SECOND SEMESTER B.Voc. DEGREE EXAMINATION, APRIL 2021

(Regular/Supplementary/Improvement)

C01 - BASIC STATISTICS AND PROBABILITY

(B.Voc.– Information Technology)

(2018 Admission onwards)

Time: Three Hours   Maximum: 80 Marks

Part A

Answer *all* questions. Each question carries 1 mark.

Fill up the blanks:

1. ………….… is the best average to analyse speed and rates

2. ………….… is the positional average

3. The range of simple correlation coefficient is ………….…

4. If A and B are Independent $P(A|B) = \cdots$

5. Total area under a probability curve is ………….…

Write true or false:

6. Standard Deviation is not affected by change of origin and scale

7. If r_{XY}=0 then the variables X and Y are said to be uncorrelated

8. Correlation coefficient is the arithmetic mean of regression coefficients

9. If $A \subset B$ then $P(A) \leq P(B)$

10. In a moderately asymmetric distribution mean, median and mode are same.

(10 x 1 = 10 Marks)

Part B

Answer any *eight* questions. Each question carries 2 marks.

11. Name the various measures of central tendency.

12. Define harmonic mean

13. Distinguish between population and sample

14. Define quartiles

15. Define principle of least squares

16. What are the two regression lines?

17. Give the Spearman's Rank correlation formula.

18. Define random experiment with an example

19. State the addition theorem for two events

20. Write the sample space of tossing three coins.

21. Define probability mass function

22. Write any two properties of a distribution function of a random variable

(8 x 2 = 16 Marks)

Part C
Answer any *six* questions. Each question carries 4 marks.

23. Explain the properties of a good average.

24. In a moderately asymmetric distribution mean is 24.6 and median is 25.1. Find the mode.

25. Compute quartile deviation for the following data

X	10	20	30	40	50	60
f	4	7	15	8	7	2

26. Prove that the correlation coefficient is independent of the change of origin and scale

27. Fit a Straight line $Y = aX + b$ to the following data

X	1	2	3	4	5	6	7
Y	7	13	19	25	32	40	50

28. If A and B are two independent events then show that

a. A and B^C are independent

b. A^C and B^C are independent

29. A Problem is given to 3 students A, B, and C whose chances of solving it are ½, ¾ and ¼ respectively. What is the probability that the problem is solved?

30. Write down the Properties of probability density function (pdf)? Check whether the following function, a pdf. $f(x) = \theta e^{-\theta x}, x \geq 0$

31. A random variable X has pmf $f(x) = kx$ when $x = 1,2,3,4,5$. Determine the value of K and also find it's cumulative distribution function.

(6 x 4 = 24 Marks)

Part D
Answer any *two* questions. Each question carries 15 marks.

32. a. Define Coefficient of Variation.

b. From the data given below which series is more consistent

Classes :	10-20	20-30	30-40	40-50	50-60	60-70
Series A:	10	16	30	40	26	18
Series B:	22	18	32	34	18	16

33. Given the two equations for the regression lines:

$$8x - 10y + 66 = 0 \ and \ 40x - 18y - 214 = 0$$

a. Identify the regression lines

b. Obtain the regression coefficients and the correlation coefficient.

c. Find the mean of X and the mean of Y

d. Given the standard deviation of X =4, Find the standard deviation of Y.

34. a. State and Prove Bayes Theorem

b. An urn is selected at random from the collection of three urns of which the first contains 1 white and 2 black balls, the second contains 2 white and 1 black ball and the third contains 2 white and 2 black balls. Then a ball is drawn from the selected urn was found to be white. What is the probability that it came from third urn?

35. a. Probability density function for a random variable X is given by

$$f(x) = 3ax^2, 0 \leq x \leq a$$

Find a and $P(X \leq \frac{1}{2} \mid \frac{1}{3} \leq X \leq \frac{2}{3})$

b. Let X be a random variable with p.d.f $f(x) = \frac{1}{\sqrt{2\pi}} e^{\frac{-x^2}{2}} - \infty < X < \infty$. Find the density function of $Y = X^2$

(2 x 15 = 30 Marks)

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