PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)
BCom DEGREE EXAMINATION DECEMBER 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	In rolling of a die until 4 appears, the sample space is a. a null set b. a countable finite set c. a countable infinite set d. an uncountable set	K1	CO1
	2	If A and B are independent events with $P(A) = P(B)$; and $P(A+B) = a$; then $P(B)$ is a. 2a b. $\sqrt{a}$ c. a/2 d. a^2	K2	CO1
2	3	Given $E(X+C) = 8$ and $E(X-C) = 12$ then C is equal to a. -2 b. 4 c. -4 d. 2	K1	CO2
	4	Poisson distribution corresponds to a. Rare events b. Certain event c. Impossible event d. Almost sure event	K2	CO2
3	5	What is level of significance? a. P(Type I Error) b. P(Type II Error) c. upper limit of P(Type I Error) d. upper limit of P(Type II Error)	K1	CO3
	6	Large sample test is applicable, when the parent population is a. normal distribution only b. binomial distribution c. Poisson distribution d. any probability distribution	K2	CO3
4	7	Support of student's t random variable is a. $-\infty < t \leq 0$ b. $0 \leq t < \infty$ c. $-\infty < t < \infty$ d. $0 \leq t \leq 1$	K1	CO4
	8	If the order of the contigency table is (5 × 4). Then the degree of freedom of the corresponding chi-square test statistic is a. 18 b. 17 c. 12 d. 25	K2	CO4
5	9	Which of the following is NOT a non-parametric test? a. t-test b. Mann-Whitney U test c. Kruskal-Wallis test d. Wilcoxon signed-rank test	K1	CO5
	10	What is the purpose of a non-parametric test? a. To make assumptions about population parameters b. To analyze data that does not meet the assumptions of parametric tests c. To estimate population means d. To test hypotheses about population variances	K2	CO5

SECTION - B (35 Marks)

Answer ALL questions

ALL questions carry EQUAL Marks $(5 \times 7 = 35)$

Module No.	Question No.	Question	K Level	CO
1	11.a.	There are 5 items defective in a sample of 30 items. Find the probability that an item chosen at random from the sample is (i) defective (ii) non – defective	K1	CO1
		(OR)		
	11.b.	State and prove addition theorem on probability <table><tr><td>x</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr><tr><td>P(X=x)</td><td>a</td><td>3a</td><td>5a</td><td>7a</td><td>9a</td><td>11a</td><td>13a</td></tr></table> (i) Find the value of 'a' (ii) Find the c.d.f F(x) of X (iii) Evaluate: (a) $P(X \geq 4)$, (b) $P(X < 5)$, (c) $P(3 \leq X \leq 6)$ (iv) $P(X = 5)$ using F(x)		
2	12.a.	Ten coins are tossed simultaneously. Find the probability of getting (i) atleast seven heads (ii) exactly seven heads (iii) atmost seven heads.	K3	CO2
		(OR)		
	12.b.	The height of the rose plants in a garden is Normally distributed with a mean 100cms. Given that 10% of the plants have height greater than104cm. Find (i) The S.D of the distribution (ii) The number of plants have height greater than 105cms if there were 200 plants in the garden.		
3	13.a.	A company producing LED bulbs finds that mean life span of the population of its bulbs is 2000 hours with a standard derivation of 150 hours. A sample of 100 bulbs randomly chosen is found to have the mean life span of 1950 hours. Test, at 5% level of significance, whether the mean life span of the bulbs is significantly different from 2000 hours.	K4	CO3
		(OR)		
	13.b.	A study was conducted to investigate the interest of people living in cities towards self-employment. Among randomly selected 500 persons from City-1, 400 persons were found to be self-employed. From City-2, 800 persons were selected randomly and among them 600 persons are self-employed. Do the data indicate that the two cities are significantly different with respect to prevalence of self-employment among the persons? Choose the level of significance as $\alpha = 0.05$		
4	14.a.	The weights (in kg.) of 8 students of class VII are 38, 42, 43, 50, 48, 45, 52 and 50. Test the hypothesis that the variance of the population is 48 kg, assuming the population is normal and μ is unknown.	K1	CO4
		(OR)		
	14.b.	A sample 800 students appeared for a competitive examination. It was found that 320 students have failed, 270 have secured a third grade, 190 have secured a second grade and the remaining students qualified in first grade. The general opinion that the above grades are in the ratio 4:3:2:1 respectively. Test the hypothesis the general opinion about the grades is appropriate at 5% level of significance.		
5	15.a.	Sign test for the following data A: 7,5,2,3,8,2,4,4,3,7,6,2,10 B: 2,1,0,1,3,2,3,5,1,4,4,3,4, Significance Level α=0.05 and One-tailed test	K4	CO5
		(OR)		
	15.b.	Median test for the following data 79,86,40,50,75,38,70,73,50,40,20,80,55,61,50,80,60,30,70,50 85,80,50,55,65,50,63,75,55,45,30,85,65,80,55,75,65,50,75,62, Significance Level α=0.05 and One-tailed test		

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	A city is partitioned into districts A, B, C having 20 percent, 40 percent and 40 percent of the registered voters respectively. The registered voters listed as Democrats are 50 percent in A, 25 percent in B and 75 percent in C. A registered voter is chosen randomly in the city. Find the probability that the voter is a listed democrat	K1	CO1
2	17	A set of three similar coins are tossed 100 times with the following results 	Number of heads	0	1	2	3
Frequency	36	40	22	2	 Fit a binomial distribution and estimate the expected frequencies.	K3	CO2
3	18	Performance of students of X Standard in a national level talent search examination was studied. The scores secured by randomly selected students from two districts, viz., D1 and D2 of a State were analyzed. The number of students randomly selected from D1 and D2 are respectively 500 and 800. Average scores secured by the students selected from D1 and D2 are respectively 58 and 57. Can the samples be regarded as drawn from the identical populations having common standard deviation 2? Test at 5% level of significance.	K4	CO3
4	19	A company gave an intensive training to its salesmen to increase the sales. A random sample of 10 salesmen was selected and the value (in lakhs of Rupees) of their sales per month, made before and after the training is recorded in the following table. Test whether there is any increase in mean sales at 5% level of significance. 	Salesman	1	2	3	4	5	6	7	8	9	10
Before	15	22	6	17	12	20	18	14	10	16
After	17	23	16	20	14	21	18	20	10	11		K1	CO4
5	20	Mann Whitney U test for the following data 53,38,69,57,46,39,73,48,73,74,60,78,44,40,61,52,32,44, 70,41,67,72,53,72, Significance Level α=0.05 and One-tailed test	K4	CO5

Z-Z-Z   END