00512

B. TECH
BTCSVI / BTECVI / BTELVI
Term-End Examination
December, 2012

BIEL-001 : BASICS OF ELECTRONICS ENGINEERING

Time : 3 Hours *Maximum Marks : 70*

Note : *(i) Attempt **any seven** questions.*

*(ii) All questions carry **equal** marks.*

*(iii) All the questions are to be answered in **english** language.*

*(iv) Use of **scientific** calculator is allowed.*

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1. (a) What is Fermi level ? Show that for intrinsic semiconductor fermi level is midway between conduction and valence bands. Show the location of Fermi level for an N type and P type semi conductor. 5

(b) Explain the drift and diffusion current in a semiconductor. In a certain copper conductor, the current density is 2.4 A/mm^2 and electron density is 5×10^{28} free electrons per m^3 of the copper. Determine the drift velocity of the electrons. 5

2. (a) Draw and explain the working of tunnel diode. 5

(b) What is a PN Junction ? What is meant by the term barrier potential for a PN Junction ? And explain how a barrier potential is developed at the PN Junction. 5

3. (a) What is Zener effect? Explain the function of Zener diode and draw its characteristics. 5

(b) What is meant by biasing a PN- Junction diode ? Draw and explain the V-I characteristics of a PN junction diode. 5

4. (a) Explain why in the active operation, the base current I_B is much smaller than I_C or I_E. What is the relation among the three currents ? 5

(b) Draw and explain the drain characteristics and transfer characteristics of a P-Channel JFET. 5

5. (a) Derive the relationship between alpha (α) and beta (β) with respect to BJT. The value of β for a transistor is 100. If the value of emitter current is 10nA, Determine the values of collector and base currents. 5

(b) Explain the construction and principle of operation of a n-channel JFET with neat diagrams. 5

6. (a) Explain the difference between the enhancement mode and depletion mode MOSFETs. 5

(b) Explain the "Pinch Off" and " Cut Off" voltage related to FET. 5

7. (a) Explain the construction and operation of n-channel enhancement type MOSFET. 5

(b) What is a phototransistor ? How does it differ from an ordinary transistor ? Give its standard symbol and characteristics. Write its main applications. 5

8. (a) Explain the working of voltage trippler and Quadrupler with neat diagram. 5

(b) What do you mean by efficiency of a rectifier ? Calculate the efficiency for half wave and full wave rectifier. 5

9. (a) What are the advantages and disadvantages of bridge rectifier over centre tap rectifier ? 5

(b) Explain the working of a centre tap rectifier with neat diagram. Calculate the D.C. values of output voltage for a full wave rectifier. 5

10. Write short notes on *any two* of the following : **2x5=10**

(a) Energy bands in solids.

(b) Varactor diode.

(c) Capacitor filter.