JHARKHAND Rai University
RANCHI

Practice Set

Subject: Mathematics
Program: CSE / B. Tech - III
Course: – Mathematics III (Probability & Statistics)
Subject code: – 3BSC201

End Semester Examination, December 2025

Course Objective:

The objectives of this course are:

- To tabulate statistical information given in descriptive form and to use graphical techniques to interpret
- To compute various measures of central tendency, dispersion, skewness and kurtosis.
- To find the probabilities of events.
- To analyze data pertaining to discrete and continuous variables and to interpret the results.
- To obtain a probability distribution of random variable (one or two dimensional) in the given situation.

UNIT – 1

1. If a die is thrown, the probability of getting 5 or 6 is (CO3) Understand [LOT]

(a) 1 /2 (b) 1/3 (c) 2/3 (d) 1/4

2. If P(A) = 1/4, P(B) = 1/3, and P(A ∩ B) =1/5 then P(A U B)= (CO2) Understand

(a) 23/60 (b) 17/60 (c) 1/10 (d) 1/4

3. If A and B are independent events P(A) = 1/ 4 and P(A U B) = 2/3 then P(B) is (CO3) Understand [LOT]

(a) 1/9 (b) 1/3 (c) 5/9 (d) 7/9

4. The mean of the binomial distribution with parameter 'n' and 'p' is CO4) Remember [LOT]

(a) np (b) npq (c) $(npq)^{1/2}$ (d) $(np)^{1/2}$

5. The variance of the binomial distribution with parameter 'n' and 'p' is **(**CO4) Remember [LOT]

(a) np (b) npq (c) $(npq)^{1/2}$ (d) $(np)^{1/2}$

6. The standard deviation of the binomial distribution with parameter 'n' and 'p' is (CO4) Remember [LOT]

(a) np (b) npq (c) $(npq)^{1/2}$ (d) $(np)^{1/2}$

7. The mean of binomial distribution is 4 and variance is 2 then, p is (CO4) Understand [LOT]

(a) 1/ 3 (b) 1/2 (c) 1/4 (d) 3/4

8. If probability density function $f(x) = x^2/9$ in $0 < x < 3$, then mean is (CO4) Understand [LOT]

(a) 1/ 4 (b) 3/4 (c) 5/4 (d) 9/4

9. If the random variable x has the following probability distribution (CO2) Understand [LOT]

X	0	1	2	3
P(x)	$2k^2$	$3k^2$	$5k^2$	$6k^2$

(a) 1/ 5 (b) 1/6 (c)± 1/4 (d) ±1/5

10. If 'a' is a constant then V(a) is

(a) a (b) a^2 (c) $a^{1/2}$ (d) none of these

11. If X and Y are two random variables and a and b are constants then E(a) is (CO4) Remember [LOT]

(a) a (b) a^2 (c) 0 (d) none of these

12. If X and Y are two random variables and a is constant then V(aX) is (CO4) Remember [LOT]

(a) aV(X) (b) a^2 V(X) (c) $a^{1/2}$ (d) 0

13. If X and Y are two random variables and a and b are constants then V(aX + b) is (CO4) Understand [LOT]

(a) aV(X) (b) a^2 V(X) (c) bV(X) (d) b^2 V(X)

14. A continuous function X has the probability density function given by $f(x) = cx^2$, $0 \leq x \leq 1$ then the value of c is (CO4) Understand [LOT]

(a) 1 (b) 2 (c) 3 (d) 4

15. The distribution of a random variable X is as follows: (CO2) Understand [LOT]

X	1	2	3	4
P(X=x)	c	2c	3c	4c

Then the value of c is

(a) 1/ 10 (b) 1/5 (c) 3/10 (d) 2/5

16. If $V(X) = \sigma^2$, then V(ax + b) =

(a) aV(x) + b (b) a^2 V(x) (c) a^2 V(x) + b (d) none of these (CO4) Understand [LOT]

17. A coin is tossed 6 times the probability of obtaining 4 or more bonds is

(a) 9/32 (b) 10/32 (c) 11/32 (d) 12/32 (CO2) Understand [LOT]

18. If A and B are two events such that P(A) is 1/3, P(B) is 3 /4, and (A U B) = 11/12, then P(A/B) is

(a) 1/9 (b) 1/3 (c) 4/9 (d) 2/9 (CO2) Understand [LOT]

X	1	2	3	4	5
P(X)	0.1	0.1	0.3	0.3	0.2

19. P($\bar{A} \cap$ B) =

(a) P(A) – P(B) (b) P(A) – P(A ∩ B) (c) P(B) – P(A ∩ B) (d) P(B) – P(A) (CO2) Understand [LOT]

20. From 25 tickets marked 1 to 25, a ticket is drawn at random. What is the probability that it is divisible by 3 or 7,

(a) 8/25 (b) 7/25 (c) 6/25 (d) 2/5. (CO2) Understand [LOT]

10 MARKS QUESTION

21. A bag contains 5 red balls, 8 blue balls and 11 white balls. Three balls are drawn together from the box. Find the probability that (a) Two white and one red ball (b) one of each. (CO3) Apply [HOT]

22. If A and B are events such that $P(A) = \frac{1}{3}, P(B) = \frac{1}{4}, P(A \cap B) = \frac{1}{5},$ Evaluate

$(a)P(A/B)$ $(b)P(B/A)$ $(c)\ P(A \cup B)$ $(d)\ P(\bar{B}/\bar{A})$ (CO3) Apply [HOT]

23. For any events A and B, Show that

(a) $P(\bar{A} \cap B) = P(B) - P(A \cap B)$ $(b)\ P(A \cap \bar{B}) = P(A) - P(A \cap B)$ (CO2) Apply [HOT]

24. An integer is chosen at random from the first 200 positive integers. What is the probability that the integer chosen is divisible by 6 or 8? (CO2) Apply [HOT]

25. Evaluate mean and variance of the discrete random variable X whose probability distribution is given below: (CO3) Apply [HOT]

X	1	2	3	4	5
P(X)	0.1	0.1	0.3	0.3	0.2

26. A continuous random variable has the probability density function $f(x) = kxe^{-\alpha x}\ if\ x \geq 0, \alpha > 0,$ and 0 otherwise. Determine the constant k and mean and variance. (CO4) Apply [HOT]

27. The mean and variance of Binomial variable X with parameters n and p are 16 and 8. Evaluate$P(X > 2)$

Apply CO4[HOT]

20 Marks Questions: -

28. (a) Calculate the in bolt factory machines A,B, and C manufacture respectively 25%, 35% and 40% of the total. If their output 5, 4 and 2 per cent are defective bolts. A bolt is drawn at random from the product and is found to be defective. What is the probability that it was manufactured by machine B.

(b) A class consist of 6 girls and 10 boys, if a committee of 3 is chosen at random from the class, find the probability that (a) exactly 3 boys are selected (b) Exactly 2 boys are selected (c) At least one boys is selected (d) Exactly 2 girls is selected (e) Exactly 3 girls are selected. (CO3) Analyze [HOT]

29.(a) Write conditions to apply binomial distribution.

(b) The probability of a bomb hitting a target is 1/5. If six bombs are fired at the bridge, find the probability that the bridge is destroyed. (CO2) Analyze [HOT]

30. (a) Write conditions to apply Poisson's distribution.

(b) It is given that 2% of the screws manufactured by a company are defective. Use Poisson distribution to find that a packet of 100 screws contains: (i) no defective screws (ii) one defective (iii) two or more defectives.

(CO4) Analyze [HOT]

UNIT - 2 -

31. Which of the following is not a measure of dispersion? CO 1Remember [LOT]
(a) Range (b) Variance (c) Mean deviation (d) Mean

32. Quartile deviation is — CO 1Remember [LOT]
(a) Half of the interquartile range (b) Twice the interquartile range (c) Equal to range (d) None of these

33. The most commonly used measure of dispersion is — CO 1Remember [LOT]

(a) Range (b) Quartile deviation (c) Standard deviation (d) Mean deviation

34. Variance is — CO 1Remember [LOT]
(a) The square of standard deviation (b) The square root of standard deviation

(c) Twice the standard deviation (d) None of these

35. The symbol for variance is — CO 1Remember [LOT]

A) σ B) σ^2 C) μ D) Σ

36. Standard deviation is denoted by —
(a) σ (b) σ^2 (c) μ (d) SD^2 CO 1Remember [LOT]

37. The coefficient of variation (C.V.) is — CO 1Remember [LOT]
(a) (Mean / SD) × 100 (b) (SD / Mean) × 100 (c) (Median / Mean) × 100 (d) (Range / Mean) × 100

38. The coefficient of variation is used to — CO 1Remember [LOT]

(a) Compare variability (b) Find mean (c) Find range (d) None

39. If all observations are equal, the standard deviation is — CO 1Remember [LOT]
(a) 0 (b) 1 (c) Infinite (d) Equal to mean

40. The unit of standard deviation is — CO 1Remember [LOT]

(a) Same as the mean (b)Square of mean (c) Square root of mean (d) Unitless
41. Variance cannot be — CO 1Remember [LOT]

(a) Positive (b) Zero (c) Negative (d) Fractional

42. The sum of deviations from the mean is always — CO 1Remember [LOT]
(a) Positive (b) Negative (c) Zero (d) 1

43. If SD = 0, all observations are — CO 1Remember [LOT]
(a) Different (b) Equal (c) Zero (d) None

44. The standard deviation is the
(a) Square root of variance (b) Square of CO 1Remember [LOT]

variance (c) Cube of variance (d) None

45. Which of the following is a relative measure of dispersion? CO 1Remember [LOT]

(a) Range (b) Standard deviation (c) Coefficient of variation (d) Variance

\46. If mean = 50 and SD = 10, then C.V. = ?
(a) 10% (b) 20% (c) 5% (d) 15% CO 1Understand [LOT]

47. A high coefficient of variation indicates — CO 1Remember [LOT]

(a) High uniformity (b) Low uniformity (c) No variation (d) Constant values
48. Standard deviation is always — CO 1Remember [LOT]

(a) Positive (b) Negative (c) Zero (d) None CO 1Remember [LOT]

49. When observations are increased by a constant, SD is —
(a) Increased (b) Decreased (c) Unchanged (d) None CO 1Remember [LOT]

50. The variance of 5, 5, 5, 5 is — CO 1Understand [LOT]
(a) 0 (b) 5 (c) 10 (d) 25

51. The square of standard deviation is —
(a) Mean (b) Variance (c) Range (d) Median
CO 1Remember [LOT]

52. Correlation measures the degree of —
(a) Association between two variables (b) Difference between two variables
(c) Causation (d) Variation within a variable
CO 1Remember [LOT]

53. The correlation coefficient (r) lies between —
(a) 0 and 1 (b) –1 and +1 (c) $-\infty$ and $+\infty$ (d) 0 and ∞
CO 1Remember [LOT]

54. If r = 0, it means —
(a) Perfect correlation (b) No correlation (c) Negative correlation (d) Positive correlation
CO 1Remember [LOT]

55. If r = +1, the correlation is —
(a) Perfect negative (b) Perfect positive (c) Zero (d) Moderate positive CO 1Remember [LOT]

56. If r = –1, then — CO 1Remember [LOT]

(a) There is perfect negative correlation (b) There is perfect positive correlation
(c) No relation (d) Data are inconsistent CO 1Remember [LOT]

57. The formula for Karl Pearson's coefficient of correlation is — CO 1Remember [LOT]

(a) $\Sigma xy / n$ (b) $\Sigma(x - \bar{x})(y - \bar{y}) / [n\sigma x\sigma y]$ (c) $\Sigma x^2 / \Sigma y^2$ (d) None of these

58. Spearman's rank correlation is used when —
(a) Data are in ranks (b) Data are nominal (c) Data are normal (d) None of these
CO 1Remember [LOT]

59. If ranks are equal, correction for ties is applied in — CO 1Remember [LOT]

(a) Pearson's correlation (b) Spearman's rank correlation (c) Regression analysis
(d) None

60. The value of correlation coefficient indicates — CO 1Remember [LOT]

(a) Strength and direction of relationship (b) Only direction (c) Only strength (d) None
CO 1Remember [LOT]

61. Regression analysis is used to — CO 1Remember [LOT
(a) Predict one variable based on another (b) Find mean (c) Measure dispersion (d) Compare data sets

62. In regression, the variable to be predicted is called —
(a) Independent variable (b) Dependent variable (c) Constant variable (d) Random variable
CO 1Remember [LOT]

63. The regression equation of Y on X is —
(a) $Y = a + bX$ (b) $X = a + bY$ (c) $X = Y + a$ (d) $Y = X + b$ CO 1Remember [LOT]

64. The regression coefficient (b) measures —
(a) Change in Y for a unit change in X (b) Change in X for a unit change in Y (c) Both (d) None
CO 1Remember [LOT]

65. The sign of correlation coefficient (r) and regression coefficient (b) —
(a) Are always the same (b) Are always opposite (c) May differ (d) Have no relation CO 1Remember [LOT]

66. The correlation coefficient between X and Y is the geometric mean of —
(a) Regression coefficients (b) Standard deviations (c) Means (d) Variances CO 1Remember [LOT]

67. When r = 0, regression coefficients are —
(a) 0 (b) 1 (c) Undefined (d) Equal CO 1Remember [LOT]

68. Regression lines intersect at —
(a) Origin (b) Mean of X and mean of Y (c) Median point (d) Mode point CO 1Remember [LOT]

69. If bxy × byx = 1, then —
(a) r = 1 (b) r = –1 (c) r = 0 (d) r = √(bxy × byx) CO 1Remember [LOT]

70. In a perfect correlation, both regression lines —
(a) Coincide (b) Intersect at 90° (c) Are parallel (d) Are perpendicular CO 1Understand [LOT]

10 MARKS QUESTION

71. Evaluate median, quartile deviation from the given distribution : - (CO3) Apply [HOT]

Marks	10-20	20-30	30- 40	40-50	50- 60	60-70
No. of student	7	20	35	55	28	20

72. Following is the distribution of marks in Economics obtained by 50 students: (CO2)Apply [HOT]

Marks(more than)	0	10	20	30	40	50
No. of students	9	20	24	38	48	27

Calculate the median marks. If 60% of the students pass this test, find the minimum marks obtained by a pass candidate.

73. Classify the three judges A, B, C give the following ranks. Find which pair of judges has common approach.

A:	1	6	5	10	3	2	4	9	7	8
B:	3	5	8	4	7	10	2	1	6	9
C:	6	4	9	8	1	2	3	10	5	7

(CO1) Analyze [HOT]

74. Find standard deviation of give data

Marks:	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60	60 – 70
No. of Students:	5	10	20	40	30	20	10

(CO1) Apply [HOT]

75. From the following data, find the regression line Y on X:

X:	1	2	3	4	5	8	10
Y:	9	8	10	12	14	16	15

(CO1) Evaluate [HOT]

76. Calculate the Kal Pearson coefficient of the following data (CO1) Apply [LOT]

x	9	8	7	6	5	4	3	2
y	15	16	14	13	11	12	10	8

77. The score of two batsmen A and B in ten innings during a certain match are:

A:	32	28	47	50	20	45	62	30	15	55
B :	19	40	25	65	10	40	61	40	10	45

Find out who is a better score and who is more consistent batsmen. (CO2) Apply [HOT]

78. An incomplete distribution is given below:

Variables	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60	60 – 70
Frequency	10	20	-	40	-	25	15

You are given that the median value is 35 and total frequency is 170. Find out missing frequency. (CO4) Apply [HOT]

20 Marks Questions

79. You are given below the daily wages paid to workers in two factories X and Y:

Daily wages	12 – 13	13 – 14	14 – 15	15 – 16	16 – 17	17 – 18	18 – 19
Factory A	15	30	44	60	30	14	7
Factory B	25	40	60	35	12	15	5

Using appropriate measures, answer the following:

(a) Which factory pays higher average wages?

(b) Which factory has a more consistent wage structure? (CO1) Analyze [HOT]

80. The monthly wages (in Rs.) 0f 100 workers are distributed as follow;

Wages (Rs.)	0 - 100	100 – 200	200 - 300	300 – 400	400 – 500	500 – 600
No. of workers	12	x	27	y	17	6

If model wage is Rs. 256.25, find the missing frequencies and hence find % variation in the distribution. (CO 1) Apply [HOT]

81. Evaluate $\mu_1,\ \mu_2,\ \mu_3,\ \mu_4$ for the following frequency distribution:

Marks	5 – 15	15 – 25	25 – 35	35 – 45	45 – 55	55 – 65
No. of	10	20	25	20	15	10

students						

(CO 1) Apply [HOT]

82. The following table gives the aptitude test scores and productivity indices of 10 workers at random:

Aptitude Score	60	62	65	70	72	48	53	73	65	82
Productivity Index	68	60	62	80	85	40	52	62	60	81

Estimate:

(a) the test score of a worker whose productivity index is 75.

(b) the productivity index of a worker whose test score is 92. (CO 1) Apply [HOT]

Course Outcome:

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Summary Sheet

CO Wise

CO	Q. No.	Marks
CO1	31,32, 33, 34, 35, 36, 37, 38, 39, 40, 41,42, 43, 44, 45, 46, 47, 48, 49, 50,51,52,53, 54, 55, 56, 57,58,59,60,61,62,63,64,65,66,67,68,69,70,73,74,75,76,77,79, 80,81,82	160
CO2	2,9,15,17,18,19,20,23,24,28, 29,72,77	87
CO3	1,3,21,22,25,71	42
CO4	4,5,6,7,8,10,11,12,13,14,16,26, 27,78,30	61
	Total =	**350**

Unit Wise

Unit	Q. No.	Marks
Unit 1	**1 to 30**	**150**
Unit 2	**31 to 80**	**200**
	Total =	**350**

Blooms Taxonomy Level (BTL) Wise

BTL	Q. No.	Marks
LOT	1 to 20 and 31 to 70	60
HOT	21 to 30 and 71 to 82	290
	Total =	**350**

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Disclaimer: - This is a Practice set of Probability and statistics. The Question in End term examination will differ from this practice set. This practice set is meant for practice only.