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**First Year BCA(Science)**  
**BCA11406 Applied Mathematics and Statistics**  
**(Semester I)**

**Program:** BCA  
**Program Specific:** BCA(Science)  
**Course Type:**  
**Paper:**

**Credits:** 2  
**Time:** 2 Hours  
**Max. Marks:** 30  
**SET:** A

**Instructions to the candidate:**

- 1) All questions are compulsory.
- 2) Figures to the right indicate full marks.
- 3) Draw a well labelled diagram wherever necessary.

**SECTION: A**

**Q1) Answer the following**

**[5 X 1= 5]**

1. Let A be the set of prime numbers less than 20. Find cardinality of A.
2. Write the converse and inverse of  $p \rightarrow q$ .
3. Define inclusive Methods of classification.
4. Define type I error and type II error.
5. Interpret given Regression line  $Y = -1.2X + 5$  where, X=supply and Y= price(₹)

**SECTION: B**

**Q2) Answer the following (Attempt any 5/7)**

**[5 X 2 =10]**

1. In a population of size  $N=3$ , the observations are A,B,C. Draw all possible SRSWOR & SRSWR of size 2.
2. State theorems of probability.
3. Compute standard deviation for the following data:  
15,18,22,25,10
4. Let p: Today is holiday; q: I go to movie  
Translate each of the following in symbolic form:  
I. If I go to the movies, then today is a holiday.  
II. If today is a holiday, then I go to the movies.
5. Let  $A = \{1,2,3,4,5,6\}$ . A relation R is defined on the set A as below.  $aRb$  if and only if a is multiple of b. Find domain and range of R. (write set R)
6. A card is drawn from an ordinary pack of 52 playing cards. What is the probability that it is a king; given that it is a face card?[A face card is either jack, a queen or a king]
7. Let  $A = \{x \in \mathbb{N} \mid 2 \leq X \leq 4\}$ ,  $B = \{x \in \mathbb{N} \mid 1 \leq X \leq 5\}$   
Find  $A \cap B$ ,  $A \cup B$

**SECTION: C**

**Q3) Answer the following/Write short notes on following (Attempt any 2/4)**

**[2 X 5 = 10]**

1. Classify which of the following sets are empty and non-empty set with justification
  - (i)  $\{x/x \text{ is real number and } x^2 - 1 = 0\}$
  - (ii)  $\{x/x \text{ is real number and } x^2 + 1 = 0\}$
  - (iii)  $\{x/x \text{ is real number and } x^2 = -9\}$
  - (iv)  $\{x/x \text{ is real number and } x = 2x + 1\}$
  - (v)  $\{x/x \text{ is real number and } x = x + 1\}$
2. Find the number of ways to choose:
  - (i) 3 out of 7 days with repetition
  - (ii) 7 out of 3 days with repetition
3. Compare the average run and standard deviation scored by cricketers A and B using arithmetic mean and variance.

Cricketer	Runs Scored				
A	5	20	90	75	100
B	40	35	60	65	50

4. Let A, B, C be any three events on sample space  $\Omega$ . Write expressions for the events,
  - i) At least one of the events A, B, C occurs.
  - ii) Only A occurs.
  - iii) A and B occur but not C.
  - iv) All three events occur.
  - v) none of the above event occurs

**SECTION: D**

**Q4) Answer the following (Attempt any 1/2)**

**[5 X 1 = 5]**

1.  $A = \{1, 2, 3, 4, \dots, 8\}$  and  $B = \{1, -1, 2, -2, 3, -3\}$  A relation R from A to B defined by  $aRb$  if and only if  $a = b^2 + 1$ . classify which of the following pairs belong to R:
  - (a) (5, -2)   (b) (1, -1)   (c) (10, 3)   (d) (1, 0)   (e) (2, 2)   (f) (2, 1)
  - (g) (8, 2)   (h) (4, -1)   (i) (3, 0)   (j) (5, 3)
2. State all 9 properties of regression coefficients and explain any 4 properties with proof

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