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BIEL-001

B.Tech. (BTCSVI / BTECVI / BTELVI)

00096

Term-End Examination

June, 2015

BIEL-001 : BASICS OF ELECTRONICS ENGINEERING

Time : 3 hours *Maximum Marks : 70*

Note : *Answer **five** questions in all. Question number **1** is **compulsory**.*

1. State whether the following statements are *true* or *false* : *10×1=10*

(a) The number of free electrons in conductors are plenty whereas in case of insulators they are negligible.

(b) Position of holes keeps changing.

(c) In a p-n junction, holes diffuse from the p-region to n-region because the holes concentration in the p-region is greater as compared to n-region.

(d) A zener diode has a high amplification.

(e) The current I_{CBO} flows in the collector and base leads.

(f) A transistor is said to be in quiescent state when it is unbiased.

(g) The filter circuit that is effective for a very large value of load resistance is capacitive filter.

(h) The UJT can turn ON only when the emitter base junction is reverse biased.

(i) In a N-channel depletion type MOSFET the N-type substrate acts as the channel.

(j) A tunnel diode uses a high doping level to provide a narrow junction.

2. (a) What is an insulator ? What is Fermi level ? Why does a pure semiconductor behave like an insulator at absolute zero temperature ? *7*

(b) Giving relevant defining equations, explain the phenomenon of drift and diffusion associated with carrier movement in semiconductors. *8*

3. (a) What is a 'barrier potential' in a p-n junction ? What happens when the n-type material is made more positive than the p-type material by an external voltage source ? What ultimately happens, if the applied voltage is gradually increased ? *7*

(b) Describe the principle and working of tunnel diode. *8*

4. (a) Draw Ebers-Moll model of a transistor and explain transistor action. Derive the current equation for I_E, I_B and I_C. 7

(b) In the CE configuration, collector supply voltage V_{CC} = 10 V, load resistance R_C is 8 kΩ. Draw dc load line. Determine the operating point 'Q' for zero signal, if the base current is 15 μA and β is 40. 8

5. (a) Draw the circuit of a transistor in common emitter configuration. Sketch the output characteristics. Indicate the active, saturation and cut-off regions. 7

(b) Draw a self-bias circuit. Explain why such a circuit is an improvement over the fixed bias circuit as far as stability is concerned. 8

6. (a) Describe briefly the construction and operation of a MOSFET in depletion region. 7

(b) Explaining the feature of JFET, draw the drain characteristics. Show all regions of operations. 8

7. (a) Explain the working of a series regulated power supply with the help of a diagram. 7

(b) Explain with the help of a neat diagram, the operation of a bridge rectifier. 8

8. Write short notes on any ***three*** of the following : *3×5=15*

(a) Photodiode

(b) UJT

(c) Avalanche and Zener Breakdown

(d) IC Regulators