PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BCA DEGREE EXAMINATION MAY 2024
(First Semester)

Branch – **COMPUTER APPLICATION**

STATISTICS & OPERATIONS RESEARCH

Time: Three Hours   Maximum: 75 Marks

SECTION-A (10 Marks)
Answer **ALL** questions

ALL questions carry **EQUAL** marks $(10 \times 1 = 10)$

Module No.	Question No.	Question	K Level	CO
1	1	With the help of histogram we can prepare: a) Frequency polygon b) Frequency curve c) Frequency distributions d) All the above	K1	CO1
	2	Extreme value have no effect on: a) Average b) Median c) Mode d) Geometric mean	K2	CO1
2	3	The Correlation value r is exactly 1 indicates: a)Perfect positive b) Perfect negative c) Zero correlation d) Linear correlation	K1	CO1
	4	To test an Hypothesis about proportion of items in a data, the test is a) t- test b) F-test c) Z-test d)None of the above	K2	CO3
3	5	Equality of several normal population means can be tested by: a) F-test b) Z-test c) t- test d) None of the above	K1	CO3
	6	The value of coefficient of contingency lies between: a) 0 and ∞ b) 0 and 1 c) 0 to 100 d) -1 and +1	K2	CO3
4	7	Any feasible solution which optimizes the objective function of an LPP is called a) Bounded Solution b)Optimal Solution c)Unique solution d) None of the above	K1	CO4
	8	The optimal solution from both the Primal and Dual LPP should be: a)Equal b)Unequal c) Zero d)None of the above	K2	CO4
5	9	In a Transportation problem,the number of allocations is equal to m+n-1 is called, a) Non-degenerate solution b) Degenerate solution c) Unique solution d) None of the above	K1	CO4
	10	The Critical path method was developed by: a) Kelly b)Walker c)D.W.Miller d)Both(a) and (b)	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.	Draw a Histogram for the following data. 	Class	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	 	f	4	6	7	14	16	14	8	16	5		K3	CO1
		(OR)		
	11.b.	The following is the distribution of marks of 80 students in a class. Apply coefficient of variation. 	Marks	0-10	10-20	20-30	30-40	40-50	 	No. of students	12	13	21	19	15			

Module No.	Question No.	Question	K Level	CO
2	12.a.	Apply the Coefficient of Correlation between X-Advertisement Expenditure and Y-Sales. <table><tr><td>X</td><td>10</td><td>12</td><td>18</td><td>8</td><td>13</td><td>20</td><td>22</td><td>15</td><td>5</td><td>17</td></tr><tr><td>Y</td><td>88</td><td>90</td><td>94</td><td>86</td><td>87</td><td>92</td><td>96</td><td>94</td><td>88</td><td>85</td></tr></table>	K3	CO3
		(OR)		
	12.b.	The mean life time of sample of 100 light tubes produced by a company is computed to be 1570 hours with a standard deviation of 120 hours. The company claims that the average life of the tubes produced by the company is 1600 hours. Using the level of significance of .05 is the claim acceptable?		
3	13.a.	Explain the testing procedure of F-test for testing two variances.	K5	CO3
		(OR)		
	13.b.	A Typist in a company commits the following number of mistakes per page in typing 432 pages? <table><tr><td>No. of mistakes per page</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr><tr><td>No. of pages</td><td>223</td><td>142</td><td>48</td><td>15</td><td>4</td><td>0</td></tr></table>Fit a Poisson law to the above information.		
4	14.a.	Food X contains 6 units of vitamins A per gram and 7 units of vitamin B per gram and costs 12 paisa per gram. Food Y contains 8 units of vitamins A per gram and 12 units of vitamin B per gram and costs 20 paisa per gram. Daily minimum requirements of vitamin A and vitamin B are 100 units and 120 units respectively. Find the minimum cost of product mix using graphic method.	K4	CO4
		(OR)		
	14.b.	Solve by graphical method: Maximize $Z = 3X_1 + 4X_2$ Subject to $4X_1 + 2X_2 \leq 80$ $2X_1 + 5X_2 \leq 180$ and $X_1, X_2 \geq 0$		
5	15.a.	Find an initial basic feasible solution by North West Corner method. <table><tr><td></td><td>D_1</td><td>D_2</td><td>D_3</td><td>D_4</td><td>Supply</td></tr><tr><td>O_1</td><td>11</td><td>13</td><td>17</td><td>14</td><td>250</td></tr><tr><td>O_2</td><td>16</td><td>18</td><td>14</td><td>10</td><td>300</td></tr><tr><td>O_3</td><td>21</td><td>24</td><td>13</td><td>10</td><td>400</td></tr><tr><td>Demand</td><td>200</td><td>225</td><td>275</td><td>250</td><td></td></tr></table>		CO5
		(OR)		
	15.b.	A Project is as follows: <table><tr><td>Activity</td><td>A</td><td>B</td><td>C</td><td>D</td><td>E</td><td>F</td><td>G</td></tr><tr><td>Duration (in days)</td><td>4</td><td>9</td><td>3</td><td>8</td><td>7</td><td>2</td><td>5</td></tr><tr><td>Preceding activity</td><td>-</td><td>-</td><td>A</td><td>B</td><td>B</td><td>D</td><td>E</td></tr></table>Construct the network and find the critical path and the project duration.		

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 table gives the marks of 7 students. Determine Mean, Median and Mode. <table><tr><td>Marks</td><td>11-20</td><td>21-30</td><td>31-40</td><td>41-50</td><td>51-60</td><td>61-70</td><td>71-80</td></tr><tr><td>No.of students</td><td>42</td><td>38</td><td>120</td><td>84</td><td>48</td><td>36</td><td>31</td></tr></table>	K5	CO1
2	17	From the data given below, find: a) the two regression equations b) the most likely marks in Statistics(Y) when the marks in Mathematics (X) is 30. <table><tr><td>X</td><td>25</td><td>28</td><td>35</td><td>32</td><td>31</td><td>36</td><td>29</td><td>38</td><td>34</td><td>32</td></tr><tr><td>Y</td><td>43</td><td>46</td><td>49</td><td>41</td><td>36</td><td>32</td><td>31</td><td>30</td><td>33</td><td>39</td></tr></table>	K4	CO2

| 3 | 18 | The following table gives the production in kg of three SeedsA,B and C of Wheat sown in 12 plots:

| Seeds A | 14 | 16 | 18 | | |
| Seeds B | 14 | 13 | 15 | 22 | |
Seeds C	18	16	19	19	20	 Is there any significant difference in the production of three Seeds.	K4	CO3
4	19	Determine the decision variables by Simplex method. Maximize $Z = 5X_1 + 3X_2$ Subject to $X_1 + X_2 \leq 2$ $5X_1 + 2X_2 \leq 10$ $3X_1 + 8X_2 \leq 12$ and $X_1, X_2 \geq 0$	K4	CO4
5	20	A Small project is composed of seven activities whose time estimates are given in the following table: | Activity	1-2	1-3	1-4	2-5	3-5	4-6	5-6
t_0	1	1	2	1	2	2	3
t_m	1	4	2	1	5	5	6
t_p	7	7	8	1	14	8	15 | i)Draw the project network and identify all the paths through it. ii) Determine the expected project length. iii) Calculate the Standard deviation and variance of the project length.	K4	CO5

Z-Z-Z   END