PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BCom DEGREE EXAMINATION MAY 2024
(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	Which one of the following is not related to random experiment? a. outcomes are predictable in advance b. outcomes is unknown, in advance c. experiment repeatable finite number of times d. experiment is repeatable any number of times.	K1	CO1
	2	If A and B are two events with P(A/B)= 0.3, P(B/A) = 0.2. then P(A) is a. 3/10 b. 7/10 c. 6/7 d.1/7	K2	CO1
2	3	Var (4X+3) is a. 7 Var (X) b. 16 Var (X) c. 256 Var X d. 0	K1	CO2
	4	In a Poisson distribution a. Mean = Variance b. Mean < Variance c. Mean > Variance d.Mean≠ Variance	K2	CO2
3	5	When H1 is a one-sided (right) alternative hypothesis, the critical region is determined by a. both right and left tails b. neither right nor left tail c. right tail d. left tail	K1	CO3
	6	What is the standard error of the sample proportion under H0? a. $\sqrt{PQ/n}$ b. $\sqrt{pq/n}$ c. PQ/n d. pq/n	K2	CO3
4	7	Paired t-test is applicable when the observations in both the samples are a. Paired b.Correlated c. Equal in number d. all the above	K1	CO4
	8	If chi-square is performed for testing goodness of fit to a data with k classes on estimating 's' parameters then degrees of freedom of test statistic is. a. k–s b. (k–1)(s–1) c.k–1–s d. k–1	K2	CO4
5	9	The Wilcoxon signed-rank test is used for: a. Independent samples b. Paired samples c. Three or more independent samples d. Three or more paired samples	K1	CO5
	10	When comparing more than two independent groups with ordinal or continuous data, which test should be used? a. Mann-Whitney U test b. Wilcoxon signed-rank test c. Kruskal-Wallis test d.Friedman test	K2	CO5

Cont...

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.	An urn contains 5 red and 7 green balls. Another urn contains 6 red and 9 green balls. If a ball is drawn from any one of the two urns, find the probability that the ball drawn is green	K1	CO1
		(OR)		
	11.b.	State and prove the Multiplication theorem of probability for dependent events.		
2	12.a.	Two cards are drawn with replacement from a well shuffled pack of 52 cards. Find the mean and variance of the number of Aces.	K3	CO2
		(OR)		
	12.b.	If 2% of electric bulbs manufactured by a certain company are defective find the probability that in a sample of 200 bulbs (i) less than 2 bulbs are defective (ii) more than 3 bulbs are defective.		
3	13.a.	A motor vehicle manufacturing company desires to introduce a new model motor vehicle. The company claims that the mean fuel consumption of its new model vehicle is lower than that of the existing model of the motor vehicle, which is 27 kms/litre. A sample of 100 vehicles of the new model vehicle is selected randomly and their fuel consumptions are observed. It is found that the mean fuel consumption of the 100 new model motor vehicles is 30 kms/litre with a standard deviation of 3 kms/litre. Test the claim of the company at 5% level of significance.	K4	CO3
		(OR)		
	13.b.	A survey was conducted among the citizens of a city to study their preference towards consumption of tea and coffee. Among 1000 randomly selected persons, it is found that 560 are teadrinkers and the remaining are coffee-drinkers. Can we conclude at 1% level of significance from this information that both tea and coffee are equally preferred among the citizens in the city?		
4	14.a.	Two types of batteries are tested for their length of life (in hours). The following data is the summary descriptive statistics.	K1	CO4

Type	Number of batteries	Average life (in hours)	Sample standard deviation
A	14	94	16
B	13	86	20

Is there any significant difference between the average life of the two batteries at 5% level of significance?

		(OR)		
	14.b.	A survey was conducted with 500 female students of which 60% were intelligent, 40% had uneducated fathers, while 30 % of the not intelligent female students had educated fathers. Test the hypothesis that the education of fathers and intelligence of female students are independent.		

Cont....

5	15.a.	On a commuter train, the conductor want to see whether the passengers entering a train enter in a random manner. He observes the first 25 people, with the following sequence of males(M) and females(F). F F F M M F F F F M F M M M F F F F M M F F F M M Test for randomness at $\alpha = 0.05$	K4	CO5
		(OR)		
	15.b.	Consider a Phase II clinical trial designed to investigate the effectiveness of a new drug to reduce symptoms of asthma in children. A total of n=10 participants are randomized to receive either the new drug or a placebo. Participants are asked to record the number of episodes of shortness of breath over a 1-week period following receipt of the assigned treatment. The data are shown below. **Placebo** 7 5 6 4 12 **New Drug** 3 6 4 2 1 Is there a difference in the number of episodes of shortness of breath over a 1-week period in participants receiving the new drug as compared to those receiving the placebo? By inspection, it appears that participants receiving the placebo have more episodes of shortness of breath, but is this statistically significant?		

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 bolt manufacturing company has four machines A, B, C and D producing 20%, 15%, 25% and 40% of the total output respectively. 5%, 4%, 3% and 2% of their output (in the same order) are defective bolts. A bolt is chosen at random from the factory and is found defective what is the probability of getting a defective bolt	K1	CO1
2	17	Students of a class were given an aptitude test. Their marks were found to be normally distributed with mean 60 and standard deviation 5. What percentage of students scored (i) more than 60 marks (ii) less than 56 marks (iii) between 45 and 65 marks?	K3	CO2
3	18	A District Administration conducted awareness campaign on a contagious disease utilizing the services of school students. Among 64 randomly selected households, 50 of them appreciated the involvement of students. Can the District Administration decide whether more than 90% success could be achieved in these kinds of programmes by involving the students? Fix the level of significance as 1%.	K4	CO3
4	19	The following table gives the scores (out of 15) of two batches of students in an examination. Batch I 6 7 9 2 13 3 4 8 7 11 Batch II 5 6 5 7 1 7 2 7 - - Test at 1% level of significance the average performance of the students in Batch I and Batch II are equal.	K1	CO4
5	20	Perform Kruskal-wallis test for the following data 8,5,7,11,9,6, 10,12,11,9,13,12, 11,14,10,16,17,12 18,20,16,15,14,22, Significance Level α=0.05 and One-tailed test	K4	CO5

Z-Z-Z END