC is a :
   (i) Three layer two junction device
   (ii) Four layer four Junction device
   (iii) Four layer three junction device
   (iv) Two layer one junction device

(d) LASCR is a :
   (i) vaccume device
   (ii) unilateral device
   (iii) bilateral device
   (iv) none of these

(e) A UJT exhibits negative resistance region :
   (i) Before the peak point
   (ii) Between peak and valley points
   (iii) After the valley point
   (iv) After the peak point

(f) In its application an SUS behaves in the same way as :
   (i) UJT (ii) SCR
   (iii) tunnel diode (iv) none of these

(g) Generally for generating triggering pulses :
   (i) UJT are used
   (ii) PUT are used
   (iii) UJT and PUT are required
   (iv) none of these

2. (a) Explain static and switching characteristics of BJT. **7+7=14**

   (b) Explain now the characteristics of power transistor are normally specified by the manufacturers in terms of SOA.

3. (a) Explain the constructional details of an SCR and draw the two transistor model of SCR.

   (b) Enumerate the basic difference between a TRIAC and SCR. **7+7=14**

4. (a) List and explain the names of the methods adopted for triggering a thyristor. **7+7=14**

(b) Explain the circuit diagram and working of a PUT relaxation oscillator.

5. (a) With necessary waveforms and diagrams explain in detail for operation of three phase half wave controlled rectifier. **7+7=14**

(b) Explain the operation of 3-phase half controlled bridge rectifier.

6. (a) Describe the working of single phase half wave controlled rectifier with RL load and freew heeling diode . **7+7=14**

(b) With neat sketch, describe the function of single phase half controlled bridge rectifier with resistive load. What will be the wave forms observed ?

7. (a) Draw the symbols for the following triggering devices. **7+7=14**

(i) SCS (ii) SUS

(iii) SBS (iv) Shockley diode

(b) Explain the difference between half controlled bridge and a fully controlled bridge.

8. Write short notes on ***any four*** of the following. **4x3.5=14**

(a) IGBT construction and characteristics

(b) SCR turn off methods

(c) Resistance firing circuit for SCR

(d) Capacitor firing circuit for SCR

(e) MCT's (MOS-controlled thyristor)

(f) RCT's (Reverse conducting thyristor)
