First Year B. Sc. (Sem. I) Examination
March / April – 2016
Applied Electronics : Paper - II
(Digital Electronics)

Time : 2 Hours] [Total Marks : 50

Instructions :

(1) Fill up strictly the details of □ signs on your answer book.

Name of the Examination :
FIRST YEAR B. Sc. (SEM. 1)

Name of the Subject :
APPLIED ELECTRONICS - 2

Subject Code No. : 2 9 3 1 → Section No. (1, 2,.....) : 1 2 3

(2) All 28 questions are compulsory.
(3) Symbols and abbreviations used in the paper have their usual meaning.
(4) Non-programmable calculators are allowed.

Q. 1 to 12 Multiple choice questions : (1 mark)
Q. 13 to 22 Multiple Choice Questions : (2 marks)
Q. 23 to 28 Multiple Choice Questions : (3 marks)

O.M.R. Sheet भरवा अंगे-अंगे अनुमत-अनुमत सूचनाओं आधारे
O.M.R. Sheet-ला पात्र आधारे है.

Important instructions to fillup O.M.R. Sheet
is given back side of provided O.M.R. Sheet.

DE-2931_B ]  1  [ Contd...
1. The Boolean expression for a 3-input AND gate is _____.
   (A) \( X = AB + C \)
   (B) \( X = AB \)
   (C) \( X = ABC \)
   (D) \( X = A + B + C \)

2. What does the small bubble on the output of the NAND gate logic symbol mean?
   (A) None of these
   (B) open collector output
   (C) tristate
   (D) The output is inverted.

3. Logically, the output of a NOR gate would have the same Boolean expression as a(n) :
   (A) NOR gate immediately followed by an inverter
   (B) NAND gate immediately followed by an inverter
   (C) OR gate immediately followed by an inverter
   (D) AND gate immediately followed by an inverter

4. The basic logic gate whose output is the complement of the input is the:
   (A) comparator
   (B) OR gate
   (C) AND gate
   (D) inverter
5 Which of the following equations would accurately describe a four-input OR gate when \( A = 1, B = 1, C=0, \) and \( D=0 \)?

(A) \[ 1 + 1 + 0 + 0 = 00 \]

(B) \[ 1 + 1 + 0 + 0 = 01 \]

(C) \[ 1 + 1 + 0 + 0 = 1 \]

(D) \[ 1 + 1 + 0 + 0 = 0 \]

6 What are the symbols used to represent digits in the binary number system?

(A) 1,2

(B) 0,1

(C) 0,1,2

(D) 0 through 8

7 A full subtracter circuit requires _______.

(A) three inputs and two outputs

(B) two inputs and two outputs

(C) two inputs and three outputs

(D) three inputs and one output

8 The output of an AND gate is LOW _______.

(A) when all inputs are HIGH

(B) all the time

(C) when any input is LOW

(D) when any input is HIGH
9. Give the decimal value of binary 10010.
   (A) 20
   (B) 6
   (C) 9
   (D) 18

10. The output of an AND gate with three inputs, A, B, and C, is HIGH when ________.
    (A) A = 1, B = 0, C = 1
    (B) A = 1, B = 1, C = 0
    (C) A = 0, B = 0, C = 0
    (D) A = 1, B = 1, C = 1

11. If a 3-input NOR gate has eight input possibilities, how many of those possibilities will result in a HIGH output?
    (A) 8
    (B) 1
    (C) 2
    (D) 7

12. The output of a NOR gate is HIGH if ______.
    (A) all inputs are LOW
    (B) all inputs are HIGH
    (C) any input is HIGH
    (D) any input is LOW
13 The sum of 1101 + 1011 equals _____.
   (A) 100100
   (B) 110011
   (C) 100001
   (D) 110100

14 A decimal 11 in BCD is _____.
   (A) 00010010
   (B) 00001011
   (C) 00001100
   (D) 00010001

15 The difference of 111 – 001 equals _____.
   (A) 110
   (B) 100
   (C) 111
   (D) 001

16 Which of the following is an invalid BCD code?
   (A) 1001
   (B) 0011
   (C) 1101
   (D) 0101

17 The binary number 1100110 is equal to the decimal number_____.
   (A) 66
   (B) 12
   (C) 206
   (D) 127
18 Which of the following is not a basic Boolean operation?
   (A) FOR
   (B) OR
   (C) NOT
   (D) AND

19 When does the output of a NAND gate = 1?
   (A) Only when all inputs = 1
   (B) Whenever a 0 is present at an input
   (C) Only when all inputs = 0
   (D) Whenever a 1 is present at an input

20 Convert binary number 01011 to decimal.
   (A) 10
   (B) 11
   (C) 35
   (D) 15

21 Convert decimal 64 to binary.
   (A) 01001000
   (B) 01010010
   (C) 01000000
   (D) 00110110

22 The BCD number for decimal 347 is _____.
   (A) 1100 1011 0110
   (B) 1100 1011 1000
   (C) 0011 0100 0111
   (D) 0011 0100 0001
23. How many gates would be required to implement the following Boolean expression before simplification?

\[ XY + X(X + Z) + Y(X + Z) \]

(A) 5

(B) 1

(C) 2

(D) 4

24. The NAND or NOR gates are referred to as "universal" gates because either:

(A) were the first gates to be integrated

(B) can be found in almost all digital circuits

(C) can be used to build all the other types of gates

(D) are used in all countries of the world

25. Which of the examples below expresses the distributive law of Boolean algebra?

(A) \[ A(BC) = (AB) + C \]

(B) \[ (A + B) + C = A + (B + C) \]

(C) \[ A(B + C) = AB + AC \]

(D) \[ A + (B + C) = AB + AC \]
26 Which of the following combinations cannot be combined into K-map groups?

(A) overlapping combinations
(B) corners in the same row
(C) corners in the same column
(D) diagonal

27 The base of the hexadecimal system is _____.

(A) two
(B) eight
(C) sixteen
(D) ten

28 Which of the following expressions is in the sum-of-products (SOP) form?

(A) AB + CD
(B) (A + B)(C + D)
(C) (A)B(CD)
(D) AB(CD)