

TILAK MAHARASHTRA VIDYAPEETH, PUNE**BACHELOR OF COMPUTER APPLICATIONS (B.C.A.)(044)/****BACHELOR OF SCIENCE(COMPUTER APPLICATIONS)(750)/****BSC (DATA SCIENCE AND ARTIFICIAL INTELLIGENCE)(799)/****BACHELOR OF COMPUTER APPLICATIONS****(DATA SCIENCE AND MACHINE LEARNING)(786)/****SPECIALIZATION IN CYBER SECURITY (CS)(464)/****BACHELOR OF SCIENCE (CYBER SECURITY)(760)****EXAMINATION: MAY/JUNE-2026****SEMESTER - I****Sub: Mathematics****(BCA-142-20 /BCA-CS-142-20/BCA23-102/ BCAC23-102/BSC24-102/
BSCC24-102/ 46425-102/78625-102/79925-102/76025-102)****Date : 04/06/2026****Total Marks : 60****Time: 10.00 am to 12.30 pm****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. In how many ways 3 persons can be selected from 6 doctors and 4 lawyers?
2. Draw the Venn diagram of 'Some students are clever'.
3. Find the value of $b^2 - 4ac$, for the quadratic equation : $x^2 - x - 72 = 0$
4. Do as directed:
 - (i) Tomato is red and sky is blue. (Write down the negation of the statement)
 - (ii) If $a = b$ then $a^2 = b^2$. (Express the statement in symbolic form)
5. How many distinct words can be formed from the letters of the word 'CAT'?
6. If $f(x) = 5x^2 + 23$. Check whether the function is even or odd?

Q.2. Solve (Any 3)**(9)**

1. If $f(x) = 3x^2 - 1$. Find $f(f(-1))$.
2. In an A.P. if the first term is 24 and common difference is 5, find t_{10} & t_{24} .
3. If $P(A) = \frac{1}{21}$, $P(B) = \frac{10}{21}$ and $P(A \cap B) = \frac{5}{21}$ Find : (i) $P(A \cup B)$ (ii) $P\left(\frac{A}{B}\right)$
4. How many four digit numbers can be formed with the help of numbers 0,1,2,3,4,5,6 and 9 if the repetition of the digits is (i) allowed (ii) not allowed.

Q.3. Solve (Any 2) (8)

1. A card is drawn from a well shuffled pack of 52 cards, find the probability that a card drawn is (i) a jack card. (ii) a club card.
2. With the help of truth tables, show that : $\sim (A \vee B) \equiv (\sim A) \wedge (\sim B)$
3. If $A = \{10, 20, 30, 40\}$, $B = \{30, 40, 50, 60, 70\}$ and universal set $U = \{10, 20, 30, 40, 50, 60, 70, 80, 90\}$. Find $(A \cup B)^c$ and $(A \cap B)^c$

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

1. If $f(x) = 3 - 2x$ and $g(x) = 5x + 2$. Find $f \circ g(2)$ & $g \circ f(2)$. Comment on the result.
2. For the sequence 14, 11, 8, 5, ...
Find: (i) a (ii) common difference (iii) t_n (iv) S_n (v) t_{30}
3. How many ways a committee of 4 members can be formed from 10 boys if
(i) Two particular students A and B should be always there in a committee.
(ii) Two particular students A and B should never be there in a committee.
4. Two cards are drawn at random from a well shuffled pack of 52 cards. Find the probability of the following events, if the cards are drawn at the same time (i) both are spade cards. (ii) both are black cards.

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

1. Two dice are thrown. Find the probability of the following events:
(i) Both the dice shows the same digits.
(ii) The number on the first die is greater than the number on the second die.
(iii) The numbers on both the dice are prime numbers.
(iv) The sum of the scores on both the dice is 10.
(v) The sum of the scores on both the dice is a perfect square number.
2. Solve the system of linear equations with the help of Cramer's Rule:
 $2x + 3y + z = 13$, $2x + y - 3z = 5$ and $8x - 5y - z = 13$.
3. If $A = \{10, 20, 30, 40\}$, $B = \{30, 40, 50\}$ and universal set $U = \{10, 20, 30, 40, 60, 70, 80, 90, 100\}$. Verify the following results:
(i) $(A \cup B)^c = (A^c \cap B^c)$
(ii) $(A \cap B)^c = (A^c \cup B^c)$