

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BVoc DEGREE EXAMINATION MAY 2024
(Third Semester)

Branch - FOOD PROCESSING TECHNOLOGY

MATHEMATICS AND STATISTICS

Time – Three hours

Maximum : 50 marks

SECTION-A (5MARKS)

Answer ALL Questions

ALL Questions carry EQUAL Marks (5x1=5)

1. $A = \begin{pmatrix} 1 & 2 \\ -1 & 2 \\ 5 & 6 \end{pmatrix}$, what is the order of matrix?

a) 2x3 b) 3x2 c) 4x3 d) None of these

2. What is the mean for the given series 3,1,1,2,3

a) 0 b) 1 c) 2 d) 3

3. The regression equation of two variables are

a) $X = \bar{X} + b_{XY}(Y - \bar{Y})$ and $X = \bar{Y} + b_{YX}(X - \bar{X})$

b) $X = \bar{X} - b_{XY}(Y - \bar{Y})$ and $X = \bar{Y} + b_{YX}(X - \bar{X})$

c) $X = \bar{X} - b_{XY}(Y - \bar{Y})$ and $X = \bar{Y} - b_{YX}(X - \bar{X})$

d) $X = \bar{X} + b_{XY}(Y - \bar{Y})$ and $X = \bar{Y} + b_{YX}(X - \bar{X})$

4. Size of type II error is denoted by

a) α b) β c) N d) $1-\beta$

5. Test for independent of two attributes is based on _____ distribution

a) χ^2 b) t c) F d) None of these

SECTION-B (15MARKS)

Answer ALL Questions

ALL Questions carry EQUAL Marks (5x3=15)

6. (a) Write the properties of addition of matrices.

(or)

(b) Show that $(A^T)^T = A$ if $A = \begin{pmatrix} 3 & 1 & 5 \\ 2 & 6 & 4 \\ 8 & 7 & 9 \end{pmatrix}$

7. (a) Calculate mean for the following data.

X : 5,7,6,10,8,3,4,12,20,24

(or)

(b) Find mode to the following data.

C.I : 0-10 10-20 20-30 30-40 40-50

f : 5 20 35 20 12

8. (a) $R_x : 5 \ 3 \ 1 \ 2 \ 4$

$R_y : 1 \ 4 \ 5 \ 3 \ 2$

Calculate Spearman's rank correlation co-efficient to the above data

(or)

(b) Given $N=10$, $\sum X=20$, $\sum Y=40$, $\sum X^2=240$, $\sum Y^2=410$, $\sum XY=200$. Find regression co-efficients.

Cont.....

9. (a) Write down the procedure for testing the hypothesis.

(or)

(b) Describe Type I error and Type II error.

10. (a) Write the assumptions of student's 't' test.

(or)

(b) Write the applications of χ^2 test for goodness of fit.

SECTION-C(30MARKS)

Answer ALL Questions

ALL Questions carry EQUAL Marks

(5x6=30)

11. (a) If $A = \begin{pmatrix} 1 & 2 & 3 \\ 2 & 4 & 6 \\ 3 & 6 & 9 \end{pmatrix}$ and $B = \begin{pmatrix} -1 & -2 & -4 \\ -1 & -2 & -4 \\ 1 & 2 & 4 \end{pmatrix}$

(i) Find $-2A+3B$ (ii) Show that $AB = BA$

(or)

(b) From the given equation find inverse of a matrix.

$$2x-y+3z = 1, \quad x+y+z = 2, \quad x-y+z = 4$$

12. (a) Draw a Histogram for the following data and hence find mode.

C.I	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90
F:	4	6	7	14	16	14	8	6	5

(or)

(b) Find Mean, Median and Mode to the following data.

X	21	25	27	32	41	46	50	55
F	2	3	10	20	15	10	8	2

(or)

13. (a) Calculate the co-efficient of correlation between Expenditure on Advertisement in 1000(x) and sales in Rs.Lakhs(y) after allowing a time lag of two months

Months	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct
X:	40	45	47	50	53	60	57	51	48	45
Y:	75	69	65	64	70	71	75	83	90	92

(or)

(b) Differentiate Correlation and Regression

14.a) In a sample of 1000 people in Maharashtra, 540 are rice eaters and the rest are wheat eaters. Can we assume that both rice and wheat are equally popular in this state at 1% level of significance?

(or)

b). The means of two single large samples of 1000 and 2000 members are 67.5 inches and 68 inches respectively. Can the samples be regarded as drawn from the same population of standard deviation 2.5 inches?

15.a) The heights of 10 males of a given locality are found to be 70, 67, 62, 68, 61, 68, 70, 64, 64, 68 inches. Is it reasonable to believe that the average height is greater than 64 inches?

(or)

b) Test whether the researchers and number of students at each level of intelligence are independent at 5% level of significance.

No. of students in each level	Researcher	
	X	Y
Below average	86	40
Average	60	33
Above average	44	25
Genius	10	2

Z-Z-Z

END