

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION MAY 2024
(Third Semester)

Common to Branches - COMPUTER SCIENCE & COMPUTER TECHNOLOGY

STATISTICS AND OPERATION RESEARCH

Time: Three Hours

Maximum: 50 Marks

SECTION-A (5 Marks)

Answer ALL questions

ALL questions carry EQUAL marks

(5 x 1 = 5)

- 1 What is the median for the following data 11, 13, 17, 13, 23, 25, 19?
(i) 23 (ii) 17
(iii) 24 (iv) 29
- 2 If the values of two variables move in the same direction, _____
(i) The correlation is said to be non-linear
(ii) The correlation is said to be linear
(iii) The correlation is said to be positive
(iv) The correlation is said to be negative
- 3 In hypothesis testing, a Type 2 error occurs when
(i) The null hypothesis is not rejected when the null hypothesis is true.
(ii) The null hypothesis is rejected when the null hypothesis is true.
(iii) The null hypothesis is not rejected when the alternative hypothesis is true.
(iv) The null hypothesis is rejected when the alternative hypothesis is true.
- 4 The sign test is
(i) Less powerful than that of the Wilcoxon signed-rank test
(ii) More powerful than the paired sample t-test
(iii) More powerful than the Wilcoxon signed-rank test
(iv) Equivalent to the Mann-Whitney test
- 5 In a transportation problem where the demand or requirement is equal to the available resource is known as
(i) Balanced transportation problem
(ii) Regular transportation problem
(iii) Resource allocation transportation problem
(iv) Simple transportation model

SECTION - B (15 Marks)

Answer ALL Questions

ALL Questions Carry EQUAL Marks (5 x 3 = 15)

- 6 a Define mode and state its merits and demerits.
OR
b Explain coefficient of variation.
- 7 a Explain the method of calculating Spearman's rank correlation coefficient.
OR
b Calculate rank correlation coefficient for the data given below

X	48	33	40	9	16	16	65	24	16	57
Y	13	13	24	6	15	4	20	9	6	19

Cont...

- 8 a An examination was given to two classes consisting of 40 and 50 students respectively. In the first class the mean mark was 74 with a standard deviation of 8, while in the second class the mean mark was 78 with a standard deviation of 7. Is there a significant difference between the performances of the two classes at a level of significance of 5%?

OR

- b Explain the following terms
 (i) Statistic and Parameter
 (ii) Critical region and Region of Acceptance
 (iii) Null and Alternative Hypothesis.
- 9 a Explain contingency table for independence of attributes.

OR

- b Explain the difference between parametric and non-parametric tests.

- 10 a Explain an algorithm for solving a transportation problem.

OR

- b Draw the event oriented network for the following data

Event No.	1	2	3	4	5	6	7
Immediate Predecessors	-	1	1	2,3	3	4,5	5,6

SECTION -C (30 Marks)

Answer ALL questions

ALL questions carry EQUAL Marks

(5 x 6 = 30)

- 11 a Calculate mean and standard deviation for the following data

X	18	19	20	21	22	23	24	25	26	27
f	3	7	11	14	18	17	13	8	5	4

OR

- b The following table gives the profits for two companies X and Y. Which of the two companies has greater consistency in profits.

X	700	625	725	625	650	700	650	700	600	650
Y	550	600	575	550	650	600	550	525	625	600

- 12 a Calculate Pearson's Coefficient of correlation from the following data

X	45	55	56	58	60	65	68	70	75	80	85
Y	56	50	48	60	62	64	65	70	74	82	90

OR

- b Calculate the coefficient of correlation and obtain the lines of regression for the following. Also obtain an estimate of Y which should correspond to the average $X=6.2$.

X	1	2	3	4	5	6	7	8	9
Y	9	8	10	12	11	13	14	16	15

- 13 a An insurance agent has claimed that the average age of policy-holder who insure through him is less than the average for all agents, which is 30.5 years. A random sample of 100 policy holders who has insured through him gave the following age distribution:

Age	16-20	21-25	26-30	31-35	36-40
No. of Persons	12	22	20	30	16

Using this distribution to test his claim at 5% level of significance.

OR

- b The heights of six randomly chosen sailors are (in inches): 63, 65, 68, 69, 71 and 72. Those of 10 randomly chosen soldiers are 61, 62, 65, 66, 69, 70, 71, 72 and 73. Test at 5% level of significance that on the suggestion that sailors are on the average taller than soldiers.

Cont...

- 14 a A dice is tossed 120 times with the following results:

No.turned up:	1	2	3	4	5	6
Frequency	30	25	18	10	22	15

Test the hypothesis that the dice is unbiased.

OR

- b Two random samples were drawn from two normal populations and their values are

A 66 67 75 76 82 84 88 90 92

B 64 66 74 78 82 85 87 92 93 95 97

Test whether the two populations have the same variance at the 5% level of significance.

- 15 a Solve the following transportation problem

		Destination				Supply
		1	2	3	4	
Origin	1	14	56	48	27	70
	2	82	35	21	81	47
	3	99	31	71	63	93
	Demand	70	35	45	60	

OR

- b Calculate the earliest start, earliest finish, latest start and latest finish of each activity of the project given below and determine the critical path of the project.

Activity	1-2	1-3	1-5	2-3	2-4	3-4	3-5	3-6	4-6	5-6
Duration (in weeks)	8	7	12	4	10	3	5	10	7	4

Z-Z-Z

END