

MARTHOMA RESIDENTIAL SCHOOL

FIRST ASSESSMENT TEST

COMPUTER SCIENCE

Marks: 20

Class XII

Time: 45min

Question 1 (5 marks)

1. Write inverse, converse and contra positive for the below statements. (1.5 marks)

If you are tall then you can climb the tree

2. By using truth table show which of the following is tautology, contradiction and contingency

a) $d.d'$ b) $f+1$ c) $g.g$ (1.5 marks)

3. Find the dual of Boolean equation $AB'+BC'+1=1$ (1 mark)

4. If $F(P, Q, R) = P'(QR'+Q'R)$, then find F' ? (1 mark)

Question 2 (5*3=15 marks)

1.

Given the Boolean function: $F(A,B,C,D) = \Sigma(0, 2, 4, 5, 8, 9, 10, 12, 13)$

- (i) Reduce the above expression by using 4-variable K-Map, showing the various groups (i.e. octal, quads and pairs). [4]
- (ii) Draw the logic gate diagram of the reduced expression. Assume that the variables and their complements are available as inputs. [1]

2.

A Football Association coach analyzes the criteria for a win/draw of his team depending on the following conditions.

- If the Centre and Forward players perform well but Defenders do not perform well.
- OR**
- If Goal keeper and Defenders perform well but the Centre players do not perform well.

OR

- If all the players perform well.

The inputs are :

INPUTS	
C	Centre players perform well.
D	Defenders perform well.
F	Forward players perform well.
G	Goalkeeper performs well.

(In all of the above cases 1 indicates yes and 0 indicates no)

Output: **X** - Denotes the win/draw criteria [1 indicates win/draw and 0 indicates defeat in all cases.]

- (a) Draw the truth table for the inputs and outputs given above and write the **POS** expression for $X(C, D, F, G)$. [5]

- (b) Reduce $X (C, D, F, G)$ using Karnaugh's Map. [5]
 Draw the logic gate diagram for the reduced **POS** expression for $X (C, D, F, G)$ using AND and OR gate. You may use gates with two or more inputs. Assume that the variable and their complements are available as inputs.
