

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

MSc DEGREE EXAMINATION MAY 2023
(Second Semester)

Branch – COMPUTER SCIENCE

STATISTICS FOR COMPUTER SCIENCE

Time: Three Hours

Maximum: 50 Marks

SECTION-A (5 Marks)

Answer ALL questions

ALL questions carry EQUAL marks (5 x 1 = 5)

- 1 If the rate of changes between two variables X and Y is in the same direction, the relationship between X and Y will be
(i) Positive Correlation (ii) negative correlation
(iii) no correlation (iv) $r=0$
- 2 If it is known that an event A has occurred, the probability of an event E given A is called
(i) Empirical Probability (ii) A priori Probability
(iii) Posterior Probability (iv) Conditional Probability
- 3 Var (x + 8) is
(i) var (8) (ii) var(x)
(iii) 8 var (x) (iv) 0
- 4 Paired t-test is applicable when the observations in the two samples are
(i) Paired (ii) Correlated
(iii) equal in number (iv) all the above
- 5 With 90, 35, 25 as TSS, SSR and SSC respectively then SSE in case of two way classifications is
(i) 50 (ii) 40 (iii) 30 (iv) 20

SECTION - B (15 Marks)

Answer ALL Questions

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

- 6 a) Write the uses of regression.
OR
b) Marks obtained by 8 students in Accountancy (X) and Statistics(Y) are given below. Compute rank correlation coefficient.

X	15	20	28	12	40	60	20	80
Y	40	30	50	30	30	10	30	60

- 7 a) A stockiest has 20 items in a lot. Out of which 12 are non-defective and 8 are defective. A customer selects 3 items from the lot. What is the probability that out of these three items
(i) Three items are non-defective (ii) two are non defective and one is defective.
OR
b) In a certain town, males and females form 50 percent of the population. It is known that 20 percent of the males and 5 percent of the females are unemployed. A research student studying the employment situation selects unemployed persons at random. What is the probability that the person selected is (i) a male (ii) a female?

Cont...

- 8 a Let X be the number that turns up when a die is thrown.
Find $E(X)$, $E(X^2)$, $\text{Var}(X)$ and standard deviation of X .

OR

- b If X is a random variable following binomial distribution with mean 2.4 and variance 1.44, find $P(X \geq 5)$
- 9 a Write the procedure for testing of hypothesis.

OR

- b To test the desirability of a certain modification in typists desks, 9 typists were given two tests of as nearly as possible the same nature, one on the desk in use and the other on the new type. The following difference in the number of words typed per minute was recorded. (Table value = 1.86)

Typists	A	B	C	D	E	F	G	H	I
Increase in number of words	2	4	0	3	-1	4	-3	2	5

Do you agree that after modifications the typing speed has been increased?

- 10 a) i) What is analysis of variance?
ii) Explain the term 'Degrees of freedom'.

OR

- b) A sample of 200 persons with a particular disease was selected. Out of these, 100 were given a drug and the others were not given any drug. The results are as follows

Number of Persons	Drug	No Drug	Total
Cured	65	55	120
Not Cured	35	45	80
Total	100	100	200

Test whether the drug is effective or not. (Table value for 5% $\log=3.84$)

SECTION -C (30 Marks)

Answer ALL questions

ALL questions carry EQUAL Marks

(5 x 6 = 30)

- 11 a) Find Karl Pearson's coefficient of correlation from the following data.

Wages	100	101	102	102	100	99	97	98	96	95
Cost of living	98	99	99	97	95	92	95	94	90	91

OR

- b) Obtain the regression lines of Y on X and X on Y from the following table and estimate the blood pressure when the age is 50

Age(X)	56	42	72	36	63	47	55	49	38	42	63	60
Blood Pressure(Y)	147	125	160	118	149	128	150	145	115	140	152	155

- 12 a) A and B alternately cut a pack of cards and the pack is shuffled after each cut. If A starts and the game is continued until one cuts a diamond. What are the respective chances of A and B first cutting a diamond?

OR

Cont...

- 12 b) A company has two plants to manufacture motorbikes. Plant I manufactures 80 percent of motor bikes, and plant II manufactures 20 percent. At Plant I, 85 out of 100 motorbikes are rated standard quality or better. At plant II only 65 out of 100 motorbikes are rated standard quality or better.
- i) What is the probability that the motorbike, selected at random came from plant I. if it is known that the motorbike is of standard quality?
- (ii) What is the probability that the motorbike came from plant II if it is known that the motor bike is of standard quality?
- 13 a) The diameter X of an electric cable is a continuous random variable with p.d.f

$$f(x) = kx(1-x), 0 \leq x \leq 1. \text{ Find i) The value of } k$$

ii) The c.d.f of X

iii) $P\left(X \leq \frac{1}{2} / \frac{1}{3} < X < \frac{2}{3}\right)$

OR

- b) The local authorities in a city installed 2000 electric lamps in streets and if the lamps have an average life of 1000 burning hours with S.D of 200 hours.
- i) What number of lamps might be expected to fail in the first 700 burning hours?
- ii) After what period of burning hours would you expect that 10% of lamps
- a) would have failed?
- b) would be still burning?
- Assume that lives of the lamps are normally distributed.
- 14 a) In a referendum submitted to the 'student body' at a university, 850 men and 550 women voted. 530 of the men and 310 of the women voted 'yes'. Does this indicate a significant difference of the opinion on the matter between men and women students?

OR

- b) Two random samples gave the following results:

Sample	size	Sample Mean	Sum of Squares of deviation from the mean
1	10	15	90
2	12	14	108

Do the sample variances differ significantly at 5% level of significance?

- 15 a) A test was given to five students taken at random from the fifth class of three schools of a town. The individual scores are

School I	9	7	6	5	8
School II	7	4	5	4	5
School III	6	5	6	7	6

Carry out the analysis of variance.

OR

- b) Three varieties of coal were analyzed by four chemists and the ash-content in the varieties were found to be as under.

Varieties	Chemists			
	1	2	3	4
A	8	5	5	7
B	7	6	4	4
C	3	6	5	4

Carry out the analysis of variance.

Table value:

- (i) Table value of F for (2,6) d.f at 5% level of significance is 5.14
- (ii) Table value of F for (6,3) d.f at 5% level of significance is 8.94