22CBA206N

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BCom DEGREE EXAMINATION MAY 2025
(Second Semester)

Branch – **COMMERCE (BUSINESS ANALYTICS)**

APPLIED BUSINESS STATISTICS - I

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	If A and are two event, the probability of occurrence of A and B simultaneously is given as a) P(A)+P(B) b) P(A∪B) c) P(A∩B) d) P(A)P(B)	K1	CO1
	2	In tossing three coins at a time, the probability of getting atmost one head a) 3/8 b) 7/8 c) 1/2 d) 1/8	K2	CO1
2	3	The height of students of a class is an example of _____ random variable. a) continuous b) discrete c) both (a) and (b) d) neither (a) nor (b)	K1	CO2
	4	If the mean and variance of binomial distribution is 8 and 4 respectively then the value of n is a) 32 b) 12 c) 16 d) 20	K2	CO2
3	5	Level of significance is the probability of a) Type I error b) Type II error c) committing no error d) acceptance region	K1	CO3
	6	The hypothesis of $H_0: \mu = 165$ against $H_1: \mu > 165$ leads to a) left-tailed test b) right-tailed test c) two-tailed test d) both (b) and (c)	K2	CO3
4	7	Paired t test is applicable when the observations in the two samples are a) paired b) correlated c) equal in number d) all of these	K1	CO4
	8	Degrees of freedom of chi square test for a contingency table of order 3X3 is a) 9 b) 4 c) 6 d) 8	K2	CO4
5	9	Sign test utilizes _____ distribution a) binomial b) Poisson c) Normal d) chi square	K1	CO5
	10	If n_1 and n_2 in Mann Whitney U test are large, the variable U is distributed with mean a) $\frac{(n_1+n_2)}{2}$ b) $\frac{(n_1-n_2)}{2}$ c) $\frac{n_1n_2}{2}$ d) n_1n_2	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.	Explain the following terms with suitable examples: (i) sample space and sample point (ii) mutually exclusive events (iii) dependent and independent events (iv) complementary events.	K2	CO1
		(OR)		
	11.b.	A bag contains 7 red, 12 white and 4 green balls, 3 balls are drawn one after another. Find the probability that all are white if the draws are made (i) with replacement (ii) without replacement		
2	12.a.	A random variable X has the following probability function: X: 1 2 3 4 5 P(x): 7c 5c 4c 3c c Solve and find c, F(x), the mean and variance of the distribution	K3	CO2
		(OR)		

Cont...

	12.b.	Identify and state the properties of Binomial and Poisson distribution		
3	13.a.	Identify the differences between the following pairs of concepts:(i) Statistic and Parameter (ii) Acceptance region and critical region and (iii) Null hypothesis and alternative hypothesis	K3	CO3
		(OR)		
	13.b.	A company claims that 60% of its customers are satisfied with their service. A survey of 100 customers shows that 54 are satisfied. Solve and test if there is any chance to reject the company's claim?		
4	14.a.	A fitness trainer wants to test if a new workout program significantly improves the performance of their clients. The time (in minutes) it takes 6 clients to run 1 mile before and after the program is recorded and given below Client 1 2 3 4 5 6 Before 10.2 9.5 10 9.8 10.5 10.1 After 9.8 9.1 9.7 9.6 10.1 9.9 Is there evidence that the workout program improves performance (i.e., reduces run time)?	K4	CO4
		(OR)		
	14.b.	Explain the procedure of two way ANOVA		
5	15.a.	A company claims that the median delivery time for its products is 3 days. It randomly selects 12 recent deliveries and the delivery times (in days): 2, 4, 3, 5, 2, 3, 4, 1, 2, 3, 5, 4. Test if the median delivery time differs from 3 days using the Sign Test.	K4	CO5
		(OR)		
	15.b.	Explain the working of one sample run test with the help of an example.		

SECTION -C (30 Marks)

Answer **ANY THREE** questions
ALL questions carry **EQUAL** Marks $(3 \times 10 = 30)$

Module No.	Question No.	Question	K Level	CO
1	16	a) State and prove Bayes theorem on probability b) Box I contains one gold and one silver coin, Box II has two gold coins, and Box III holds two silver coins. A box is selected at random, and one coin is drawn—it turns out to be gold. Analyse and find the probability that the other coin in the selected box is silver?	K4	CO1
2	17	The joint probability function of x and y is given by $f(x,y) = \begin{cases} 4xy, 0 \le x \le 1; 0 \le y \le 1 \\ 0, \quad \text{Otherwise} \end{cases}$ Simplify and find the (i) marginal pdf of x and y (ii) conditional pdf of x and y (iii) mean values of x and y (iv) variances of x and y (v) Covariance of x and y.	K4	CO2
3	18	A school wants to compare the average math scores of students in two different classes. • Class A ($n_1 = 50$) has a mean score of 78 with a known standard deviation of 10. • Class B ($n_2 = 60$) has a mean score of 74 with a known standard deviation of 8. Test if there is any significant difference between the average scores of the two classes?	K4	CO3
4	19	A researcher wants to know if gender is related to preferred study method among a random sample of 90 students. Test if the two attributes gender and the study method are independent. **Visual Auditory Reading Total** **Male** 10 15 5 30 **Female** 20 10 30 60 **Total** 30 25 35 90	K4	CO4
5	20	Analyze the procedure for conducting the Kruskal-Wallis test for hypothesis testing, illustrating each step with an example.	K4	CO5

Z-Z-Z END