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22CAU103N

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BCA DEGREE EXAMINATION DECEMBER 2025
(First Semester)

Branch – COMPUTER APPLICATION

STATISTICS & OPERATION RESEARCH

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 of the followings is a one-dimensional diagram? a) Bar diagram b) Pie-chart c) Cylinder d) Histogram	K1	CO1
	2	The median of the variate values 11, 7, 6, 9, 12, 15, 19 is: a) 9 b)12 c)15 d)11	K2	CO1
2	3	The range of simple correlation coefficient is: a)0 to ∞ b)-∞ to +∞ c)0 to 1 d)-1 to +1	K1	CO2
	4	Level of significance is the probability of: a) type I error b) type II error c) non committing error d) any of the above	K2	CO3
3	5	Student's t- test was invented by: a) R.A.Fisher b) G.W.Snedecor c) W.S.Gosset d) W.G.Cochran	K1	CO3
	6	Analysis of Variance utilizes: a)F-test b)χ^2 test c)Z-test d)t-test	K2	CO3
4	7	A constraint in an LPP is expressed as a) an equation with = sign b) inequality with ≥ sign c)inequality with ≤ sign d) any of the above	K1	CO4
	8	The graphical method is best suited for solving LPPs with: a) More than two variables b)Two variables c) No variables d) Any number of variables	K2	CO4
5	9	On the critical path, the total float is always: a) Positive b) Negative c) Zero d) Maximum	K1	CO5
	10	What is the expected time of an activity if the optimistic time is 2, the most likely time is 5 and the pessimistic time is 8? a)5 b)8 c)15 d)10	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.	A survey of 2000 software developers was conducted to determine their most-used programming language. The results are given in the following table. Construct a pie diagram for the following data. Programming Language: C, C++, PHP, HTML, SQL Number of developers: 600, 400, 450, 300, 250	K3	CO1
		(OR)		
	11.b.	A student secures the following marks. Identify the mean, median and mode marks. 41, 50, 75, 91, 95, 69, 61, 53, 69, 70, 82, 46, 69		
2	12.a.	Explain the scatter diagram method.	K2	CO2
		(OR)		
	12.b.	Interpret the result using the coefficient of correlation between the sales and expenses of the following 7 computer parts manufacturing factory: Sales('000): 50, 55, 60, 65, 60, 60, 50 Expenses ('000): 11, 14, 16, 15, 14, 13, 13		
3	13.a.	The sales data of an item in six computer shops before and after a special promotional campaign are as under: Before Campaign: 53, 28, 31, 48, 50, 42 After Campaign: 58, 29, 30, 55, 56, 45 Can the campaign be judged to be a success? Test at 5% level of significance. (Given $t_{0.05,5}$=2.57)	K4	CO3
		(OR)		

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	13.b.	The following table gives the number of goods and bad parts produced by each of three shifts in a factory: Shift / Good / Bad Day / 900 / 130 Evening / 700 / 170 Night / 400 / 200 Is there any association between the shift and the quality of parts produced? (Given $\chi^2_{0.05,2}=5.991$)		
4	14.a.	ABC animal feed company must produce at least 200kg. of a mixture consisting of ingredients A and B daily. A Costs Rs. 3 per kg and B costs Rs. 5 per kg. Not more than 80 kg. of A can be used and at least 60 kg. of B must be used. Formulate the problem for minimizing the cost.	K3	CO4
		(OR)		
	14.b.	Solve graphically: Maximize $Z= 3X_1+4X_2$ Subject to the constraints $4X_1+2X_2 \leq 80$ $2X_1+5X_2 \leq 180$ and $X_1, X_2 \geq 0$		
5	15.a.	Discover an initial basic feasible solution to the following transportation problem using the north – west corner rule: D / E / F / G / Available A / 11 / 13 / 17 / 14 / 250 B / 16 / 18 / 14 / 10 / 300 C / 21 / 24 / 13 / 10 / 400 Requirement / 200 / 225 / 275 / 250	K4	CO5
		(OR)		
	15.b.	Construct a network diagram for the following data and discover CPM and total project duration. Activity / A / B / C / D / E / F / G / H / I Predecessor / - / - / - / A / B / C / D,E / B / H,F Duration in days / 3 / 5 / 4 / 2 / 3 / 9 / 8 / 7 / 9		

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	The following data were obtained while observing the life span of a few neon lights of a company. Apply Standard deviation. Life Span (years) / 4-6 / 6-8 / 8-10 / 10-12 / 12-14 No. of Neon lights / 10 / 17 / 32 / 21 / 20	K3	CO1
2	17	Price(X) and Sales (Y) are given below for the one weeks of a month. Price / 10 / 12 / 13 / 12 / 16 / 15 Sales / 40 / 38 / 43 / 45 / 37 / 43 Analyze the average relationship between Price and Sales by using regression equations.	K4	CO2
3	18	To test the significance of the variation of the retail prices of a commodity in three principle cities. Bombay, Calcutta and Delhi four shops were chosen at random in each city and prices observed in rupees were as follows: Bombay / 16 / 8 / 12 / 14 Calcutta / 10 / 10 / 10 / 6 Delhi / 4 / 10 / 8 / 8 Do the data indicate that the prices in the three cities are significantly different? (Given $F_{0.05,2,9}=4.26$)	K4	CO3
4	19	Solve the following L.P.P by using Simplex method: Maximize $Z= X_1+X_2+3X_3$ Subject to the constraints $3X_1+2X_2+X_3 \leq 3$ $2X_1+X_2+2X_3 \leq 2$ and $X_1, X_2, X_3 \geq 0$	K3	CO4
5	20	A project consists of eight activities with the following relevant information: Activity / A / B / C / D / E / F / G / H Immediate Predecessor / - / - / - / A / B / C / D,E / F,G Optimistic / 1 / 1 / 2 / 1 / 2 / 2 / 3 / 1 Most likely / 1 / 4 / 2 / 1 / 5 / 5 / 6 / 2 Pessimistic / 7 / 7 / 8 / 1 / 14 / 8 / 15 / 3 i)Draw the network diagram ii) Find out the expected project completion time.	K2	CO5

Z-Z-Z END