SHRIMATHI DEVKUNVAR NANALAL BHATT VAISHNAV COLLEGE FOR WOMEN
(AUTONOMOUS)
(Affiliated to the University of Madras and Re-accredited with 'A+' Grade by NAAC)
Chromepet, Chennai - 600 044.
B.C.A - END SEMESTER EXAMINATIONS - NOV'2024
SEMESTER - I
24UCAAT1001 - Allied Mathematics - I

Total Duration : 2 Hrs.30 Mins.   Total Marks : 60

Section B

Answer any **SIX** questions $(6 \times 5 = 30$ Marks$)$

1. Construct the truth tables of Conjunction , Disjunction and negation.

2. Let $f : \{2, 3, 4, 5\} \to \{3, 4, 5, 9\}$ and $g : \{3, 4, 5, 9\} \to \{7, 11, 15\}$ be functions defined as $f(2) = 3$, $f(3) = 4$, $f(4) = f(5) = 5$ and $g(3) = g(4) = 7$ and $g(5) = g(9) = 11$. Find gof.

3. In how many ways a committee consisting of 3 men and 2 women, can be chosen from 7 men and 5 women?

4. Prove that the matrix $\begin{pmatrix} cosx & -sinx \\ sinx & cosx \end{pmatrix}$ is orthogonal.

5. Prove that $16\sin^5\theta = \sin5\theta$ - $5\sin3\theta + 10\sin\theta$.

6. Construct the truth tables of $(p \to q) \to (q \to p)$.

7. Find the characteristic equation of the matrix $\begin{pmatrix} 2 & -1 & 1 \\ -1 & 2 & -1 \\ 1 & -1 & 2 \end{pmatrix}$

8. If $\dfrac{sinx}{x} = \dfrac{863}{864}$, find an approximate value of x.

Section C

Answer any **THREE** questions $(3 \times 10 = 30$ Marks$)$

9. By Constructing the truth table, Show that $\neg (p \vee \neg(p \wedge q))$ is a contradiction.

10. From 50 students taking examinations in Mathematics, Physics and Chemistry, each of the student has passed in at least one of the subject, 37 passed Mathematics, 24 Physics and 43 Chemistry. At most 19 passed in Mathematics and Physics, at most 29 passed in Mathematics and Chemistry and at most 20 passed in Physics and Chemistry. What is the largest possible number that could have passed in all three examination?

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11. In how many ways 6 children can be arranged in a line, such that
    (i) Two particular children of them are always together
    (ii) Two particular children of them are never together.

12. Verify the cayley Hamilton theorem, for $A = \begin{pmatrix} 2 & 2 & 1 \\ 1 & 3 & 1 \\ 1 & 2 & 2 \end{pmatrix}$.

13. Expand $\cos 8\theta$ in terms of $\sin\theta$.

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