B. Sc. / M. Sc. (Applied Physics)
(Sem. III) (CBCS) Examination
November / December – 2017
Applied Electronics : X
(New Course)

Faculty Code : 003
Subject Code : 0493002

Time : $2\frac{1}{2}$ Hours]   [Total Marks : **70**

Instructions : (1)   All questions are compulsory.

(2)   Numbers in the right margin indicate marks.

1   Attempt any seven short questions : (two marks each)   **14**

(1)   What is the "dark current" of photodiode?

(2)   Draw the construction of solar cell.

(3)   What is thermistor? Which materials are used to construct thermistor?

(4)   Draw the general block diagram of voltage regulators.

(5)   Sketch the block diagram of CRO.

(6)   Draw symbol of FET and MOSFET.

(7)   State the effect of V_{GS} on channel conductivity of n-channel JFET.

(8)   Draw the basic flip-flop circuit using NOR gate.

(9)   Which gates are the universal gates? Write name with proper symbol.

(10) Covert $(110110)_2$ into decimal.

2   (a)   Write answers of any **two** :   **10**

(1)   Draw the general structure of IR emitters and write the applications.

(2)   Write the basic construction and characteristics of tunnel diode.

(3)   Discuss photodiode with its applications.

(4)   Describe basic operation of liquid crystal display.

(b) Write answers of any **two** :   4

   (1) Draw the symbol of given diodes.
       (A) Schottky diodes
       (B) Photo diodes
       (C) Thermistor
       (D) Tunnel diodes.

   (2) What is photoconductive cell? Which materials are used for photoeonductive cell?

   (3) Discuss the application varicap (varactor) diode.

   (4) Draw the construction and I-V characteristics of schottky diode.

3 (a) Write answers of any **two** :   10

   (1) What is switching regulator? Draw the block diagram of three terminal voltage regulators.

   (2) Explain theory and construction of Cathode Ray Tube.

   (3) Explain shunt voltage regulation with basic shunt regulator circuit.

   (4) Draw the block diagram of operation of delayed sweep.

   (b) Write answers of any **two** :   4

   (1) What is Voltage regulation? Write the equation for voltage regulation.

   (2) Draw the block diagram of series voltage regulator.

   (3) What is Synchronization in CRO?

   (4) Explain triggering in CRO.

4 (a) Write answers of any **two** :   10

   (1) Give the difference between BJT and FET.

   (2) Describe basic construction of a P-channel depletion type MOSFET.

   (3) Explain fixed-bias configuration in FET.

   (4) With help of neat circuit diagram explain the working of self bias method for FET.

(b) Write answers of any one : **4**

    (1) With the help of neat diagram write construction of n-channel FET.

    (2) Explain voltage divider biasing in JFET.

5 (a) Write answers of any **two** : **10**

    (1) Explain AND, OR and NOT gates with truth table.

    (2) Explain Master-Slave operation of a flip-flop.

    (3) Design a 1- bit full adder with two half adders and minimum number of additional gates.

    (4) Convert the following numbers as required in each case.

        (1) $(25.625)_{10} = (?)_2$

        (2) $(603.23)_{10} = (?)_2$

(b) Write answers of any **two** : **4**

    (1) What is binary half adder? Draw the circuit for it.

    (2) Using K-map simplify
$Y = A'BC + ABC + B'C + AC + A'B'C'$

    (3) Draw the circuit of a BCD adder using 4 - bit binary adders.

    (4) Use Boolean algebra to show that,
$A'BC' + AB'C' + AB'C + ABC' + ABC = A + BC'$

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