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Total number of printed pages – 2

B. Tech
BE 2101

Second Semester Examination – 2013

BASIC ELECTRONICS

QUESTION CODE : A 437

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 last stage of a operational amplifier and why ?
 - (b) How a BJT can be used as a switch ?
 - (c) What happens when peak amplitude of the signal is greater than DC biasing voltage of transistor ? Explain with necessary diagram.
 - (d) Why a time base voltage is generally given to the horizontal plate of CRO ?
 - (e) How a feedback amplifier will act as an oscillator ?
 - (f) $(24)_R + (17)_R = (40)_R$. Find the radix (R) so that the above statement is true.
 - (g) If $F - A + BC$. Then prove $F + F' = 1$
 - (h) What is the difference between flip flop and latch ?
 - (i) What is the difference between zenor and avalanche breakdown ? Which of the among is generally used for high voltage application ?
 - (j) Draw the block diagram of a 8×1 MUX.
2. A silicon diode having 20Ω internal resistance is used as half wave rectifier. If the applied input voltage is $50 \sin 100 \pi t$ and load resistance is 800Ω , then find 10
- (a) I_m , I_{dc} and I_{rms}
 - (b) Output frequency and ripple factor
 - (c) AC input and output power and efficiency.

3. (a) What is input impedance of an ideal CRO ? Why ? Explain CRO as voltmeter. 5
- (b) With a neat block diagram explain the principle of a function generator. 5
4. (a) Draw a non inverting OPAMP amplifier circuits and derive its voltage gain assuming the open loop gain of OPAMP is A_d . 5
- (b) What is MUX ? Design the following Boolean function using MUX. 5
- $$F = A'B'C' + ABC + AB'C + A'BC'$$
5. (a) Simplify the following Boolean function using Boolean algebra identities. 5
- $$F(A, B, C, D) = \sum m(0, 1, 3, 4, 7, 9, 11, 15).$$
- And then, realize the simplified functions using logic gates.
- (b) Implement the following function using NOR gate only. 5
- $$F(A, B, C, D) = (A + C)(B + D).$$
6. (a) What is Barkhausen criterion ? How this condition is used in oscillator ? Also, mention the primary requirements to obtain steady oscillation at a fixed frequency. 6
- (b) The open loop gain of an amplifier changes by 5 percents. If 10 dB negative feedback is applied, calculate percentage change of the closed loop gain. 4
7. (a) What is active, saturation and cut-off region of a transistor ? Explain with necessary diagram. 5
- (b) Explain the comparison of CB, CC and CE transistor amplifiers. 5
8. Write short Notes on any **two** : 5×2
- (a) SR flip flop
- (b) Static and dynamic memories
- (c) Zenor diode as voltage regulator
- (d) CRT