Reg. No…… Name……

B A, B SC, B COM DEGREE END SEMESTER EXAMINATION - APRIL 2025

UGP (HONS.) SEMESTER - 2: CORE COURSE

COURSE: 24BCADCC104 – STATISTICAL METHODS FOR COMPUTATIONAL ANALYSIS

(For Regular 2024 Admission)

Time: 2 Hours Max. Marks - 70

(Use of non-programmable scientific calculator is permitted)

PART A

Each question carries 2 marks. Maximum marks from this part is 10

1. Write any two desirable properties of a good measure of central tendency. (R,CO1)
2. Define coefficient of variation. (U,CO2)
3. Distinguish between positive and negative skewness. (U,CO2)
4. What are the limits within which correlation coefficient must lie? What is meant by perfect correlation? (R,CO3)
5. Define mutually exhaustive event events and provide a suitable example. (R,CO4)
6. What is the probability of drawing either a king or a queen in a single draw from a well shuffled pack of 52 cards? (4,COA)
7. Define probability density function. (R,CO5)
8. What do you mean by the characteristic function of a random variable X? (U,CO6)

PART B

Each question carries 5 marks. Maximum marks from this part is 30

9. Obtain the values Median and the two quartiles of the following data. (A,CO1, 2)

   391, 384, 591, 407, 672, 522, 777, 2488, 1490

10. Given n=9, $\sum x = 72$, $\sum y = 60, \sum xy = 520, \sum x^2 = 576, \sum y^2 = 600$. Obtain the regression equation y on x. (A,CO3)
11. The average score and the standard deviation of runs scored by two cricket teams are given below:

    Team P : Based on 30 matches, the average score is 280 runs and the standard deviation is 40.

    Team Q : Based on 25 matches, the average score is 320 runs and the standard deviation is 60.

    Compare the stability of the two teams in terms of their scores. (A,CO1,2)
12. State and prove the addition theorem of probability for two events. (R,CO4)
13. A card is drawn from a pack of 52 cards. Find the probability of getting a king or a heart or a red card. (A,CO4)

14. X is a discrete random variable having the following probability distribution.

x	0	1	2	3	4	5	6	7
p(x)	0	k	2k	3k	8k	4k	2k	7k

i) Find the value of k ii) Find P(1<X<5) (E,CO5)

15. Three unbiased coins are tossed. Find the expectation of the number of Heads. (E,CO4)

16. Explain moment generating function of a random variable.
Also state its properties. (U,CO6)

PART C

Each question carries 15 marks. Maximum marks from this part is 30.

17. The following data refer to the dividend paid by two companies A and B over the last 7 years. Calculate the coefficient of variation and comment which company is more consistent in paying the dividend. (An,CO1,2)

A	4	8	4	15	10	11	9
B	12	8	3	15	6	4	10

18. With the help of correlation analysis, find the correlation between the age and glucose level given in the following data. Also comment on the type of correlation. (A,CO3)

Age	43	23	22	47	50	60
Glucose Level	98	68	73	79	88	82

19. (a) State and prove Bayes Theorem (A,CO4)

(b) A company has two factories, Factory 1 and Factory 2, that produce the same product. Factory 1 produces 60% of the total products, while Factory 2 produces the remaining 40%. The probability that a product from Factory 1 is defective is 2%, while the probability that a product from Factory 2 is defective is 5%.
If a randomly chosen product is defective, what is the probability that it came from Factory 1?

20. The joint p.d.f. of the random variable pair (X,Y) is f(x,y) = $\frac{x+y}{21}$, (A,CO5)
x = 1,2,3, y= 1,2
Find (i) Marginal distributions
(ii) Examine the independence of X and Y
(iii) f (x/y =2)