Registration No. :

Total number of printed pages – 3

## First Year Special Examination – 2014

## BASIC ELECTRONICS

**BRANCH(S) : AEIE, AUTO, BIOTECH, CHEM, CIVIL, CSE, EC, EEE, ELECTRICAL, ENV, ETC, FASHION, IEE, IT, MANUFACT, MECH, MME, PLASTIC, TEXTILE**

QUESTION CODE : G 484

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) Compare the merits and demerits of silicon diodes and germanium diodes.

   (b) What is peak inverse voltage (PIV) of rectifier circuits ? What is PIV of bridge rectifier and center-tapped rectifier diode circuits ?

   (c) What do you mean by digital logic invertors ? Mention two ICs used as digital logic invertors in electronics.

   (d) What will appear at the screen of CRO when time base voltage is giben to Y-plate and a square wave is given to X-plate ?

   (e) What is the closed loop gain of an operational amplifier when unit gain –ve feedback is used ?

   (f) Perform the following subtraction using 2's compliment method :

   $$(47)_{16} - (68)_{10}$$

   (g) Construct an AND gate using NOR gate.

P.T.O.

(h)  What is the difference between flip-flop and latch ?

(i)  Mention two conditions that must be fulfilled in oscillator circuits.

(j)  What is the difference between ROM and RAM ?

2.  Express the necessary derivation for ripple factor of a full wave bridge silicon diode rectifier. If a 50 Ω load resistance is connected across a full wave rectifier. The input supply voltage is 230 V (rms) at 50 Hz, then find ripple factor of the circuit.                                                                             10

3.  (a)  Explain, how amplitude and frequency of a signal is measured using CRO ?

                                                                             5

    (b)  What is input impedance of an ideal CRO ? Explain CRO as voltmeter.   5

4.  (a)  Give comparison between common base, common emitter and common collector amplifier. Mention their applications.                              5

    (b)  What is $\alpha$ and $\beta$ of a bipolar transistor. Establish the relation between them.

                                                                             5

5.  (a)  Simplify the following Boolean function using Boolean algebra identities :

         $F (A, B, C, D) = \Sigma m (0, 1, 4, 5. 7, 9, 11, 12)$.

         And then, realize the simplified functions using logic gates.         5

    (b)  What is POS in Boolean expressions ? Implement the following function in POS :                                                                    1+4

         $F (A, B, C) = (AB + C) (B + AC)$.

6.  (a)  With a neat diagram establish the gain of a negative feedback amplifier. How distortion is effected by negative feedback in analog circuits ?     5

    (b)  Explain the principle of an oscillator circuit. Mention the requirements to be filled up to built a oscillator circuit.                              5

7.  (a)  What is an differentiator circuits circuit ? Draw and find the transfer function of OPAMP based differentiator circuit. Also draw the output wave form when a 4 V peak to peak square wave voltage is given.            5

BE 2101                                  2                                  Contd.

(b) What is MUX ? Design the following Boolean function using MUX : 5

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

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

(a) Full adder

(b) Characteristic of ideal electronics instruments

(c) Slew rate (SR) and common mode rejection ratio (CMMR) of OPAMP

(d) Small signal analysis of transistor.

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