**C. ABDUL HAKEEM COLLEGE (AUTONOMOUS),**
**MELVISHARAM - 632 509.**
**SEMESTER EXAMINATIONS, NOVEMBER - 2018**

**B.Sc., COMPUTER SCIENCE & B.C.A.,** **SEMESTER I**

**U15AMA102 / U14ACS101 / U14ACA101 –**
**MATHEMATICAL FOUNDATION - I (ALLIED)**

Time: Three Hours Maximum: 75 Marks

SECTION - A (10 X 2 = 20 Marks)

Answer **ALL** Questions.

1. Define disjunction.
2. Define contradiction.
3. Define disjoint set.
4. Define one – one function.
5. Define permutation.
6. State the dual of $a \vee \bar{a} = 1$.
7. If $y = xlogx$ then find $\frac{dy}{dx}$.
8. Define maximum value of the function.
9. Find the slope of the line $2x - 3y + 7 = 0$.
10. Write the condition that the general equation of the 2nd degree represents a pair of straight lines.



SECTION - B (5 X 5 = 25 Marks)

Answer **ALL** Questions.

11. a) Prove that $(p \rightarrow q) \wedge (q \rightarrow p) \equiv (p \leftrightarrow q)$.

(Or)

b) Construct truth table for (i) $\sim (P \wedge Q)$ (ii) ( ~P)v(~Q).

12. a) If A, B, C are sets such that $A \cup B = A \cup C$ *and* $A \cap B = A \cap C$. Show that $B = C$.

(Or)

b) Find fog, gof when f : R → R and g : R → R defined by f(x) = 2x-1, g(x) = $x^2 - 2$.

13. a) Write the basic properties of Boolean algebra.

(Or)

b) Write the laws of binary operation.

14. a) Find $\lim_{x \to 0} \frac{1 - \cos x}{x}$.

(Or)

b) Find the maxima and minima of the function $2x^3 - 3x^2 - 36x + 10$.

15. a) Show that the equation $2x^2 + 5xy + 3y^2 + 6x + 7y + 4 = 0$ represents a pair of straight line and find the angle between them.

(Or)

b) Find the centre and radius of the circle $x^2 + y^2 - 14x + 6y + 9 = 0$.

SECTION - C (3 X10 = 30 Marks)

Answer **ANY THREE** Questions.

16. Prove that $p \rightarrow (q \rightarrow r) \equiv (p \wedge \sim r) \rightarrow \sim q$.
17. In a survey of 60 people, it is found that 25 like to drink milk, 26 like coffee and 26 like tea. Also 9 like milk and tea, 11 like milk and coffee, 8 like coffee and tea and 8 like none of the three. Find the number of people who like all the three drinks.
18. How many different permutations are there if all the letters of the word ALABAMA? Of these permutations how many contains the word LAMB?
19. Find the radius of curvature to the curve $x^3 + y^3 = 3axy$ at $x = y = \frac{3a}{2}$.
20. Find the values of $\lambda$ so that the equation
    $x^2 - \lambda xy + 2x^2 + 3x - 5y + 2 = 0$ represents a pair of straight lines.

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