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

Total number of printed pages – 3

B. Tech
BE 2101

First Semester Back Examination – 2014

BASIC ELECTRONICS

BRANCH(S) : AEIE, AERO, AUTO, BIOTECH, CHEM, CIVIL, CSE, EC, EEE, EIE, ELECTRICAL, ETC, FAT, IEE, IT, MANUFACT, MANUTECH, MECH, MINING, MM, MME, PLASTIC, TEXTILE

QUESTION CODE : L 351

Full Marks – 70

Time – 3 Hours

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*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 diffusion theorem is in related with PN junction ?

   (b) How transistors act as switch ? Justify.

   (c) What is clipping in signal ? Draw a simple diode clipper.

   (d) What is bandwidth of an amplifier ? How bandwidth of an amplifier can be increased ?

   (e) Mention two conditions that must be fulfilled in an amplifier for self sustained oscillation.

   (f) What is the ideal impedance of a voltage amplifier ? Justify.

   (g) Give four characteristics of a cathode ray oscilloscope.

   (h) What should be the radix of the numbers used in the following addition ?

   $11 \times 12 = 66$

P.T.O.

(i) What is the difference between combinational and sequential circuits ?

(j) Which logic circuits is called as data selector circuits and why ?

2. Derive the expression for ripple factor of a half wave rectifier circuits. 10

3. (a) Explain CB, CE and CC connection of transistor amplifier. Discuss their merits and demerits. 5

(b) (i) What happens when peak amplitude of the signal is greater than DC Biasing voltage of transistor ? Explain with necessary diagram.

(ii) Draw a transistor amplifier circuit used as switch and explain. 5

4. (a) Explain the frequency response of an single stage transistor amplifier. 3+3

(b) Derive the voltage gain, input impedance of a CE transistor amplifier. Use simplified hybrid model. 4

5. (a) Draw and find the transfer function of OPAMP based integrator circuit. Also draw the output wave form when a 2 V peak to peak square wave voltage is given. 5

(b) Derive the gain expression of an amplifier when –ve feedback is used State the assumptions you used. 5

6. (a) What is a full adder circuits. With logic gates, construct a full adder circuit. Also find its characteristics equation and truth table. 5

(b) Implement the following function using NAND gate only : 5

$$F(A,B,C,D) = (A+C)(B+D)$$

7. (a) Explain the principle of 4-bit binary counter. 5

(b) Simplify the following Boolean function using K-maps 5

$F(A, B, C, D) = \Sigma m\,(0, 2, 4, 7, 8, 9)$.

And then, realize the simplified functions using logic gates.

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

(a) Universal logic gates

(b) Principle of oscillator

(c) Emitter follower circuits

(d) Instrumentation amplifier.

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