23FPB317N

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BVoc DEGREE EXAMINATION DECEMBER 2025
(Third Semester)

Branch – **FOOD PROCESSING TECHNOLOGY**

MATHEMATICS & STATISTICS

Time: Three Hours Maximum: 75 Marks

SECTION-A (10 Marks)
Answer **ALL** questions
ALL questions carry **EQUAL** marks (10 × 1 = 10)

Module No.	Question No.	Question	K Level	CO
1	1	Every diagonal element of Hermitian matrix is. (a) $\|\lambda\|=1$ (b) Real (c) Imaginary (d) Zero	K1	CO1
	2	Find the Transpose of the matrix $\begin{bmatrix}3&4&5\\2&1&6\\7&8&0\end{bmatrix}$ (a) $\begin{bmatrix}3&4&5\\2&1&6\\7&8&0\end{bmatrix}$ (b) $\begin{bmatrix}3&4&5\\7&8&0\\2&1&6\end{bmatrix}$ (c) $\begin{bmatrix}3&2&7\\4&1&8\\5&6&0\end{bmatrix}$ (d) $\begin{bmatrix}3&1&8\\4&7&2\\5&0&6\end{bmatrix}$	K2	CO1
2	3	Select the Quartile deviation formula. (a) $Q=1/3(Q_3-Q_2)$ (b) $Q=1/2(Q_3-Q_2)$ (c) $Q=1/3(Q_3+Q_2)$ (d) $Q=1/2(Q_3-Q_2)$	K1	CO2
	4	Find the 'mode' of the given data. 50,55,70,90,30,70,40. (a) 50 (b) 70 (c) 30 (d) 40	K2	CO2
3	5	If r = +1, the correlation is (a) Prefect and Negative (b) Prefect and Unity (c) Prefect and Zero (d) Prefect and Positive	K1	CO3
	6	If one of the regression coefficient is greater than unity, the other must be either (a) greater than unity (b) Less than unity (c) Zero (d) One	K2	CO3
4	7	Mention the name of the region of rejection of H_0. (a) Level of region (b) Significant level (c) Critical region (d) Level of confidence	K1	CO4
	8	Identify the error type of accepting H_0 when H_0 is false (a) Type I error (b) Type II error (c) Standard error (d) No error	K2	CO4
5	9	Choose the M.G.F of Chi-Square distribution (a) $(1+2t)^{-n/2}$ (b) $(1-2t)^{-n/2}$ (c) $2^{-n/2}$ (d) $2^{n/2}$	K1	CO5
	10	Which sample size is considered as the small sample space? (a) <30 (b) >30 (c) <50 (d) >50	K2	CO5

SECTION - B (35 Marks)
Answer **ALL** questions
ALL questions carry **EQUAL** Marks (5 × 7 = 35)

Module No.	Question No.	Question	K Level	CO
1	11.a.	If A = $\begin{bmatrix}2&3\\-1&2\\4&3\end{bmatrix}$ and B = $\begin{bmatrix}1&-2&4\\2&3&1\end{bmatrix}$ Find AB and BA	K1	CO1
		(OR)		
	11.b.	Find the inverse of the matrix A=$\begin{bmatrix}2&3\\4&5\end{bmatrix}$	K4	CO1

Cont...

2	12.a.	Obtain the Median for the following table X 1 2 3 4 5 6 7 8 9 f 8 10 11 16 20 25 15 9 6	K3	CO2
		(OR)		
	12.b.	The average salary of male employees in a firm was Rs 5200 and that of females was Rs.4,200. The mean salary of all the employee was Rs. 5,000. Find the percentage of male and female employees.	K4	CO2
3	13.a.	Calculate the correlation coefficient for the following. X 65 66 67 67 68 69 70 72 Y 67 68 65 68 72 72 69 71	K3	CO3
		(OR)		
	13.b.	Find the most likely price in Mumbai(x) corresponding to the price of Rs. 70 at Kolkata(y) from the following: $\bar{x} = 65$, $\bar{y} = 67$, σ_x =2.5, σ_y= 3.5 and the correlation coefficient between the prices of commodities in the two cities is 0.8.	K4	CO3
4	14.a.	Give a short note on i) Null and Alternative Hypothesis ii) Critical Region iii) Error in sampling	K2 K2	CO4 CO4
		(OR)		
	14.b.	Derive the test of significance for difference of proportions.		
5	15.a.	Certain pesticide is packed into bages by a machine. A random of 10 bages is drawn and their contents are found to weight(in kgs) as follows: 50,49,52,44,45,48,46,45,49,45. Test of the average packing can be taken as 50kg. using suitable test.	K4	CO5
		(OR)		
	15.b.	Write the testing procedure of ANOVA. (one – way classification)	K3	CO5

SECTION -C (30 Marks)

Answer **ANY THREE** questions

ALL questions carry **EQUAL** Marks (3 × 10 = 30)

Module No.	Question No.	Question	K Level	CO
1	16	If A= $\begin{pmatrix} 2 & 3 & 5 \\ 4 & 7 & 9 \\ 1 & 6 & 4 \end{pmatrix}$ and B= $\begin{pmatrix} 3 & 1 & 2 \\ 4 & 2 & 5 \\ 6 & -2 & 7 \end{pmatrix}$ Show that 5(A+B)=5A+5B.	K2	CO1
2	17	Calculate the standard deviation for the following table giving the age distribution of 542 members: Age : 20-30 30-40 40-50 50-60 60-70 70-80 80-90 Members : 3 61 132 153 140 51 2	K3	CO2
3	18	Obtain the equations of two lines of regression for the following data. Also obtain the estimate of x for y = 70. X 65 66 67 67 68 69 70 72 Y 67 68 65 68 72 72 69 71	K4	CO3
4	19	The means of two single large samples of 1000 and 2000 members are 67.5 inches and 68.0 inches respectively. Can the samples be regarded as drawn from the same population of standard deviation 2.5 inches? (test at 5% level of significance)	K4	CO4
5	20	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 to test the significance of test score among the three schools.	K4	CO5

Z-Z-Z END