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Enrolment No:																																				
UPES End Semester Examination, December 2023																																				
Course: B. Tech Mechanical engineering Program: Industrial Engineering Course Code: MEPD3004		Semester: V Time : 03 hrs. Max. Marks: 100																																		
Instructions:																																				
SECTION A (5Qx4M=20Marks)																																				
S. No.		Marks	CO																																	
Q 1	The observed time for an element is 1.2 minutes. The pace rating for the element is 120% and job difficulty is found to be 30%. Find Normal Time of the element. Also find standard Time a t a n allowance of 10%.	4	CO3																																	
Q2	List out the important factors which determine the location of an industrial plant in rural sector.	4	CO1																																	
Q3	In a project where budget constraints are tight, how do you make decisions regarding cost-effective solutions without sacrificing quality or efficiency?	4	CO3																																	
Q4	Describe any two inventory analysis techniques.	4	CO2																																	
Q5	Define SQC and SPC . How is it different from inspection?	4	CO1																																	
SECTION B (4Qx10M= 40 Marks)																																				
Q6	<p>The following data gives readings of 10 samples of size 6 each in the production of a certain product. Draw control chart for mean and range with its control limits.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>Sample</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td>6</td> <td>7</td> <td>8</td> <td>9</td> <td>10</td> </tr> <tr> <td>Mean</td> <td>383</td> <td>508</td> <td>505</td> <td>582</td> <td>557</td> <td>337</td> <td>514</td> <td>614</td> <td>707</td> <td>753</td> </tr> <tr> <td>Range</td> <td>95</td> <td>128</td> <td>100</td> <td>91</td> <td>68</td> <td>65</td> <td>148</td> <td>28</td> <td>37</td> <td>80</td> </tr> </table>	Sample	1	2	3	4	5	6	7	8	9	10	Mean	383	508	505	582	557	337	514	614	707	753	Range	95	128	100	91	68	65	148	28	37	80	10	CO2
Sample	1	2	3	4	5	6	7	8	9	10																										
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Q7	Discuss the functions and significance of MATERIAL Resource Planning?	10	CO1																																	
Q8	In a manufacturing unit, a sample of 5 sheets is taken every one hour. The data collected from the measurement of thickness of these sheets is tabulated below:	10	CO3																																	

Sample number	I	II	III	IV	V
1	25	31	22	26	24
2	32	31	30	34	33
3	35	34	33	32	32
4	26	25	29	30	25
5	33	34	30	29	33
6	34	32	31	28	27

Draw the control chart for mean and range, and establish whether the process is under control?

Q9	Briefly explain the following in context of an industry. A. 5S B. six sigma C. Kaizen	10	CO2
SECTION-C (2Qx20M=40 Marks)			
Q10	(a) Describe the EOQ MODEL with DISCOUNT . (b) A motor company requires 50000 speedometer / year. The ordering, receiving and handling cost is Rs. 3/ order, while inspection cost is Rs. 12/order. Interest Cost = Rs. 0.06/unit/year. Obsolescence Cost=Rs. 0.004/unit/year, Storage Cost = Rs. 1000/yr. for 50000 units. Calculate following: <ul style="list-style-type: none"> • EOQ • Re-order period • No. of orders/yr. • Total variable cost of inventory <p style="text-align: center;">OR</p> Explain the advantages of scheduling orders and briefly explain various production control activities.	20	CO3
Q11	Du Pont Process control networks are one of the essential applications of IT manufacturing environments. For example, more than 2400 oil, natural gas and chemical companies in the united states employ process control networks in their manufacturing systems. Other heavy users of process	20	CO2/CO 3

networks include power, water, food, drug, automobile, metal, mining and manufacturing industries. For example, process network in the chemical industry control, chemical making equipment and monitor sensors. If anything goes wrong such networks react by adjusting the environment in predefined ways, such as shutting off gas flow to prevent leaks or explosions. sp3 3 BS2127 One company that's taking process network security seriously and involving IT is Du Pont Co. in Wilmington, Delaware. Tom good, a project engineer at the chemical manufacturer, has been leading its 20 month old efforts to categorize and reduce its process control systems vulnerabilities. Du Pont's philosophy for dealing with this problem, he says is that "On all of our critical manufacturing processes, we are going to totally isolate our process from our business systems by not connecting out networks, or we are going to put in firewalls to control access.

Questions : What security measures is Du Pont taking to protect their process-control networks? Are the measures are adequate? Explain with valid arguments.

OR

It the responsibility for maintaining the quality of the product and incurring less cost on its production is the responsibility of the production/Operation and deciding the price of the product and finding the customers that will buy it comes under "marketing", what does the materials management function do?