PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

MCom DEGREE EXAMINATION DECEMBER 2025
(First Semester)

Common to Branches – COMMERCE / COMMERCE WITH COMPUTER APPLICATIONS

QUANTITATIVE TECHNIQUES

Time: Three Hours Maximum: 75 Marks

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

Module	Question No.	Question	K Level	CO
	1	If the regression equation Y=a + b X has b = 0, what does this indicate about the relationship between X and Y? A) There is no relationship between X and Y B) X and Y are perfectly correlated C) X increases as Y decreases D) Y increases as X increases	K1	CO1
	2	Identify one of theoretical distributions which is discrete in nature? A) Normal distribution B) Binomial distribution C) Exponential distribution D) Logistic distribution	K2	CO1
	3	_____ test is most commonly used for comparing the means of two independent large samples. A) Chi-square test B) F-test C) Z-test D) t-test	K1	CO2
	4	Mention the scenario best illustrates the use of a test of proportions in large samples. A) Testing if the mean weights of two groups differ B) Comparing the percentage of defective items from two factories C) Determining variance equality in two groups D) Assessing relationship strength between two variables	K2	CO2
	5	A researcher wants to determine whether the proportion of males and females preferring a particular soft drink differ significantly. Which statistical test should be applied? A) Z-test for proportions B) ANOVA C) Paired t-test D) Chi-square test of independence	K2	CO3
	6	What does ANOVA stand for in statistics? A) Analysis of variables B) Analysis of variance C) Average of variables D) Association of variables	K1	CO3
	7	In a run test for randomness, the observed number of runs is 6 and the expected number is 10. What would likely be the conclusion? A) Sequence is not random B) Run does not exists C) Sequence is random D) Not enough data	K1	CO4
4	8	The Kruskal-Wallis test is used when: A) Comparing means of two related samples B) Comparing means of two independent samples C) Comparing medians of more than two groups D) Testing correlation between variables	K2	CO4
	9	In a linear programming problem, what is the purpose of introducing slack variables? A) To convert an inequality into an equation B) To maximize the objective function C) To minimize the objective function D) To convert a 'less than or equal to' constraint into an equation	K1	CO5
5	10.	In the transportation problem, _____ is the primary goal. A) Minimize the total transportation cost B) Minimize the number of routes used C) Maximize the number of shipments D) Maximize the total quantity transported	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
	11.a.	Explain the types of correlation and give one real-life example for each type.	K2	CO1
		(OR)		
	11.b.	Delineate about the poisson distribution and calculate the probability of exactly 3 events occuring when the average number of events is 2 per interval.		

2	12.a.	Discuss when to use a t-test instead of a z-test, write its assumptions with an example.	K2	CO
		(OR)		
	12.b.	Calculate the confidence interval for the mean when a sample of 30 items has an average of 100 and standard deviation of 15, assuming normality. Use 95% confidence level.		
3	13.a.	Define a contingency table and its use in testing independence of two categorical variables.	K4	CO
		(OR)		
	13.b.	For samples of size 10 from two populations with variances 25 and 16 respectively, test at 5% significance whether the population variances differ using the F-test.		
4	14.a.	Perform a Sign test on the following paired data: Before treatment: 40, 45, 50, 55, 60; After treatment: 42, 48, 49, 59, 62.	K4	CO
		(OR)		
	14.b.	Calculate the trend component of a time series using the 3 years moving average method for the data: 12, 15, 14, 16, 18, 20, 22, 24, 28.		
5	15.a.	Solve the following transportation problem using the Northwest Corner Method:	K4	CO

Supply/Demand	D1	D2	D3	Supply
S1	2	3	1	20
S2	5	4	8	30
Demand	15	25	10	

		(OR)		
	15.b.	State the main steps of the Hungarian assignment method.		

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	The following data shows the values of two variables, X and Y: X: 10, 12, 13, 16, 17, 20 Y: 39, 41, 36, 42, 45, 46 a) Fit the least squares regression equation of Y on X for the above data. b) Using the regression equation, estimate the value of Y when X = 15. c) Calculate the coefficient of determination and interpret its value with respect to this dataset.	K4	CO1
2	17	In a sample of size 100, 40 people have a particular trait. Test whether the population has 50% proportion of this trait at 5% significance level.	K2	CO2
3	18	Perform a one-way ANOVA test for the following group data: Group - A: 12, 15, 13 Group - B: 17, 19, 18 Group - C: 14, 16, 15 Check if there is a significant difference at 5% level.	K4	CO3
4	19	Based on Mann-Whitney test, compare the effectiveness of two treatments with data collected as below: Treatment - A: 55, 57, 59, 60, 61 Treatment - B: 54, 57, 56, 58, 52	K4	CO
5	20	Solve the following linear programming problem using the simplex method: Maximize $Z = 5x + 4y$ $6x + 4y \leq 24$ $x + 2y \leq 6$ $-x + y \leq 1$ $x, y \geq 0$	K4	CO

Z-Z-Z END