

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)
BSc DEGREE EXAMINATION MAY 2026
(Third Semester)

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

STATISTICS & 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	The most commonly used measure of central tendency is (a) Mean (b) Median (c) Mode (d) Range	K1	CO1
	2	Range is defined as (a) Difference between maximum and minimum values (b) Ratio of mean to median (c) Square of standard deviation (d) Sum of deviations	K2	CO1
2	3	When $r = +1$, it indicates (a) No relationship (b) Perfect positive correlation (c) Perfect negative correlation (d) Random relationship	K1	CO2
	4	The product of regression coefficients $b_{xy} \times b_{yx}$ is always (a) Equal to r^2 (b) Greater than r^2 (c) Less than r^2 (d) Equal to r	K2	CO2
3	5	The probability of making a Type II error is denoted by (a) α (b) β (c) $1-\alpha$ (d) $1-\beta$	K1	CO3
	6	Z-test is suitable for (a) Large samples ($n > 30$) (b) Small samples ($n < 30$) (c) Nominal data (d) Ordinal data	K2	CO3
4	7	Chi-square test is used for (a) Testing equality of variances (b) Testing goodness of fit and independence (c) Testing equality of means (d) Testing linearity	K1	CO4
	8	Non-parametric tests are also called (a) Distribution-free tests (b) Parametric tests (c) Large sample tests (d) Small sample tests	K2	CO4
5	9	If total supply $\neq$ total demand, the problem is (a) Balanced (b) Degenerate (c) Unbalanced (d) Infeasible	K1	CO5
	10	Dummy activity in a network (a) Consumes no time or resources (b) Represents missing data (c) Consumes resources (d) Represents delay	K2	CO5

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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.	The following data are the weights of students in a class. Find the median weights of the students <table><tr><td>X</td><td>10</td><td>20</td><td>30</td><td>40</td><td>50</td><td>60</td><td>70</td></tr><tr><td>f</td><td>4</td><td>7</td><td>12</td><td>15</td><td>13</td><td>5</td><td>4</td></tr></table>	X	10	20	30	40	50	60	70	f	4	7	12	15	13	5	4	K3	CO1														
	X	10	20	30	40	50	60	70																										
	f	4	7	12	15	13	5	4																										
(OR)																																		
11.b.	Find the variance for the number of days patient admitted in the hospital: <table><tr><td>Days of confinement</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td></tr><tr><td>No.of patients</td><td>18</td><td>14</td><td>9</td><td>3</td><td>1</td></tr></table>	Days of confinement	5	6	7	8	9	No.of patients	18	14	9	3	1																					
Days of confinement	5	6	7	8	9																													
No.of patients	18	14	9	3	1																													
2	12.a.	Compute coefficient of correlation for the following data: <table><tr><td>X</td><td>12</td><td>9</td><td>8</td><td>10</td><td>11</td><td>13</td><td>7</td></tr><tr><td>Y</td><td>14</td><td>8</td><td>6</td><td>9</td><td>11</td><td>12</td><td>3</td></tr></table>	X	12	9	8	10	11	13	7	Y	14	8	6	9	11	12	3	K4	CO2														
	X	12	9	8	10	11	13	7																										
	Y	14	8	6	9	11	12	3																										
(OR)																																		
12.b.	Define regression and its types in brief.																																	
3	13.a.	What is hypothesis and explain different types of hypotheses with an example?	K4	CO3																														
	(OR)																																	
	13.b.	A sample of 900 items has mean 3.4 and standard deviation 2.61. Can the sample be regarded as drawn from a population with mean 3.25 at 1% level of significance? (The table value of z at 1% level is 2.58)																																
4	14.a.	Apply χ^2 test to find out if the following figures provide evidence of the effectiveness of inoculations <table><tr><td></td><td>Attacked</td><td>Not attacked</td><td>Total</td></tr><tr><td>Inoculated</td><td>20</td><td>300</td><td>320</td></tr><tr><td>Not Inoculated</td><td>80</td><td>600</td><td>680</td></tr><tr><td>Total</td><td>100</td><td>900</td><td>1000</td></tr></table> (The table value of $\chi^2=3.84$)		Attacked	Not attacked	Total	Inoculated	20	300	320	Not Inoculated	80	600	680	Total	100	900	1000	K2	CO4														
		Attacked	Not attacked	Total																														
	Inoculated	20	300	320																														
Not Inoculated	80	600	680																															
Total	100	900	1000																															
(OR)																																		
14.b.	Write a short note on non parametric test in brief.																																	
5	15.a.	Obtain the initial basic feasible solution of the transportation problem using north west corner rule. <table><tr><td>*</td><td>D1</td><td>D2</td><td>D3</td><td>Supply</td></tr><tr><td>O1</td><td>2</td><td>7</td><td>4</td><td>5</td></tr><tr><td>O2</td><td>3</td><td>3</td><td>1</td><td>8</td></tr><tr><td>O3</td><td>5</td><td>4</td><td>7</td><td>7</td></tr><tr><td>O4</td><td>1</td><td>6</td><td>2</td><td>14</td></tr><tr><td>Demand</td><td>7</td><td>9</td><td>18</td><td>34</td></tr></table>	*	D1	D2	D3	Supply	O1	2	7	4	5	O2	3	3	1	8	O3	5	4	7	7	O4	1	6	2	14	Demand	7	9	18	34	K4	CO5
	*	D1	D2	D3	Supply																													
	O1	2	7	4	5																													
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O3	5	4	7	7																														
O4	1	6	2	14																														
Demand	7	9	18	34																														
(OR)																																		
15.b.	Explain the concept of Programme Evaluation and Review Technique (PERT) in brief																																	
			K4	CO5																														

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SECTION -C (30 Marks)

Answer ANY THREE questions

ALL questions carry EQUAL Marks

(3 × 10 = 30)

Module No.	Question No.	Questions	K Level	CO																																								
1	16	Obtain the coefficient of variation for the given data: 27, 28, 56, 59, 63, 75	K3	CO1																																								
2	17	Calculate the regression equation of X on Y from the data given below, <table><tr><td>x</td><td>12</td><td>14</td><td>15</td><td>14</td><td>18</td><td>17</td></tr><tr><td>y</td><td>42</td><td>40</td><td>45</td><td>47</td><td>39</td><td>45</td></tr></table>	x	12	14	15	14	18	17	y	42	40	45	47	39	45	K4	CO2																										
x	12	14	15	14	18	17																																						
y	42	40	45	47	39	45																																						
3	18	An IQ test was administrated to 5 persons before and after they were trained, and the results are given below., <table><tr><td>Candidates</td><td>I</td><td>II</td><td>III</td><td>IV</td><td>V</td></tr><tr><td>IQ before gtraining</td><td>110</td><td>120</td><td>123</td><td>132</td><td>125</td></tr><tr><td>IQ after training</td><td>120</td><td>118</td><td>125</td><td>136</td><td>121</td></tr></table> <i>(The table value of t for 4 df at 1% level is 4.6)</i>	Candidates	I	II	III	IV	V	IQ before gtraining	110	120	123	132	125	IQ after training	120	118	125	136	121	K4	CO3																						
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IQ before gtraining	110	120	123	132	125																																							
IQ after training	120	118	125	136	121																																							
4	19	There are three brands of a certain powder. A set of 120 sample values is examined and found to be allocated among four groups (A,B,C and D) and three brands (I, II, III) as shown here., <table><tr><th rowspan="2">Brands</th><th colspan="4">Groups</th></tr><tr><th>A</th><th>B</th><th>C</th><th>D</th></tr><tr><td>I</td><td>0</td><td>4</td><td>8</td><td>15</td></tr><tr><td>II</td><td>5</td><td>8</td><td>13</td><td>6</td></tr><tr><td>III</td><td>18</td><td>19</td><td>11</td><td>13</td></tr></table> Using One way ANOVA, test whether there is any significant difference in brand preference. <i>(Table value of F at 5% level for (2,9)df=4.26)</i>	Brands	Groups				A	B	C	D	I	0	4	8	15	II	5	8	13	6	III	18	19	11	13	K4	CO4																
Brands	Groups																																											
	A	B	C	D																																								
I	0	4	8	15																																								
II	5	8	13	6																																								
III	18	19	11	13																																								
5	20	The following table lists the jobs of a network with their estimates. <table><tr><th>Jobs</th><th>Optimistic</th><th>Most likely</th><th>Pessimistic</th></tr><tr><td>1-2</td><td>3</td><td>6</td><td>15</td></tr><tr><td>1-6</td><td>2</td><td>5</td><td>14</td></tr><tr><td>2-3</td><td>6</td><td>12</td><td>30</td></tr><tr><td>2-4</td><td>2</td><td>5</td><td>8</td></tr><tr><td>3-5</td><td>5</td><td>11</td><td>17</td></tr><tr><td>4-5</td><td>3</td><td>6</td><td>15</td></tr><tr><td>6-7</td><td>3</td><td>9</td><td>27</td></tr><tr><td>5-8</td><td>1</td><td>4</td><td>7</td></tr><tr><td>7-8</td><td>4</td><td>19</td><td>28</td></tr></table> Draw the project network and calculate the length and variance of the critical path.	Jobs	Optimistic	Most likely	Pessimistic	1-2	3	6	15	1-6	2	5	14	2-3	6	12	30	2-4	2	5	8	3-5	5	11	17	4-5	3	6	15	6-7	3	9	27	5-8	1	4	7	7-8	4	19	28	K5	CO5
Jobs	Optimistic	Most likely	Pessimistic																																									
1-2	3	6	15																																									
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3-5	5	11	17																																									
4-5	3	6	15																																									
6-7	3	9	27																																									
5-8	1	4	7																																									
7-8	4	19	28																																									

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