

B.Tech - Odd Sem : End Semester Exam
Academic Year:2020-2021

18EC3019 - System Engineering, Operation Research & Designing
Set No: 2

Time:		Max.Marks: 100																																						
S.NO	Answer All Questions	Choice	Options	Marks	CO	CO BTL	COI BTL																																	
1.	What do you understand by life cycle? You can also use the diagram to show it. Explain the concept development phases using block diagram and short discussion on each stage.	choice Q-2		10Marks	CO1	2	2																																	
2.	Define what is complex system and explain in short with example what is Engineered Complex Systems and Complex Non-Engineered System. Explain open and closed systems with suitable diagrams by using system boundary.			10Marks	CO1	2	2																																	
3.	Carry out the functional analysis for washing machine. Draw the functional block diagram and functional decomposition. Use suitable diagrams	choice Q-4		15Marks	CO1	2	2																																	
4.	Carry out the functional analysis for an Elevator. Draw the functional block diagram and functional decomposition. Use suitable diagrams.			15Marks	CO1	2	2																																	
5.	A school is preparing a trip for 500 students. The company who is providing the transportation has 10 buses of 50 seats each and 8 buses of 40 seats, but only has 9 drivers available. The rental cost for a large bus is \$900 and \$700 for the small bus. Calculate how many buses of each type should be used for the trip for the least possible cost.	choice Q-6		10Marks	CO2	3	3																																	
6.	A transport company has two types of trucks, Type A and Type B. Type A has a refrigerated capacity of 25m ³ and a non-refrigerated capacity of 45m ³ while Type B has the same overall volume with equal sections for refrigerated and non-refrigerated stock. A grocer needs to hire trucks for the transport of 2000m ³ of refrigerated stock and 4000m ³ of non-refrigerated stock. The cost per kilometer of a Type A is \$20, and \$30 for Type B. Formulate the linear programming problem to find number of trucks of each type should the grocer rent to achieve the minimum total cost?			10Marks	CO2	3	3																																	
7.	(a) Determine the expected value and the variance of the completion time for each activity. (b) Use the expected times from (a) to find the critical path. (c) Assuming that the normal distribution applies, determine the probability that the critical path will take between 18 and 26 days to complete	choice Q-8		15Marks	CO2	3	3																																	
<table border="1"> <thead> <tr> <th>Activity</th> <th>Preceding Activity</th> <th>Optimistic Completion Time days</th> <th>Most Likely Completion Time days</th> <th>Pessimistic Completion Time days</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>-</td> <td>6</td> <td>8</td> <td>9</td> </tr> <tr> <td>B</td> <td>A</td> <td>4</td> <td>6</td> <td>15</td> </tr> <tr> <td>C</td> <td>A</td> <td>5</td> <td>16</td> <td>21</td> </tr> <tr> <td>D</td> <td>B, C</td> <td>3</td> <td>5</td> <td>7</td> </tr> <tr> <td>E</td> <td>C</td> <td>5</td> <td>16</td> <td>18</td> </tr> </tbody> </table>		Activity	Preceding Activity	Optimistic Completion Time days	Most Likely Completion Time days	Pessimistic Completion Time days	A	-	6	8	9	B	A	4	6	15	C	A	5	16	21	D	B, C	3	5	7	E	C	5	16	18									
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8.	Solve a mixed strategy problem given in the table below. (a) Find value of the game (b) Find the probabilities of all strategies			15Marks	CO2	3	3																																	
<table border="1"> <thead> <tr> <th colspan="2"></th> <th colspan="4">Company B</th> </tr> <tr> <th colspan="2"></th> <th>B1</th> <th>B2</th> <th>B3</th> <th>B4</th> </tr> </thead> <tbody> <tr> <th rowspan="4">Company A</th> <th>A1</th> <td>35</td> <td>65</td> <td>25</td> <td>5</td> </tr> <tr> <th>A2</th> <td>30</td> <td>20</td> <td>15</td> <td>0</td> </tr> <tr> <th>A3</th> <td>40</td> <td>50</td> <td>0</td> <td>10</td> </tr> <tr> <th>A4</th> <td>55</td> <td>60</td> <td>10</td> <td>15</td> </tr> </tbody> </table>				Company B						B1	B2	B3	B4	Company A	A1	35	65	25	5	A2	30	20	15	0	A3	40	50	0	10	A4	55	60	10	15						
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9.	Explain objectives of functional design and analysis in System Development Phase.	choice Q-10		10Marks	CO3	3	3																																	
10.	Explain the System Development Process workflow through a block diagram.			10Marks	CO3	3	3																																	
11.	What is Preliminary Design? What tasks it includes? What are the objectives of Preliminary Design Review (PDR) and what is the outcome of PDR? What are the activities included in Component Design and Design Validation?	choice Q-12		15Marks	CO3	3	3																																	
12.	Why do so many new complex system developments incur large risks by choosing to apply immature technology? Give an example of where and how such choices paid off and one where they did not			15Marks	CO3	3	3																																	
13.	Critically Compare the User Experience of any two products of same type in the form of attributes of User Experience	choice Q-14		10Marks	CO4	2	2																																	
14.	What is user Interface and what are important attributes of User Experience? Explain How to conduct a study before considering design of User Interface			10Marks	CO4	2	2																																	
15.	How to introduce design thinking mind set, when you have a set of students who are accustomed to Traditional mind set and they tend to feel nervous to participate in discussions or process. What timeframe we should allocate for them to join-in? What steps/process we can introduce to help them to migrate from Traditional mind set to design thinking/product development mind set! From which year in engineering we should introduce design thinking process?	choice Q-16		15Marks	CO4	2	2																																	
16.	Design a User interface for a car considering a drunk man is driving			15Marks	CO4	2	2																																	

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