

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION DECEMBER 2024
(Third Semester)

Common to Branches - **COMPUTER SCIENCE AND COMPUTER TECHNOLOGY**

STATISTICS AND OPERATIONS 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 average is affected most by extreme observations? (a) Mode (b) Median (c) Geometric Mean (d) Arithmetic Mean	K1	CO1
	2	The sum of squares of deviations from arithmetic mean is (a) Zero (b) Maximum (c) Minimum (d) None	K2	CO1
2	3	The Coefficient of correlation: (a) has no limits (b) can be less one (c) can be more than 1 (d) varies between ± 1	K1	CO2
	4	The regression is independent of: (a) change of scale only (b) change of origin only (c) both change of scale and origin (d) none	K2	CO2
3	5	The ideas of testing of hypothesis was first set forth by: (a) R.A. Fisher (b) J. Neyman (c) E.L. Lehman (d) A. Wald	K1	CO3
	6	Standard error of number of success is given by (a) $\sqrt{\frac{pq}{n}}$ (b) $\sqrt{npq}$ (c) npq (d) $\sqrt{\frac{np}{q}}$	K2	CO3
4	7	Analysis of variance technique was originated in the field of (a) Agriculture (b) Industry (c) Biology (d) Genetics	K1	CO4
	8	The non-parametric test from the following is (a) t test (b) F test (c) Anova (d) Run test	K2	CO4
5	9	The transportation problem deals with the transportation of _____ (a) a single product from several sources to a destination. (b) a multi-product from several sources to several destinations. (c) a single product from several sources to several destinations. (d) a single product from a source to several destinations.	K1	CO5

CONT....

	10	The solution to a transportation problem with m - sources and n - destinations is feasible, if the number of allocations is _____ (a) $m + n - 1$ (b) $m + n + 1$ (c) $m + n$ (d) $m \times n$	K2	CO5
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SECTION - B (35 Marks)

Answer ALL questions

ALL questions carry EQUAL Marks

(5 × 7 = 35)

ALL Questions carry EQUAL Marks (5 × 7 = 35)

Module No.	Question No.	Question	K Level	CO																														
1	11.a.	Calculate the Arithmetic Mean and Median from the following data :	K3	CO1																														
		<table border="1"> <tr> <td>Weights in(Kgs)</td> <td>35</td> <td>40</td> <td>45</td> <td>50</td> <td>55</td> <td>60</td> </tr> <tr> <td>Number of men</td> <td>12</td> <td>18</td> <td>24</td> <td>16</td> <td>6</td> <td>4</td> </tr> </table>			Weights in(Kgs)	35	40	45	50	55	60	Number of men	12	18	24	16	6	4																
	Weights in(Kgs)	35			40	45	50	55	60																									
Number of men	12	18	24	16	6	4																												
(OR)																																		
	11.b.	Describe the Scope of Statistics.																																
2	12.a.	Explain Scatter Diagram method.	K3	CO2																														
	(OR)																																	
	12.b.	Calculate the Rank correlation coefficient for the following data																																
<table border="1"> <tr> <td>x</td> <td>92</td> <td>89</td> <td>87</td> <td>86</td> <td>86</td> <td>77</td> <td>71</td> <td>63</td> <td>53</td> <td>50</td> </tr> <tr> <td>y</td> <td>86</td> <td>83</td> <td>91</td> <td>77</td> <td>68</td> <td>85</td> <td>52</td> <td>82</td> <td>37</td> <td>57</td> </tr> </table>		x	92	89	87	86	86	77	71	63	53	50	y	86	83	91	77	68	85	52	82	37	57											
x	92	89	87	86	86	77	71	63	53	50																								
y	86	83	91	77	68	85	52	82	37	57																								
3	13.a.	Write the procedure of testing of hypothesis.	K4	CO3																														
	(OR)																																	
	13.b.	Explain the test procedure to test the significance of mean in case of small samples																																
4	14.a.	Explain the procedure of Chi-square test for testing independence of attributes.	K5	CO4																														
	(OR)																																	
	14.b.	Explain the test procedure for sign test.																																
5	15.a.	Solve the following transportation problem using the North-West corner rule.	K4	CO5																														
		<table border="1"> <tr> <td></td> <td>D</td> <td>E</td> <td>F</td> <td>G</td> <td>Available</td> </tr> <tr> <td>A</td> <td>11</td> <td>13</td> <td>17</td> <td>14</td> <td>250</td> </tr> <tr> <td>B</td> <td>16</td> <td>18</td> <td>14</td> <td>10</td> <td>300</td> </tr> <tr> <td>C</td> <td>21</td> <td>24</td> <td>13</td> <td>10</td> <td>400</td> </tr> <tr> <td>Requirement</td> <td>200</td> <td>225</td> <td>275</td> <td>250</td> <td></td> </tr> </table>				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	
					D	E	F	G	Available																									
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C	21	24	13	10	400																													
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(OR)																																		
15.b.	Describe CPM and PERT models in the construction of networks.																																	

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	Find the Mean and standard deviation of the salaries	K4	CO1								
		Salary (in Rs.)			75	80	85	90	95	100		
		No. of persons			3	7	18	12	6	4		
2	17	Calculate the coefficient of correlation between x and y for the following data :	K5	CO2								
		x			10	12	13	16	17	20	25	
		y			19	22	26	27	29	33	37	
3	18	A Group of 5 patients treated with medicine 'A' weigh 42, 39, 38, 60 and 41 kgs: Second group of 7 patients from the same hospital treated with medicine 'B' weigh 38, 42, 56, 64, 68, 69 and 62 kgs. Do you agree with the claim that medicine 'B' increases the weight significantly of 5% level of significance?	K5	CO3								
4	19	Three processes A, B and C are tested to see whether their outputs are equivalent. The following observations of outputs are made	K4	CO4								
		A			10	12	13	11	10	14	15	13
		B			9	11	10	12	13			
C	11	10	15	14	12	13						
		Apply the analysis of variance techniques and state the conclusion.										
5	20	Find the IBFS the following transportation problem by Vogel's Approximation Method.	K5	CO5								
					D ₁	D ₂	D ₃	D ₄	Supply			
		S ₁			3	7	6	4	5			
S ₂	2	4	3	2	2							
S ₃	4	3	8	5	3							
Demand	3	3	2	2								