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

Total number of printed pages – 3

B. Tech
BE 2101

Second Semester Regular Examination – 2015

BASIC ELECTRONICS

BRANCH (S) : AEIE, AERO, AUTO, BIOTECH, CHEM, CIVIL, CSE, EC, EEE, EIE, ELECTRICAL, ETC, FASHION, IT, MANUTECH, MECH, MINERAL, MINING, MME

QUESTION CODE : J 366

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 dynamic resistance of diode ? What are the factors that the dynamic resistance of diode depends upon ?

   (b) Why the gain of a amplifier reduces at very high and very low frequency ?

   (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 given to Y-plate and a pulse is given to X-plate ? Justify.

   (e) How gain of an amplifier can be increased ? What are the disadvantages of increasing the gain of the amplifier ?

   (f) Perform the following subtraction using 1's compliment method.

   $(17)_{16} - (26)_{10}$

   (g) State two physical importance of EX-OR gate.

P.T.O.

(h) Write down the truth table SR flip-flop. What is its limitation ?

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

(j) What are the disadvantages of an OPAMP with low slew rate value ?

2. (a) Express the necessary derivation for the efficiency of a center tapped a full wave silicon diode rectifier. 5

(b) If a 50Ω load resistance is connected across a full wave rectifier. The input supply voltage is 230V (rms) at 50 Hz, then find ripple factor and efficiency of the circuit. 5

3. (a) What are the characteristics of an ideal electronics voltmeter ? Explain with suitable diagram, how loading error can be minimized during measurement with voltmeter. 5

(b) With suitable diagram explain the basic principle of a CRO. 5

4. (a) What is α and β of a bipolar transistor ? Establish the relation between them. 5

(b) Derive the voltage gain, current gain, input impedance, and output impedance of a bypassed CE transistor amplifier. 5

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

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

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

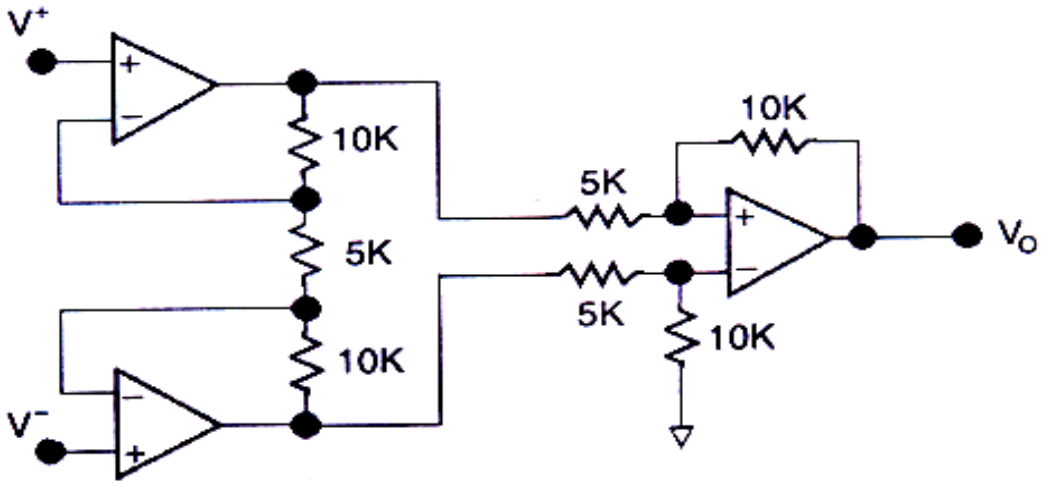
$F(A, B, C) = (AB + C)(B + AC)$.

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 ? 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

(b) Derive the expression for the output voltage and then find the magnitude of the output voltage of the opamp circuits shown below : 5



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

(a) Full adder

(b) Universal logic gates

(c) ROM and RAM

(d) DC biasing.