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BIEL-001

01275

BTCSVI / BTECVI / BTELVI

Term-End Examination

June, 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 questios are to be answered in **english** language.*

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

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1. (a) Explain why the energy levels of an atom become energy bands in a solid. Differentiate semiconductors, Conductors , insulator on the basis of band gap. **5**

(b) What is semiconductor ? Define a hole in semiconductor. Explain why a semiconductor acts as an insulator at 0K ? **5**

2. (a) What is a PN junction diode ? Explain the formation of depletion region in a PN junction. **5**

(b) Explain the diffusion and depletion layer capacitance of a PN junction. **5**

3. (a) Explain zener breakdown and Avalanche multiplication phenomena in a PN - junction diode. 5

(b) Define the reverse saturation current of a diode ? The forward current through Si diode is 10 mA at room temperature (27°C) The corresponding forward voltage is 0.75 V . Calculate the reverse saturation current I_o. 5

4. (a) Draw the circuit of transistor in CE configuration. Sketch and explain the input and output characteristics. Indicate all the region of operations. 5

(b) Define alpha (α) and beta (β) related to BJT. The collector and base current of n-p-n transistor are measured as Ic = 5 mA, I_B = 50 MA and I_{CBO} = 1 mA Determine alpha , beta and I_E (Emitter current). 5

5. (a) Define the pinch off voltage related to FET and mark it on the characteristics graph. Explain its significance in the operation of FET. 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

6. (a) Explain the difference between enhancement and depletion type of MOSFETs. With the help of I-V curve. 5

(b) Explain the construction and operation of n-channel Depletion type MOSFET. 5

7. (a) Explain why a transistor action can not be achieved by connecting two back - to - back diodes, In a transistor explain, why emitter region is heavily doped, base width is small and collector area is large. 5

(b) The collector and base currents of transistor are 5 mA and 50 mA respectively. If the current amplification factor is CB configuration is 0.98, calculate the value of collector leakage current in CE and CB configuration. 5

8. (a) What are filter circuits ? Explain the working of a shunt capacitor filter with neat diagram. 5

(b) Draw a neat diagram of a full wave bridge rectifier circuit. Explain its working in detail by marking the direction of flow of currents for positive and negative cycles. 5

9. (a) Define ripple factor ? Calculate the ripple factor for half wave and full wave rectifier. 5

(b) A half - wave rectifier rectifies an alternating voltage of 325 volt peak value and the diode has a forward resistance of 100 Ω . The value of load resistance is 1000 Ω. Determine the following : 5

(i) Peak, average and rms value of current.

(ii) efficiency of the rectifier.

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

(a) Drift and diffusion current.

(b) PIN diode.

(c) Voltage multipliers.