

TILAK MAHARASHTRA VIDYAPEETH, PUNE
BACHELOR OF COMPUTER APPLICATIONS (B.C.A.)(044)/
BACHELOR OF SCIENCE (COMPUTER APPLICATIONS)(750)/
BACHELOR OF COMPUTER APPLICATIONS (CYBER SECURITY) (464)/
BACHELOR OF SCIENCE(CYBER SECURITY)(760)
EXAMINATION : DECEMBER -2024
SEMESTER – I
Sub: Mathematics

(BCA142-20/18/BCA23-102/BSC24-102/BCA-CS142-20/BCAC23-102/BSCC24-102)

Date : 26/12/2024

Total Marks : 60

Time: 10.00am To 12.30pm

Instructions:

1. All questions are compulsory unless and otherwise stated.
2. Bold figures to the right of every question are the maximum marks for that question.
3. Candidates are advised to attempt questions in order.
4. Answers written illegibly are likely to be marked zero.
5. Use of scientific calculators, Log tables, Mollier Charts is allowed.
6. Draw neat and labeled diagrams wherever necessary.

Q.1. Solve (Any 4)

(8)

1. If set $A = \{1, 3, 5\}$, $B = \{2, 4, 6\}$ and $C = \{0, 2, 4, 6, 8\}$. Then write the universal set for all three sets.
2. Check if $x(x + 1) + 8 = (x + 2)(x - 2)$ is in the form of quadratic equation.
3. How many 3-letter words can be formed using the letters from the word "FABLE"?
4. A dice is rolled. What is the probability that an even number has been obtained?
5. Draw Venn diagram for $(A \cup B)$ and $(A \cap B)$
6. Draw diagrammatic representation of Implication and double Implication

Q.2. Solve (Any 3)

(9)

1. Find the number of permutations and combinations of $n = 9$ and $r = 3$
2. Find the 10th term of the arithmetic sequence where the first term a is 5 and the common difference d is 3.
3. The first term of a G.P is 2 and the sum to infinity is 6. Find the common ratio
4. Express the following in the forms of $a+ib$
 $(2+3i)+(2-3i)$

Q.3. Solve (Any 2)

(8)

1. Find the domain and the range of the real function, $f(x) = 1/(x + 3)$.
2. Construct truth table for following. Check for Tautology and comment on your answer:
 - a) $p \vee q$
 - b) $(p \vee q) \vee \sim q$
3. If A.M and G.M between two numbers be 17 respectively. Find their H.M

Q.4. Solve (Any 3)**(15)**

1. A coin is tossed three times, consider the following events.

P: 'No head appears',

Q: 'Exactly one head appears' and

R: 'At Least two heads appear'.

Check whether they form a set of mutually exclusive and exhaustive events.

2. State properties of Intersection of Sets
3. Test whether the given functions are even or odd

a) $F(x) = 2x-3$

b) $F(x) = 1/x$

4. Solve $5x^2 + 6x + 1 = 0$

Q.5. Solve (Solve any 2)**(20)**

1. In a school, there are 30 teachers who teach Mathematics or Physics. Of these, 18 teach Mathematics and 6 teach both Physics and Mathematics. How many teach Physics only?

2. Solve the following system of linear equations:

$$x+y+4z-4 = 0$$

$$2x+3y+6z-5 = 0$$

$$2y+z-3x+4 = 0$$

3. Let $f = \{(3, 1), (9, 3), (12, 4)\}$ and $g = \{(1, 3), (3, 3), (4, 9), (5, 9)\}$. Show that $g \circ f$ and $f \circ g$ are defined. Also find $f \circ g$ and $g \circ f$.