K16U 0218

Reg. No. : .....

Name : .....

VI Semester B.Sc. Degree (CCSS-Reg./Supple./Improv.) Examination, May 2016
CORE COURSE IN PHYSICS
6B14 PHY : Digital Electronics

Time : 3 Hours Max. Weightage : 30

Instructions: *1) Answer **all** the questions from Section **A**. **Each** bunch carries a wt. of **1**.*
*2) Answer **any six** from Section **B**. **Each** carries a wt. of **1**.*
*3) Answer **any nine** from Section **C**. **Each** carries a wt. of **2**.*
*4) Answer **any one** from Section **D**. **Each** carries a wt. of **4**.*

SECTION – A

Each bunch carries a weightage of **1**.

1. 1) The binary equivalent of decimal 53.62 is
   a) 0101011.11 b) 110101.10 c) 110111.11 d) 10011.11
   2) The decimal equivalent of octal 120 is
   a) 60 b) 90 c) 80 d) 110
   3) The 2's complement of 1010 is
   a) 0110 b) 0101 c) 1011 d) 0111
   4) The signed binary equivalent of decimal – 44 is
   a) 10110110 b) 11010100 c) 10010100 d) 11000011
2. 1) Subtracting 0111 from 1001 gives
   a) 1010 b) 0110 c) 0010 d) None of these
   2) $A + \overline{A}B$ =
   a) AB b) A + B c) $\overline{A}$ d) $\overline{A}B$
   3) The Boolean equation A + AB = A is called
   a) Consensus law b) Distributive property
   c) Commutative property d) Absorption law
   4) An advantage of amplitude modulation is
   a) Reduce antenna size b) Reduce noise
   c) Reduce bandwidth d) All of the above **(2×1=2)**

P.T.O.

SECTION – B

Answer **any six**. **Each** carries a weightage of **1**.

3. Write down the BCD Code for the following
   a) 4081 b) 921
4. Convert the following octal numbers to hexadecimal
   a) 137 b) 775
5. Add the numbers + 38 and – 22 using 2's complement method.
6. Show the symbol and truth table of a three input NOR gate.
7. Apply De-Morgan's theorem to the equation $y = \overline{(A \cdot B) + (\overline{C} \cdot \overline{D})}$.
8. Show the realisation of Ex – OR gate using basic gates.
9. What do you mean by the modulation factor of amplitude modulation ?
10. Sketch the diagram of a pulse modulated wave. **(6×1=6)**

SECTION – C

Answer **any nine**. **Each** carries a weightage of **2**.

11. What do you mean by the base of a number system ? Explain the relation between the base and positional weight.
12. Write a short note on different binary codes.
13. What do you mean by the parity of a binary code ? What is its importance ?
14. Perform the following arithmetic in 2's complement binary :
    a) Add + 29 and + 19
    b) Add – 47 and + 29.
15. Explain De-Morgan's theorems.

16. Simplify the following Boolean equations
    a) $AB + BC + \overline{B}C$.
    b) $\overline{A}\,\overline{B}\,\overline{C} + \overline{A}B\overline{C} + A\overline{B}\,\overline{C} + AB\overline{C}$.
17. Sketch the logic circuit for the expression $Y = \overline{A}B + \overline{B}\,\overline{C} + AC$.
18. Show the Boolean equation for the given figure and give its out put if A = B = C = 1.

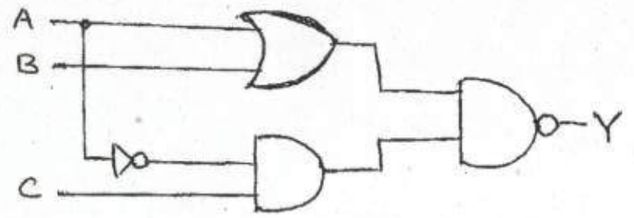

Fig. 1

19. Write a SOP Boolean equation for the given three variable K-map.

	00	01	11	10
0	0	1	0	1
1	1	0	1	0

20. Write down the equation for an amplitude modulated wave and explain the terms.
21. Explain any two advantages of frequency modulation over amplitude modulation.
22. A carrier wave of 500 W is subjected to 100% amplitude modulation. Determine the power in sidebands and the power of modulated wave. **(9×2=18)**

SECTION – D

Answer **any one** . **Each** carries a weightage of **4**.

23. Sketch the symbol and truth table of NAND gate. Show how basic gates are realised using NAND gates. Also give the Boolean expression for each circuit.
24. With the help of a block diagram, explain the operation of a superheterodyne receiver. **(1×4=4)**

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