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3 (Sem 1) CSC M1

2015

**COMPUTER SCIENCE**

**(Major)**

Paper : 1.1

**(Computer Fundamentals and Programming)**

Full Marks – 60

Time – Three hours

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

1. Answer the following questions :  $1 \times 7 = 7$

(a) Printer is a secondary storage device. (State true or false).

(b) The expression  $11\%3$  evaluates to ..... (Fill in the blank).

(c) Choose the correct option.

The break statement causes an exit

(i) only from the innermost loop

(ii) only from the innermost switch

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(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

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(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 :  $2 \times 4 = 8$

- (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 ?

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3. Answer any *three* questions :  $5 \times 3 = 15$

- (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 :  $10 \times 3 = 30$

- (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.

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(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.

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