



UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, December 2021

Course: Operations & Materials Management

Semester: III


Program: BBA (Aviation Management)

Duration: 3 Hrs.

Course Code: LSCM 2001

Max. Marks: 100

Instructions: Do as directed in each section.

Q.1	Section A (Answer all questions)	20 Marks	COs
(i)	What is input to a windmill?	2	CO1
(ii)	Mention names of two quality gurus.	2	
(iii)	_____ is a measure of competitiveness. [Select right answer] a) productivity b) GDP c) Both d) None of these	2	
(iv)	One of the location alternative can be selected, if on knows _____ a) their fixed costs and variable costs b) total costs c) both [Select right answer]	2	
(v)	Mention one controllable and one uncontrollable factors in the process of selecting a plant facility location.	2	
(vi)	While designing a layout, a zig-zag line code '  ' is used in the relationship diagram, which means _____. [Select right answer] a) unimportant b) undesirable	2	
(vii)	Can a project network have two critical paths? [Select right answer] a) Always b) Sometimes c) Never	2	
(viii)	_____ is an input to _____. [Fill in the blanks by using two words from: CRP, BOM, MRP, ERP]	2	
(ix)	VED Analysis is one of the popular inventory analysis. VED stands for _____.	2	
(x)	As per the value analysis concept, Value = (_____) / (_____) [Fill in the blanks]	2	

Q.2	Section B (Answer all questions)	20 Marks	COs										
(i)	Explain how operations management acts as a technical core in a manufacturing business.	5	CO2										
(ii)	Explain the difference between efficiency and effectiveness in terms of value.	5											
(iii)	Product and service designs are interrelated to the process design. Justify.	5											
(iv)	Describe different types of layouts and their suitability for different types of production.	5											
Q.3	Section C (Answer all questions)	30 Marks	COs										
(i)	The observed time of assembling an electric switch is one minute. The assembler has a performance rating of 120%, and both the process and personal allowances are at the rate of 10%. Then for the assembly operation, determine – <ul style="list-style-type: none"> • Basic time • Normal time • Standard time 	10	CO3										
(ii)	<p>ABC company produces toilet soaps at their works in B'bay. Aggregate planning measures used by ABC is tonnes of soap which includes making and packing of the soap. The planning is done for a time horizon of one year, over 4 quarters.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Quarter</th> <th>I</th> <th>II</th> <th>III</th> <th>IV</th> </tr> </thead> <tbody> <tr> <td>Demand (in tonnes)</td> <td style="text-align: center;">40</td> <td style="text-align: center;">60</td> <td style="text-align: center;">50</td> <td style="text-align: center;">45</td> </tr> </tbody> </table> <p>The company has a regular work force which can produce 35 tonnes of output per quarter. If the workers are allowed to work overtime with a restriction that the extra time cannot be more than 20% of the regular time in any case. The output raises by 25% higher than regular production during overtime. But the overtime expenses are 40% more than that of regular time. The company subcontracts the soap making and packing operation to an SSI unit but only at the cost of 50% premium than the cost of production. The regular time production costs are Rs. 10,000/- per tonne. No shortages are allowed as per company policy. Inventory carrying costs are Rs. 5,000/- per tonne per annum.</p> <ul style="list-style-type: none"> • Design the cost efficient aggregate plan with no starting inventory. • Compute total production cost. 	Quarter	I	II	III	IV	Demand (in tonnes)	40	60	50	45	10	CO3
Quarter	I	II	III	IV									
Demand (in tonnes)	40	60	50	45									

(iii)	<p>The spare parts stores department of a factory has the following cost data in the table. Classify the spare parts into A, B and C categories as per the principles of ABC analysis of inventory.</p> <table border="1" data-bbox="298 302 1214 380"> <tr> <td>Parts</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>Costs</td> <td>550</td> <td>250</td> <td>60</td> <td>50</td> <td>40</td> <td>20</td> <td>12</td> <td>8</td> <td>6</td> <td>4</td> </tr> </table> <p style="text-align: center;">OR</p> <p>A company has annual demand of a particular part for ten thousand pieces per year. The purchase cost per unit is two rupees and the cost of placing an order is thirty-six rupees. Carrying the inventory costs at the rate of 9% of the average inventory investment. Determine –</p> <ul style="list-style-type: none"> • The economic ordering quantity. • The optimal ordering cost. • The optimal inventory carrying cost. • The optimal total inventory cost. 	Parts	1	2	3	4	5	6	7	8	9	10	Costs	550	250	60	50	40	20	12	8	6	4	10	CO3						
Parts	1	2	3	4	5	6	7	8	9	10																					
Costs	550	250	60	50	40	20	12	8	6	4																					
Q.4	<p>Section D</p> <p>(Answer all questions)</p>	30 Marks	COs																												
(i)	<p>The forecasted demand for a product for 6 months cycle is shown. Each unit requires 10 man hours and labor cost is Rs.6/hr regular time and Rs.9/hr OT. The total cost per unit is estimated to be Rs.200 and can be subcontracted at the cost of Rs.208/unit. Currently there are 20 workers employed and hiring & training costs for additional workers are Rs.300/person whereas layoff costs/person is Rs.400/-. Company has a policy of retaining a safety stock of 20% of the monthly forecast and each month's safety stock becomes the beginning inventory for the next month. There are currently 50 units in stock carried at a cost of Rs.2/month. Stock out cost is Rs. 20/unit /month.</p> <table border="1" data-bbox="298 1310 1230 1541"> <thead> <tr> <th></th> <th>Jan</th> <th>Feb</th> <th>Mar</th> <th>Apr</th> <th>May</th> <th>Jun</th> </tr> </thead> <tbody> <tr> <td>Forecast Demand</td> <td>300</td> <td>500</td> <td>400</td> <td>100</td> <td>200</td> <td>300</td> </tr> <tr> <td>Works days</td> <td>22</td> <td>19</td> <td>21</td> <td>21</td> <td>22</td> <td>20</td> </tr> <tr> <td>Worker hr at 8/day</td> <td>176</td> <td>152</td> <td>168</td> <td>168</td> <td>176</td> <td>160</td> </tr> </tbody> </table> <p>Three aggregate plans are proposed.</p> <ul style="list-style-type: none"> • Vary the work-force size to accommodate demand. • Maintain a constant work force of 20 and use overtime and idle time to meet demand • Maintain constant work force of 20 and build inventory or incur stock out cost. The firm must begin January with 50 inventory units on hand. <p>Compare the costs of three plans and suggest the best one.</p>		Jan	Feb	Mar	Apr	May	Jun	Forecast Demand	300	500	400	100	200	300	Works days	22	19	21	21	22	20	Worker hr at 8/day	176	152	168	168	176	160	15	CO4
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Worker hr at 8/day	176	152	168	168	176	160																									

(ii)

A company manufactures seasonal products. The information regarding the seasonal demand pattern, available production capacities during regular time, overtime and other details are as follows:

Available Production Capacity (units)				Demand Forecast	
Period	RT	OT	SC	Period	Demand
1	900	350	600	1	700
2	1000	350	600	2	1000
3	1100	350	600	3	2000
4	700	350	600	4	1200

Some other relevant data –

- Initial inventory = 200 units
- Final inventory = 25 units
- Regular time prodn. cost/ unit = Rs.125/-
- Over time prodn. cost/unit = Rs.150/-
- Subcontracting cost/unit = Rs.175/-
- Inventory Carrying cost/unit/period = Rs.25/-

Formulate the problem as a transportation model to determine the optimum production levels and means of production for next four quarters.

OR

Explain the ten functions of production planning and controlling (PPC) cycle and describe how these are carried out in relation to each other in a car manufacturing company.

15

CO4