CB
60:40

TILAK MAHARASHTRA VIDYAPEETH, PUNE

BACHELOR OF COMPUTER APPLICATIONS (B.C.A.)

SPECIALIZATION IN CYBER SECURITY(CS)

EXAMINATION : MAY - 2024

SEMESTER – I

Sub: Mathematics

(BCA-142-18/BCA-142-20/ BCA-CS-142-20/ BCA23-102/ BCAC23-102)

Date : 24/05/2024 **Total Marks : 60** **Time: 2.00 pm To 4.30 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. If A and B are two finite sets, then n (A) + n (B) is equal to?
2. Find the domain of $f(x) = x/x^2 - 9$
3. Find transpose of the Matrix

a) $\begin{vmatrix} 1 & 2 & 3 \\ 4 & 5 & 0 \\ -1 & 2 & 3 \end{vmatrix}$ b) $\begin{vmatrix} 1 & -1 & 2 \\ 3 & 0 & 1 \end{vmatrix}$

4. What is the probability of getting a sum of 7 when two dice are thrown?
5. Draw Venn diagram for Double Implication
6. Write Equations for De-Morgan's Law

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

1. If $T_n=3n^2+4n+7$, Find T_4, T_9,T_{13}
2. Check if the following function is Even: $f(x) = 3x+5$
3. If A and B are two events such that P(AUB)=5/6,P(A∩B) =1/3 and P(B') =1/3 Find P(A)
4. Find the modulus of (2+i) (3-5i)

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

1. There are 7 English, 5 Marathi and 4 Sanskrit books. In how many ways can they be arranged on a shelf, so that all the books of the same language are together
2. Check if the following Matrices are Singular:

$B=\begin{vmatrix} 1 & 2 & 3 \\ 4 & 5 & 0 \\ 5 & 7 & 3 \end{vmatrix}$ $A=\begin{vmatrix} 2 & 4 \\ 6 & 12 \end{vmatrix}$

3. In how many ways can letters of the word MOBILE be arranged? In many of these the consonants occupy the even places?

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

1. Evaluate $\sum r\,(r+1)\,(r+3)$
2. Factorize : x^2+2x+5
3. The probability that a person stopping at a petrol pump will ask for petrol is 0.80 and the probability that he will ask for water is 0.70 and the probability that he will ask for both is 0.65. Find the probability that a person stopping at the petrol pump and will ask neither petrol nor water
4. Among a set of 5 black balls and 3 red balls, how many selection of 5 balls can be made such that at least 3 of them are black balls

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

1. A purse contains 4 silver coins and 5 copper coins. Another purse contains 3 sliver and 4 copper coins. A purse is selected at random and a coin is drawn at random. What is the probability that it is a copper coin?
2. Solve using Cramer's rule
   $x+y+4z = 4$,

   $2x+3y+6z = 5$,

   $3x+2y+z = -4$
3. Find the nature of roots of the following equation. If they are real find them:
   a) $3x^2-2x+13=0$
   b) $3x^2-6x+2=0$