GIRLS' HIGH SCHOOL AND COLLEGE

2020-2021

CLASS 12 B

COMPUTER SCIENCE

TEST PAPER – 01

CHAPTER - BOOLEAN ALGEBRA

TIME : 30 Minutes Max. Marks: 25

Note for the parents: Parents to ensure that child takes only *30 minutes* to complete the test. After the test the child will correct the test with either red pen or any coloured pen and assign marks. Test worksheet is to be signed by the parent with date. Worksheet is to be kept safely as it will be submitted when the school reopens.

Answer the following questions: [1X25]

1. State the Absorption law and prove it with the help of truth table.
2. State the two De Morgan's Laws.
3. State Commutative Law and prove it with the help of a truth table.
4. State the Associative law and prove it with the help of truth table.
5. Minimize the following function using K-Map:

   $F(x,y,z)=\Pi(0,1,2,3,4,5,6,7)$
6. Minimize the following function using K-Map:

   $F(x,y,z)=\Sigma(1, 2, 4, 7)$
7. Minimize the following Boolean expression using K-Map:

   $X'YZ' + X'YZ + XYZ' + XYZ$
8. Draw the truth table to prove the propositional logic expression:

   $p \Leftrightarrow q = p \cdot q + p' \cdot q'$
9. Draw the truth table to prove the propositional logic expression:

   $p \Longrightarrow q = p' + q$
10. Convert the following cardinal form of expression into its canonical form:

    $F(P, Q, R) = \Sigma(1, 3, 6)$
11. Convert the following function into canonical product of sums form:

F(x, y, z) = $\Pi(1, 2, 4, 5)$

12. Convert the following function in cardinal form:

    F(x, y, z) = ∑(x.y.z + x.y'.z + x'.y.z')

13. Write the cardinal form of the following expression:

    $\overline{X}\,\overline{Y}\,\overline{Z} + \overline{X}\,Y\,Z + X\,\overline{Y}\,\overline{Z} + X\,Y\,Z$

14. If A =1 and B = 0, then find (A'+1) . B

15. Find the complement of: A+(A'.B)+B

16. Find the complement of: A . A' + B

17. If F = P + Q(P' + R') then find F'

18. Draw the logic diagram and truth table for a two input OR gate.

19. Show that X + (X . Y)' is a tautology.

20. State the Principle of Duality.

21. Find the dual of:

    X.Y + X' + 1 = 1

22. Give the dual of:

    (A + 0) . (A . 1 . $\overline{A}$)

23. If A=1, B=0, C=1 and D=1, find its maxterm.

24. Find the minterm when P=0, Q=1, R=1, and S=0

25. Prove X + $\overline{X}$Y = X + Y using algebraic method.

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