

TILAK MAHARASHTRA VIDYAPEETH, PUNE
BACHELOR OF COMPUTER APPLICATIONS (B.C.A.)
SPECIALIZATION IN CYBER SECURITY(CS)//
BACHELOR OF SCIENCE (CYBER SECURITY)/
BACHELOR OF SCIENCE
EXAMINATION : JUNE - 2025
SEMESTER – I
Sub: Mathematics

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

Date : 12/06/2025

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 $A = \{1, 3, 5, 7, 9\}$ and set $B = \{1, 2, 3, 4, 5\}$, find $A \cup B$ and $A \cap B$.
2. If $P(A) = 7/13$, $P(B) = 9/13$ and $P(A \cap B) = 4/13$, evaluate $P(A|B)$.
3. Write truth table of $p \vee q$ and $p \wedge q$
4. There are 8 balls in a container, 4 are red, 1 is yellow and 3 are blue. What is the probability of picking a yellow ball?
5. Find the negation of the given statement “ a number 6 is an even number”
6. Draw truth table of Implication

Q.2. Solve (Any 3)

(9)

1. A survey of 100 students found that 70 students like pizza, 75 like burgers, and 60 like both. How many students like neither pizza nor burgers?
2. Given that, $f(x) = x^2 + 1$. Find $f(f(2))$
3. If the first term of a G.P. is 20 and the common ratio is 4. Find the 5th term.
4. In a class of 20 students, 12 are girls. What is the probability of randomly selecting a boy?

Q.3. Solve (Any 2)

(8)

1. If $f(x) = 2x$ and $g(x) = x+1$, then find $(f \circ g)(x)$ if $x = 1$.
2. Check if $x(x + 1) + 8 = (x + 2)(x - 2)$ is in the form of quadratic equation..
3. If 4,7,10,13,16,19,22.....is a sequence, Find:
 - Common difference
 - nth term
 - 21st term

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

1. Solve $5x^2 + 6x + 1 = 0$
2. Write symbols and draw Venn diagrams of the following:
 1. Union of Sets
 2. Intersection of Sets
 3. Compliment of Sets
 4. Difference of Sets
 5. Subsets
3. In how many ways a committee consisting of 4 men and 2 women, can be chosen from 6 men and 5 women?
4. 1 card is drawn at random from the pack of 52 cards.
 - (i) Find the Probability that it is an honor card.
 - (ii) It is a face card.

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

1. In a group of 100 persons, 72 people can speak English and 43 can speak French. How many can speak English only? How many can speak French only and how many can speak both English and French?
 2. If there are three functions, such as $f(x) = x$, $g(x) = 2x$ and $h(x) = 3x$. Then find the composition of these functions such as $[f \circ (g \circ h)](x)$ for $x = -1$.
 3. Solve the following system of equations using Cramer's rule:
 $x + y + z = 6$
 $y + 3z = 11$
 $x + z = 2y$ or $x - 2y + z = 0$
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