B.C.A Part-I (Semester–I) (CBCS) Examination

1BCA4

FUNDAMENTALS OF ELECTRONICS IN COMPUTER SCIENCE

Time : Three Hours] [Maximum Marks : 80

Note :— (1) Question no. **1** is compulsory.

(2) Draw neat diagram wherever necessary.

1. (A) Choose the correct alternative & rewrite the sentence :

(i) Which of the following is not a binary Number?

(a) 10101 (b) 000

(c) 1A1 (d) 111

(ii) The Octal equivalent of 1100101. 001010 is ___.

(a) 145.12 (b) 145.21

(c) 154.12 (d) None

(iii) The output of a NOR gate is High if the input is ____.

(a) All High (b) All Low

(c) Both (a) and (b) (d) None

(iv) How many combinations are there for 3 input gates ?

(a) 2 (b) 4

(c) 6 (d) 8

(v) The Boolean function A+AB is a reduce form of ____.

(a) AB+BC (b) (A+C) (A+B)

(c) B (A+C) (d) None

(vi) Select line required for 16 : 1 MUX is ____.

(a) 3 (b) 4

(c) 5 (d) 8

(vii) Race around condition occurs in ____ FF.

(a) JK (b) JKMS

(c) D (d) T

(viii) In SRFF, if Q=O, the output is said to be____.

(a) Set (b) Reset

(c) Invalid (d) None

(ix) Asynchronous counter is also called as ____ counter.

(a) Serial (b) Parallel

(c) Ripple (d) None

(x) In ____ counter the clock is applied to all Flip-Flop simultaneously.

(a) Synchronous (b) Asynchronous

(c) Serial (d) None 10×1=10

(B) Fill in the blanks :

(i) 2'S complement of binary number 101011 is ____.

(ii) A full adder circuit has ____ inputs.

(iii) Multiplexer is also called as ____.

(iv) To avoid Race around condition ____ FF is used.

(v) To make a 8 bit counter we require ____ FF. 5

(C) Answer in one sentence :

(i) What is the base of binary & hex number system ?

(ii) Which gates are called as basic logic gates?

(iii) Write Boolean expression of De-Morgan's First & second theorem.

(iv) What is meant by Toggle output?

(v) What is synchronous counter? 5

2. (A) Explain decimal to binary & binary to decimal conversion with example. 8

(B) Perform the following binary arithmetic operations : 4

(1) 101011 + 10101

(2) 110110 × 101

OR

3. (A) Explain decimal, binary & hex number system. 8

(B) Subtract $(11001)_2$ from $(10110)_2$ using 2'S complement method. 4

4. (A) Explain half adder with block & logic diagram. 4

(B) Explain Ex-OR & Ex-NOR logic gates. 8

OR

5. (A) Explain with truth table basic logic gates. 4

(B) Explain with logic diagram full subtractor. 8

6. (A) Prove that : 4

(1) (A+B) (A+C) = A+BC

(2) AB+A (B+C) +B (B+C) = AC+B

(B) Explain with logic diagram 1 : 8 De-MUX 8

OR

7. (A) State & prove De-Morgan's theorems. 4

(B) Minimize the function using K-map Y = $\sum$ m (1, 3, 4, 9,11,12) 8

8. (A) Explain the working of JK-FF with logic diagram & truth table. 8

(B) Explain the operation of D-FF using logic diagram, truth table & symbol. 4

OR

9. (A) What is race around condition? Explain how JKMS remove this condition. 8

(B) Explain RS latch using NOR gates. 4

10. (A) Explain 4 bit synchronous up counter with waveform. 8

(B) Explain operation of shift left register with timing diagram. 4

OR

11. (A) Draw block diagram of PISO shift register and explain its working. 8

(B) Explain 4 bit asynchronous down counter. 4