

END SEMESTER EXAMINATION : NOVEMBER 2023
SEMESTER 3 : INTEGRATED M.Sc. PROGRAMME COMPUTER SCIENCE
COURSE : 21UP3CPSTA01 :PROBABILITY AND STATISTICS

(For Regular 2022 Admission and Improvement / Supplementary 2021 Admission)

Time : Three Hours

Max. Weightage: 30

PART A
Answer any 8

1. What is the correlation coefficient between the pairs of points (2,5) and (3,1)?
2. The mean mark of 100 students was found to be 50. Later on it was found out that a score of 87 was misread as 78. Find the correct mean
3. Give axiomatic definition of probability
4. The mean weight of 150 students (both boys and girls) in a class is 60 kg. The mean weight of boys is 70kg. and the girls is 55kg. Find the number of boys and girls?
5. Define classification and tabulation of data?
6. Define frequency density of a class
7. Define marginal distributions
8. Distinguish between census and sampling
9. Find k, if $f(x,y) = k$, $0 < x < 1$, $0 < y < 1$ is a joint probability density function.
10. Find the A.M. and S.D. of the natural numbers from 1 to 11.

(1 x 8 = 8 weight)

PART B
Answer any 6

11. Show that correlation coefficient is invariant under linear transformation
12. Define mathematical expectation? State its properties?
13. Find the coefficient of correlation if the regression equations are $3x+11y-7=0$ and $3y+8x+16=0$
14. There are two options in a game. If the player wins (1) he will get Rs.200 with probability 0.7 and Rs.500 with probability 0.3, (2) he will get an assured amount Rs.300. Which option is beneficial for the player?
15. Define simple random sampling. Distinguish between simple random sampling with and without replacement.
16. Briefly explain different types of scaling techniques.
17. The mean of a distribution is 15 and variance is 25. Also given that $\beta_1 = 1$. Find the third moment about origin ?
18. Show that the arithmetic mean is never less than and the geometric mean, again geometric mean is never less than the harmonic mean

(2 x 6 = 12 weight)

PART C
Answer any 2

19. (a) Explain Skewness? How is it measured? (b) calculate the Karl Pearson's coefficient of skewness from the following data

class	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80
No.	6	12	22	48	56	32	18	6

20.

Explain the concept of regression. Obtain the regression equation of Y on X

Y : 9 8 10 12 11 13 14 16 15

X : 1 2 3 4 5 6 7 8 9

21. What are the different methods for collection of primary data?
22. A continuous random variable X has the following density function,
 $f(x) = ax, 0 \leq x \leq 1$
 $= a, 1 \leq x \leq 2,$
 $= -ax + 3a, 2 \leq x \leq 3$
 $= 0$ elsewhere
- (1) Determine the constant a (2) obtain the distribution function
(3) sketch the graphs of $f(x)$ and $F(x)$

(5 x 2 = 10 weight)