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BIEL-001

B.Tech. (BTCSVI / BTECVI / BTELVI)

Term-End Examination

00620 **December, 2014**

BIEL-001 : BASICS OF ELECTRONICS ENGINEERING

Time : 3 hours *Maximum Marks : 70*

Note : *Attempt any* ***seven*** *questions. Each question carries 10 marks.*

1. (a) What is Fermi level ? Where does it lie in case of p-type and n-type semiconductors ? 5

(b) How can you differentiate insulators, conductors and semiconductors on the basis of energy band diagram ? 5

2. (a) Explain the phenomenon of conduction by diffusion in semiconductors. Also define the diffusion constant. 5

(b) Discuss how the depletion layer and potential barrier are formed in a P-N junction under no-bias condition. 5

3. (a) Draw and explain the V-I characteristics of a P-N junction diode. 5

(b) Explain the working of a PNP transistor with proper biasing diagram. 5

4. Draw the circuit diagram of a transistor in common-base configuration and also draw its input – output characteristics. *10*

5. (a) Explain the construction of n-channel JFET with the help of a diagram and output characteristics. *5*

   (b) What is a hetero-junction ? Draw the band. Draw the ideal hetero-junction between a p-type, wide gap semiconductor and an n-type narrower band gap semiconductor. *5*

6. With a neat circuit diagram, explain the working of a full-wave rectifier using centre-tapped transformer. Also mention its V_{dc}, PIV, ripple factor and efficiency. *10*

7. (a) Draw a neat schematic of a p-i-n diode and explain its working. *5*

   (b) Draw the circuit diagram of a series regulator and explain how regulation occurs. *5*

8. Explain the construction and working principle of MOSFET. Draw its output and transfer characteristics also. *10*

9. (a) Explain the working and V-I characteristics of a Tunnel diode. *5*

   (b) Define ripple factor of a rectifier and derive it for a half-wave rectifier. *5*

10. Write short notes on any ***two*** of the following : *5+5=10*

(a) Ebers-Moll model

(b) Diode capacitance

(c) Capacitor-filter