Registration No. : | | | | | | | | | | |

Total number of printed pages – 2

B. Tech

BENG 1105

First Year Special Examination – 2014

BASIC ELECTRONICS

BRANCH(S) : AEIE, BIOTECH, CSE, EC, EEE, IT

QUESTION CODE : G 485

Full Marks – 70

Time : 3 Hours

*Answer Question No. **1** which is compulsory and any **five** from the rest.*

The figures in the right-hand margin indicate marks.

1. Answer the following questions : 2 ×10

(a) What is the significance of acceptor and donor ions in semiconductors ? How these ions effect the charge of the semiconductor ?

(b) What is zenor and avalanche breakdown of diode ? Which mechanism occurs at lower voltage of application ? Justify.

(c) Under what condition transistors act as a clipper circuits ?

(d) What is operating point of a transistor ? How operating point effect the output collector current of transistor amplifier ?

(e) What is the significance of emitter resistance of a transistor amplifier ? Why a capacitor called emitter bypass capacitor is generally connected across it ?

(f) What is a binary counter ? Design a MOD-2 binary counter.

(g) Why +ve feedback is called regenerative feedback ? Justify by necessary mathematical expression.

(h) What is the need of carrier signal in communication system ?

(i) What is CMRR ? What is its value for ideal OPAMP ?

(j) What are three states in a tri-state buffer ? Mention its physical significance.

P.T.O.

2. (a) What is a diode clipper ? Explain a diode clipper circuits which will double the dc level of a input square wave signal ? Explain with necessary mathematical expression. 5

(b) Explain the cut-off, saturation and active region of transistor. How these parameters affect the performance of a transistor ? 5

3. (a) What are emmiter follower circuits ? Draw a emitter follower circuit using FET. Derive the voltage gain of an emitter follower circuits. 5

(b) What do you mean by logic inverter circuit ? Explain with diagram the principle operation of a C-MOS logic inverter. 5

4. (a) What are the demerits of a negative feedback amplifier ? How –ve feedback affect the bandwidth and distortion of an amplifier circuits ? 5

(b) What is Barkhausen criterion ? How this condition is used in a oscillator ? Explain the principle of RC phase shift oscillator. 5

5. (a) Draw a substractor circuits using a single OPAMP. Derive its voltage gain in terms of resistor you have used. 6

(b) What do you mean by modulation in communication ? Discuss the basic three modulation systems used in analog communication. 4

6. (a) Write characteristics equation and table for a full adder circuit. Then, implement the full adder with half adder and OR gates. 5

(b) Express the following Boolean function into POS. Then realize the function using logic gate. 5

$$F = A'B'C' + ABC + AB'C + A'BC'$$

7. (a) What are Flip-flop circuits ? Explain RS and JK flipflops. 5

(b) What is basic principle of signal communication using optical fiber ? Explain the advantages of optical fiber communication system. 5

8. Write short notes on any **two** : 5 × 2

(a) AD Converters

(b) Demodulation

(c) CRO

(d) Electronics voltmeter.
