CB

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SPECIALIZATION IN CYBER SECURITY(CS)
EXAMINATION : DECEMBER/JANUARY – 2023-24
SEMESTER – I
Sub: Mathematics (BCA –142-18/142-20/BCA-CS-142-20)

Date : 02/01/2024   **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. Let U = {1, 2, 3, 4, 5, 6, 7, 8, 9}, A = {1, 2, 3, 4} and B = {2, 4, 6, 8}.
   (i) Find A'   (ii) Find B'

2. If f (x) = 2x and g(x) = x+1, then find (f∘g) (x) if x = 1.

3. Find the total number of distinct permutations of the letters of the word CONSTITUTION

4. Find the modulus of Z= 3+2i

5. Two fair dice are rolled. The probability that the maximum of the two numbers is greater than four is?

6. Draw Venn diagram for All X's are Y's

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

1. A Committee of 4 boys and 3 girls is to be formed from a group of 8 boys and 5 girls selecting randomly. What is the probability that the committee contains a particular boy and a particular girl?

2. Solve: (2+3i)(4-7i)

3. Find r if $21C_r = 21C_{3r-3}$

4. Find the image of following functions

   $F(x) = 2x^2 - 3x + 4$. Find f (1), f (0), f (-1), f (-2), f (2)

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

1. Find the three numbers in AP such that their sum is 15 and their product is 105

2. Solve A-B

$$A = \begin{vmatrix} 5 & 4 & -4 \\ 6 & 5 & 7 \\ -4 & 2 & 5 \end{vmatrix} \qquad B = \begin{vmatrix} -6 & -2 & 1 \\ 6 & 0 & -2 \\ 8 & -4 & -3 \end{vmatrix}$$

3. Find Tn and Sn for the following AP: -29, -25, -21, -17…….

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

Draw graph of the following functions

1.   F(x) = 3+ 2x when x<0

= 3-2x when x>0

2.   Solve: $9x^2+60x+100=0$

3.   In a class, 35% of the students study science and history. 65% of the students study science. What is the probability of a student studying history given he/she is already studying science?

4.   Determine the nature of roots of the following equation:
$9x^2+9x-4 = 0$

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

1.

Of 10 girls in a class, 3 have blue eyes. If 2 of the girls are chosen at random, the probability that:

a.   Both have blue eyes is?

b.   Neither has blue eyes is?

c.   At least one has blue eyes is?

2.

Solve the following 2A-3AB+3C if

$$A= \begin{matrix} 1 & 2 & 2 \\ 1 & -1 & 0 \\ 3 & 2 & 1 \end{matrix} \qquad B = \begin{matrix} -1 & 2 & 3 \\ 3 & 1 & 2 \\ 4 & 1 & -1 \end{matrix} \qquad C = \begin{matrix} -1 & 0 & 1 \\ 1 & 2 & 1 \\ 3 & 3 & 2 \end{matrix}$$

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

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