

K. J. Somaiya Institute of Technology, Sion, Mumbai-22
(Autonomous College Affiliated to University of Mumbai)

May-June 2024	Scheme I/II/IIB/III: <u>II</u>
(B.Tech / M.Tech.) Program: M.Tech All Programmes	Regular Examination: FY Semester: II
Course Code: PCEILC2056 and Course Name: Research Methodology	
Date of Exam: <u>27/05/2024</u>	Duration: 02.5 Hours Max. Marks: 60

Instructions:
(1) All questions are compulsory. (2) Draw neat diagrams wherever applicable. (3) Assume suitable data.

		Max. Marks	CO	BT level
Q 1	Solve any six questions out of eight:	12		
i)	Explain the term postulate in brief.	02	CO1	2
ii)	Compare quantitative and qualitative research.	02	CO2	4
iii)	Compare primary data and secondary data	02	CO3	4
iv)	State the properties of exponential distribution	02	CO4	1
v)	What do you understand about a balanced and an unbalanced transportation problem? Demonstrate how an unbalanced problem can be tackled.	02	CO5	3
vi)	Explain the various methods useful for decision making under uncertainty	02	CO6	2
vii)	Write the steps involved in formulating a research problem	02	CO2	2
viii)	Explain in a brief sign test.	02	CO4	2
Q.2	Solve any four questions out of six.	16		
i)	Discuss law and principle with suitable examples.	04	CO1	2
ii)	State True/false and justify : sample size is directly proportional to variability in the population and independent of population size.	04	CO2	5
iii)	What is validity? Why is it important in research?	04	CO3	5
iv)	Explain the steps involved in hypothesis testing	04	CO4	2
v)	Explain the meaning of duality in linear programming and demonstrate how it can be used for the following: Maximise $Z = 2X_1 + 3X_2$ Subject to, $X_1 + 2X_2 \leq 10$ $2X_1 + 2X_2 \geq 1$ Where $X_1, X_2, \geq 0$	04	CO5	3
vi)	Discuss the different tools used for management decision making.	04	CO6	2
Q.3	Solve any two questions out of three.	16		

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(B.Tech / M.Tech.) Program: M.Tech All Programmes Scheme I/II/IIB/III:
 Regular Examination: FY Semester: II
 Course Code: PCEILC2051 and Course Name: Research Methodology
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i)	Justify -the research should be systematic, logical, empirical and verifiable.	08	CO1	5																																	
ii)	Genetic theory states that children having one parent of blood type <i>A</i> and the other of blood type <i>B</i> will always be of one of three types, <i>A</i> , <i>AB</i> , <i>B</i> and that proportion of three types will on an average be as 1:2:1. A report states that out of 300 children having one <i>A</i> parent and <i>B</i> parent, 30 percent were found to be types <i>A</i> , 45 percent were found to be type <i>AB</i> and remainder type <i>B</i> . Test the hypothesis by chi square test.	08	CO4	6																																	
iii)	A machine tool company decides to make four subassemblies through four contractors. Each contractor is to receive only one subassembly. The cost of each assembly is determined by the bids submitted by each contractor and is shown as in hundreds of rupees as shown below. Assign the different subassemblies to contractors so as to minimise the total cost. <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="2"></th> <th colspan="4" style="text-align: center;">Contractors</th> </tr> <tr> <th colspan="2"></th> <th style="text-align: center;">1</th> <th style="text-align: center;">2</th> <th style="text-align: center;">3</th> <th style="text-align: center;">4</th> </tr> </thead> <tbody> <tr> <th rowspan="4" style="text-align: right; vertical-align: middle;">Subassemblies</th> <th style="text-align: right;">1</th> <td style="text-align: center;">15</td> <td style="text-align: center;">13</td> <td style="text-align: center;">14</td> <td style="text-align: center;">17</td> </tr> <tr> <th style="text-align: right;">2</th> <td style="text-align: center;">11</td> <td style="text-align: center;">12</td> <td style="text-align: center;">15</td> <td style="text-align: center;">13</td> </tr> <tr> <th style="text-align: right;">3</th> <td style="text-align: center;">13</td> <td style="text-align: center;">12</td> <td style="text-align: center;">10</td> <td style="text-align: center;">11</td> </tr> <tr> <th style="text-align: right;">4</th> <td style="text-align: center;">15</td> <td style="text-align: center;">17</td> <td style="text-align: center;">14</td> <td style="text-align: center;">16</td> </tr> </tbody> </table>			Contractors						1	2	3	4	Subassemblies	1	15	13	14	17	2	11	12	15	13	3	13	12	10	11	4	15	17	14	16	08	CO5	6
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Q.4	Solve any two questions out of three.	16																																			
i)	The effect of price and store size of pharmaceutical products need to be studied at three and two levels respectively. Which research design method should be adopted and why?	08	CO2	5																																	
ii)	Justify that interpretation is a fundamental component of research process.	08	CO3	5																																	
iii)	The Indian Yacht Company has developed a new cabin cruiser which they have earmarked for the medium to large boat market. A market analysis has a 30% probability of annual sales being 5,000 boats, a 40% probability of 4,000 annual sales and a 30% probability of 3,000 annual sales. This company can go into limited production, where variable costs are Rs. 10,000 per boat, and fixed costs are Rs.8 lakhs annually. They can go into full scale production , where variable costs are Rs 9,000 per boat, and fixed costs are Rs. 50 lakhs annually. If the new boat is to be sold for Rs. 11,000, should the company go into limited or full scale production when their objective is to maximise the expected profits?	08	CO6	6																																	
