1101E1110

Candidate's Seat No :_____

M.Sc IT BIA Sem.-1 Examination

BIAMSC-06

Mathematical Found of CS

January-2024

Time : 2-30 Hours] **[Max. Marks : 70**

Instructions:

Figures to the right indicate full marks.

Q.1 Answer the following Questions. (Any Two) **(7*2 Marks)**

A) Among a group of students, 50 played cricket, 50 played hockey and 40 played volley ball. 15 played both cricket and hockey, 20 played both hockey and volley ball, 15 played cricket and volley ball and 10 played all three. If every student played at least one game, find the number of students and how many played only cricket, only hockey and only volley ball? (Venn Diagram require)

B) Three unbiased coins are tossed. Find the probability of getting (i) exactly two heads, (ii) at least one tail, (iii) at most two heads, (iv) a head on the second coin, and (v) exactly two heads in succession.

C) Set A= {3,4,5,6,7,8}, Universal Set= {x:x≤10, x is natural number}, B= {Prime number between 1 to 10}. Do the following operation.

1) Number of subsets in set B and write proper subset of B.
2) Find n(p(p(p(B))))

Q.2 Answer the following Questions. (Any Two) **(7*2 Marks)**

A) In a bolt factory, machines A, B, C manufacture 25%, 35%, and 40% of the total output and out of the total manufacturing, 5%, 4%, and 2% are defective bolts. A bolt is drawn at random from the product and is found to be defective. Find the probabilities that it is manufactured from (i) Machine A, (ii) Machine B, and (iii) Machine C.

B) Bag A contains 2 white and 3 red balls, and Bag B contains 4 white and 5 red balls. One ball is drawn at random from one of the bags and it is found to be red. Find the probability that the red ball is drawn from the bag B.

C) How many words can be formed by using all the letters of the word 'DAUGHTER so that the vowels always come together?

Q.3 Answer the following Questions. (Any Two) **(7*2 Marks)**

A) Find the value of a, b, c and d from the equation:

$$\begin{bmatrix} 2a+b & a-c \\ a-3b & c-3d \end{bmatrix} = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$$

B) A, B, C are three matrixes, Prove that (A + B) – C =A + (B - C) if

$$A = \begin{bmatrix} 3 & 2 & -1 \\ 4 & 5 & 6 \\ 4 & 3 & 1 \end{bmatrix}, B = \begin{bmatrix} 0 & 5 & -4 \\ 9 & 4 & 2 \\ 5 & 1 & 0 \end{bmatrix} \text{ and } C = \begin{bmatrix} 1 & 2 & 3 \\ 6 & 7 & 8 \\ 3 & 5 & 9 \end{bmatrix}$$

C) A, B are matrix, Find the Determinant of matrix A and B. Then prove that $(A+B)^T = A^T + B^T$ if

$$A = \begin{bmatrix} 1 & 9 & 0 \\ 4 & 8 & 1 \\ 5 & 6 & 2 \end{bmatrix} \text{ and } B = \begin{bmatrix} 0 & 3 & -5 \\ 1 & 7 & 4 \\ 8 & 4 & 2 \end{bmatrix}$$

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Q.4 Answer the following Questions. (Any Two) **(7*2 Marks)**

A) What is the mean, median, mode, variance and standard deviation of the following data
18, 24, 84, 24, 65, 94, 65, 28, 95, 87, 34, 76, 65

B) Find Variance and standard deviation of the following data:
12, 23, 65, 76, 45, 76, 21, 98, 15, 87, 11, 85, 76

C) Find Five-point Summary for the following data:
12, 23, 65, 76, 45, 76, 21, 98, 15, 87, 11, 85, 76

Q.5 Answer the following Questions. **(2*7=14)**

A) Explain Transpose of matrix with example.
B) Explain Trial and event.
C) Explain Exhaustive event with example.
D) Write types of Sets.
E) Explain Cardinal number with example.
F) Find the Euclidean distance between two points P(0, 4) and Q(6, 2).
G) Find dy/dx for the following:
$y = x^3 (4x - 3)$