

**Diploma in Electrical and Mechanical  
Engineering**

**Term-End Examination**

**June, 2012**

**BEE - 042 : ELECTRONICS**

*Time : 2 hours*

*Maximum Marks : 70*

- Note :** (i) *Question No. 1 is compulsory.*  
(ii) *Attempt any four questions from the remaining questions numbered 2 to 8.*  
(iii) *Use of calculator is permitted.*

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1. (a) State *true* or *false* against the given statements : **7x1=7**
- (i) The forward bias resistance of a P-N diode is greater than the reverse bias resistance.
  - (ii) The volt - Ampere characteristics of a P-N diode does not obey ohm's law.
  - (iii) Electron in an atom can have certain permitted energies only.
  - (iv) The width of the depletion layer of P-N junction is increased under reverse bias.
  - (v) Storage oscilloscope is used to store a transient waveform.
  - (vi) Relative humidity is defined as the mass of water vapour per unit mass of dry air in a mixture of air and water vapour.

- (vii) The intermediate frequency is always 544 KHz irrespective of the frequency to which receiver is tuned.
- (b) Select the correct answer from the given four alternatives. 7x1=7
- (i) In a transistor  $\beta$  may be expressed in term of  $\alpha$  as given below.
- (A)  $\frac{\alpha}{1+\alpha}$       (B)  $\frac{\alpha}{1-\alpha}$
- (C)  $\frac{1+\alpha}{\alpha}$       (D)  $\frac{1-\alpha}{\alpha}$
- (ii) In active region operation of a transistor
- (A) both junctions are reverse biased.
- (B) both junctions are forward biased.
- (C) Emitter junctions is forward biased while collector junction is reversed biased.
- (D) Emitter junctions is reverse biased while collector junction is forward biased.
- (iii) Zener breakdown occurs
- (A) mostly in germanium junction
- (B) due to rupture of covalent bonds
- (C) in lightly - doped junctions
- (D) due to thermally - generated minority carriers.

(iv) The number of digits in a binary number system are :

- (A) 2                      (B) 4  
(C) 6                      (D) 8

(v) DC output voltage ( $V_{dc}$ ) of half wave rectifier is :

(A)  $\frac{V_m}{2\pi}$                       (B)  $\frac{V_m}{\pi}$

(C)  $\frac{2V_m}{\pi}$                       (D)  $\frac{V_m}{\sqrt{2}}$

(vi) FM receiver operates in VHF Band of:

- (A) 80 - 108 MHz  
(B) 88 - 108 MHz  
(C) 88 - 118 MHz  
(D) 80 - 100 MHz

(vii) SCR is :

- (A) three terminal four layer device  
(B) three terminal three layer device.  
(C) three terminal four junctions device.  
(D) Two terminal three junction device

2. (a) Discuss various types of single phase AC motors and their principle of working 7  
(b) What is piezoelectric effect ? Explain the piezoelectric transducer. 7
3. (a) With the help of block diagram, explain the function of an automatic control system. 7  
(b) Explain the block diagram of superheterodyne receiver. 7

4. (a) Explain the construction and working of SCR. 7
- (b) (i) Convert  $(317)_{10}$  into octal number.  $3\frac{1}{2} \times 2$
- (ii) Convert the decimal number  $(268)_{10}$  into hexadecimal number.
5. (a) Explain the characteristics (Input and output) of a transistor in common base mode. 7
- (b) Explain the clamper circuit with the help of waveform of Input and Output voltages. 7
6. (a) Explain the half wave rectifier with the help of waveforms. 7
- (b) Explain the energy band diagram of P - N diode under without bias. 7
7. (a) Explain the principle of working of thermistor , Discuss its merit and demerits. 7
- (b) Explain the different types of Flip Flops. 7
8. Write short notes on *any four* of the following :  $4 \times 3\frac{1}{2} = 14$
- (a) FET.
- (b) TRIAC.
- (c) Bridge rectifier.
- (d) Full Adder.
- (e) UJT.
- (f) Optical transducer.
- (g) Magnetic recorder.