22CAP105

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

MCA DEGREE EXAMINATION MAY 2023
(First Semester)

Branch – **COMPUTER APPLICATIONS**

STATISTICAL METHODS

Time: Three Hours Maximum: 50 Marks

SECTION-A (5 Marks)
Answer **ALL** questions
ALL questions carry **EQUAL** marks (5 x 1 = 5)

1. Which one of the following is central measure?
   i) σ ii) C.V iii) β iv) $\bar{X}$
2. Regression coefficient x on y is
   i) b_{xy} ii) b_{yx} iii) ρ_{xy} iv) ρ_{yx}
3. Mean of the Poisson distribution is denoted by
   i) μ ii) λ iii) σ^2 iv) p
4. Level of significance is denoted by
   i) β ii) α iii) δ iv) μ
5. Which of the following test is used for testing equality of two variance?
   i) F-test ii) Sign test iii) Run test iv) χ^2

SECTION - B (15 Marks)
Answer **ALL** Questions
ALL Questions Carry **EQUAL** Marks (5 x 3 = 15)

6. a) Enumerate the merits of dispersion measures.

   OR

   b) Calculate Median and Modal scores for 10 students' aptitude test.
   10,15,10,25,10,18,12,5,4,8

7. a) The programming skills of 10 students are evaluated by two different programmers and their scores are given in the table.

Programmer -I	10	15	12	18	25	35	50	40	50	60
Programmer -II	20	12	18	15	30	25	60	45	55	65

   Apply the spearman rank correlation coefficient and give your comment.

   OR

   b) Illustrate the correlation by using scatter diagram method.

8. a) An integer is chosen at random out of the integers from 1 to100.What is probability that ,it is (i) multiple of 5 (ii) divisible by 7 (iii) greater than 70?

   OR

   b) In turning out certain electronic chips in a manufacturing process in a factory, the average number of defectives is 10%. What is the probability of getting exactly three defective electronic chips in a sample of 10 chips chosen at random by using the Poisson distribution? ($e^{-1} = 0.36788$).

9. a) Elucidate the classifications of hypotheses and errors.

   OR

   b) A machine is designed to produce insulating washers for electrical devices of average thickness of 0.025cm. A random sample of 10 washers was found to have an average thickness of 0.024cm with a standard deviation of 0.002cm. Test the significance of the deviation. Value of t for 9 degrees of freedom at 5 % level is 2.262.

10. a) A random sample of 15 students is selected from an University and their heights (in Cms) is given below. Test whether the medium height of the students is regarded as 145 or not. Test at 5% level of significance.

142	144	148	149	152	142	150	146	145	150	149	142	141	146	148

   OR

   b) Explain the testing procedures of equality of variances.

Cont...

SECTION -C (30 Marks)

Answer **ALL** questions
ALL questions carry **EQUAL** Marks (5 x 6 = 30)

11. a) From the following frequency table, calculate quartile deviation of 46 chips.

Memory Capacity in GB.	130-135	135-140	140-145	145-150	150-155	155-160	160-165	165-170
No.of Chips	9	6	10	5	7	3	4	2

OR

b) The ten problems are worked out by two different systems. The problems and their speed (mbps)are given in the table:

Problem	1	2	3	4	5	6	7	8	9	10
Speed of System A	47	48	50	55	67	76	29	10	19	37
Speed of System B	68	72	70	84	85	66	56	83	45	21

Find which system is consistent.

12. a) Describe the types of correlation with suitable examples.

OR

b)

RAM size (X) in G.B	20	25	30	45	55	60	75	80	90
Speed (Y) in G.B	60	70	80	90	100	110	120	130	140

Obtain the two regression equation and estimate RAM size when the speed is 145.

13. a) Explain the Poisson distribution with examples.

OR

b) If 10% of the screws produced by an automatic machine are defective, find the probability that of 20 screws selected at random, there are
(i) exactly two defectives
(ii) at the most three defectives and
(iii) at least two defectives

14. a) A company arranged an intensive training programme for its team of salesmen. A random sample of 10 salesmen was selected and the value(in'000) of their sales made in the weeks immediately before and after the programme are shown in the following table

Sales man	1	2	3	4	5	6	7	8	9	10
Sales Before	12	23	5	18	10	21	19	15	8	14
Sales After	18	22	15	21	13	22	17	19	12	16

Test whether there is evidence of an increase in mean sales.

OR

b) A machine is designed to produce insulating washers for electrical devices of average thickness of 0.025cm. A random sample of 10 washers was found to have an average thickness of 0.024cm with a standard deviation of 0.002cm. Test the significance of the deviation. Value of t for 9 degrees of freedom at 5% level is 2.262.

15. a) A random sample of employees of a large company was selected and the employees were asked to complete a questionnaire. One question asked was whether the employee was in favour of the introduction of flexible working hours. The following table classifies the employees by their response and by their area of work.

Response	Area of work	
	Production	Non-Production
In Favour	129	171
Not in favour	31	69

Test whether there is evidence of a significant association between the response and the area of work.

OR

b) Two independent samples of 15 employees each from two Companies namely, Company A and Company B are drawn. The scores obtained by the employees of these two companies in an aptitude test are given in the table. Test whether two company's employees' aptitude score differ or not by using Mann Whitney U test.

A	83	75	69	76	74	84	71	77	67	64	65	59	58	49	62
B	88	90	63	71	73	76	67	82	80	80	96	70	69	61	78

Z-Z-Z END