Total No. of printed pages = 5

2015

COMPUTER SCIENCE

(Major)

Paper : 1.2

(Basic Electronics)

Full Marks – 60

Time – Three hours

The figures in the margin indicate full marks
for the questions.

1. Answer the following questions :   1×7=7

   (a) The basic unit of measurement for current
   is ——.

   (i) Volt   (ii) Watt

   (iii) Ampere   (iv) Ohm

   (b) Which of the following is a universal gate ?

   (i) AND   (ii) OR

   (iii) NAND   (iv) EX-OR

[Turn over

(c) A multiplexer is also called a ——.

    (i) encoder

    (ii) data distributor

    (iii) data selector

    (iv) demultiplexer

(d) The clock signals are used in sequential logic circuits to

    (i) tell the time of the day

    (ii) carry serial data signal

    (iii) synchronize events in various parts of a system

    (iv) None of the above

(e) Which one of the following is used for voltage regulation only ?

    (i) Photo diode

    (ii) Zener diode

    (iii) Both

    (iv) None

(f) Choose the correct statement :

    (i) An NPN transistor receives positive voltage at the emitter terminal.

    (ii) A PNP transistor receives positive voltage at the emitter terminal.

    (iii) Both PNP and NPN are junction diodes.

    (iv) None.

(g) A rectifier is an electrical device that

    (i) converts DC to AC

    (ii) converts AC to DC

    (iii) Provide steady DC voltage

    (iv) None of the above.

2. Answer the following questions :   2×4=8

(a) Define Ohm's law.

(b) Define Kirchoff's law.

(c) What is meant by intrinsic and extrinsic semiconductor ?

(d) What is meant by positive and negative logic ?

3. Answer any *three* questions : 5×3=15

(a) Explain Thevenin's theorem with proper circuit diagram.

(b) What is Zener diode ? Give VI characteristics of Zener diode.

(c) State and prove DeMorgan's theorem.

(d) What is a full adder ? Write truth table for a full adder and develop its logic circuit.

(e) Simplify the Boolean expression using K-map.

$$F(A, B, C, D) = \sum (0, 2, 4, 6, 8, 10, 12, 14, 15)$$

4. Answer any *three* questions : 10×3=30

(a) Design a combinational circuit that converts BCD to decimal.

(b) Design a 4-bit magnitude comparator circuit.

(c) What is a flip-flop ? Draw the logic diagram and characteristic table of JK flip-flop. Discuss its working principle.

(d) What are digital multiplexers ? Explain their operating principle.

(e) Write short notes on any *two* :

(i) Photo diode

(ii) MOSFET

(iii) Digital counter

(iv) Parallel plate capacitor.