Reg. No. ☐☐☐☐☐☐☐☐☐

BCACAC 285

Choice Based Credit System Fourth Semester B.C.A. Degree Examination, September 2022
(2020-21 Batch Onwards)
BUSINESS STATISTICS AND MATHEMATICS

Time : 3 Hours

Max. Marks : 80

Note : a) Answer **any ten** questions from Part – **A** and **one full** question from **each** Unit of Part – **B**.

b) **Scientific** calculator is **allowed**.

PART – A

(10×2=20)

1. a) How do you describe set using selector method ? Give example.

 b) Write the Venn diagram for

 i) A ∩ B where A = {1, 2, 3} and B = {4, 5, 6}.

 ii) A ∪ B where A = {P, Q} and B = {M, N, P, Q, R, S}.

 c) If A = {a, b, c}, B = {b, c, d}, C = {d, e, f, g}. Find A – (B – C) and (C – B) – A.

 d) Differentiate scalar and vector quantities. Give example for each.

 e) What is meant by triangle law of vector addition ?

 f) Find the angle between the vectors.

 a = i + 2j + 2k and b = i – 2j + 2k.

 g) Define Statistics.

 h) What is a frequency polygon ?

 i) What is Range ? Write two uses of Range.

 j) Write any two applications of Harmonic Mean.

 k) What is meant by mutually exclusive events ? Give an example.

 l) State the Addition Law of Probability.

P.T.O.

PART – B

Unit – I

2. a) Explain equivalent sets, family of sets and power sets. Give example.

   b) Find the elements of sets A, B, C if A $\cup$ B = {p, q, r, s}, A $\cup$ C = {q, r, s, t}
   A $\cap$ B = {q, r} and A $\cap$ C = {q, s}.

   c) Write the De Morgan's laws. Prove De Morgan's law of complement of
   intersection is union of complements.   **(5+4+6)**

3. a) Write a note on symmetric difference.

   b) Prove that (A $\cap$ B) $\cap$ C = A $\cap$ (B $\cap$ C). Also illustrate it using Venn diagram.

   c) What are the properties of complements ? Express each with symbolic
   expression.   **(4+5+6)**

Unit – II

4. a) The position vectors of four points P, Q, R, S are a, b, 2a + 3b, 2a – 3b
   respectively. Express the vectors $\overrightarrow{PR}, \overrightarrow{RS}$ and $\overrightarrow{PQ}$ in terms of a and b.

   b) Explain various properties of vector addition.

   c) Show that scalar product of vector satisfies distributive law of multiplication.
                                                                  (4+5+6)

5. a) Write a note on Reciprocal vector and Coplanar vector.

   b) Explain any five properties of scalar product of vectors.

   c) If a = 3i – j + 2k, b = 2i + j – k, c = i – 2j + 2k find (a $\times$ b) $\times$ c and a $\times$ (b $\times$ c).
   Also show that they are not equal.   **(5+5+5)**

Unit – III

6. a) Explain the functions of Statistics.

   b) Find the Geometric Mean and Harmonic Mean from the following data :

Items :	1	2	3	4	5	6	7	8	9	10
Value :	15	250	15.7	157	1.57	105.7	105	1.06	25.7	0.257

   c) Calculate the coefficient of variation from the following data :

No. of days absent :	0-5	5-10	10-15	15-20	20-25	25-30
No. of Students :	29	140	250	108	52	21

                                                                  (5+5+5)

7. a) Form a frequency distribution for the following data by exclusive method :

30	42	30	54	40	48	15	17	51	42	25
41	30	27	42	36	28	26	37	54	44	31
36	40	36	22	30	31	19	48	16	42	32
21	22	40	33	41	21					

b) Calculate the Arithmetic Mean, Median and Standard Deviation for the following distribution.

Height (inches)	No. of persons	Height (inches)	No. of persons
60 less than 63	4	69 less than 72	33
63 less than 66	14	72 less than 75	8
66 less than 69	59	75 less than 78	2

(5+10)

Unit – IV

8. a) Explain any two approaches to probability.

b) Explain Bayes' theorem of probability.

c) A study showed that 65 percent of managers had some business education and 50 percent had some engineering education. Furthermore, 20 per cent of the managers had some business education but no engineering education. What is the probability that a manager has some business education, given that he has some engineering education ? **(5+5+5)**

9. a) Write a short note on Events.

b) Explain the basic probability rules.

c) A factory produces a mechanism which consists of three independently manufactured parts. It is known that 1 percent of part one, 4 percent of part two and 3 per cent of part three are defective. What is the probability that a complete mechanism is not defective ? **(5+5+5)**

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