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Total number of printed pages – 3

B. Tech
BE 2101

First Semester (Back/ Special) Examination – 2013

BASIC ELECTRONICS

**BRANCH : AERO, AUTO, BIOTECH, CHEM, CIVIL, CSE, EC, EEE, EIE,
ELECTRICAL, ENV, ETC, FASHION, FAT, IEE, IT, MECH, MINING,
MM, MME, PLASTIC, TEXTILE**

QUESTION CODE : D 175

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 slew rate of an operational amplifier? What is its significance?
- (b) What is biasing? What should be the condition of proper biasing?
- (c) What is α and β of a bipolar transistor. Write the relation between them.
- (d) Why a time base voltage is generally given to the horizontal plate of CRO?
- (e) Mention two ideal characteristics of a voltage amplifier?
- (f) Perform the following subtraction using 1's compliment and 2's compliment method.
- $(24)_{10} - (18)_{10}$
- (g) What is Demerger's law ?
- (h) What is the difference between flip-flop and latch ?
- (i) Mention two conditions that must be fulfilled in oscillator circuits.
- (j) Draw the block diagram of a 8 X 1 MUX.

P.T.O.

2. A $50\ \Omega$ load resistance is connected across a half-wave rectifier. The input supply voltage is 230 V (rms) at 50 Hz. 10

Determine

- (a) the d.c. output (average) voltage,
(b) peak-to-peak ripple in the output voltage (V_{p-p}), and
(c) the output ripple frequency
3. (a) What is input impedance of an ideal CRO ? Why ? Explain CRO as voltmeter. 5
(b) What is a multi-metre ? With a neat block diagram explain the principle of a multi-metre. 5
4. (a) What is an integrator circuit ? Draw and find the transfer function of OPAMP based integrator circuit. Also draw the output waveform when a 4 V peak-to-peak square wave voltage is given. 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.
 $F(A, B, C, D) = \sum m(0, 2, 4, 7, 8, 9)$
And then, realize the simplified functions using logic gates. 5
(b) What is POS in Boolean expressions ? Implement the following function in POS.
 $F(A, B, C, D) = (B + C)(A + D)$ 1+4
6. (a) With a neat diagram establish the gain of a negative feedback amplifier. What is the significance of negative feedback in analog circuits ? 6
(b) The open-loop gain of an amplifier changes by 10 per cents. If 5 dB negative feedback is applied, calculate percentage change of the closed-loop gain. 4

7. (a) Draw CB, CE, and CC amplifier circuits. Explain their importance in electronics circuits. 5
- (b) With a neat diagram, explain the principle of an oscillator circuit. Mention the requirements to be filled up to built a oscillator circuit. 5
8. Write short notes on any **two** of the following : 5×2
- (a) Emitter follower circuits
- (b) Memory
- (c) Diode as voltage regulator
- (d) Resistance measurement in CRO.

