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**UNIVERSITY OF PETROLEUM  
AND ENERGY STUDIES**

**End Semester Examination, May 2018**

**Program/course: MBA(General Management)**

**Subject: Production Planning and Control**

**Code : LSCM7010**

**No. of page/s: 4**

**Semester – II**

**Max. Marks : 100**

**Duration : 3 Hrs.**

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**Section A**

**Maximum Marks: 20**

**Note: Attempt all questions.**

**1.** Mark True/False (T/F) for the following (4 marks)

- a) Scheduled receipt is derived from MPS or planned order release of the parent (T/F)
- b) Time phasing is the lowest level at which the item appears in product structure (T/F)
- c) Correct amount of aggregation is highly dependent on type of products or services (T/F)
- d) In Assemble to Order, the product is completely made into their final form and stocked as finished goods (T/F)

**2.** Fill in the blanks (16 marks)

- i. \_\_\_\_\_ is known as the heartbeat of the customer
- ii. The three general categories of strategic approaches used as a part of Sales and Operations Planning are \_\_\_\_\_, \_\_\_\_\_ and \_\_\_\_\_
- iii. \_\_\_\_\_ inventory is the inventory purposely placed between operations to allow them to operate independently of one another.
- iv. \_\_\_\_\_ lot sizing technique is discrete, simple and straightforward that provides for period coverage netting

- v. The original approach to JIT focussed on \_\_\_\_\_ reduction.
- vi. The process of breaking down of aggregate plan into finer detail is called \_\_\_\_\_.

### Section B

**Note: Attempt any four questions. Each question carries 5 marks.**

- 3. Discuss how a lean production system can still operate effectively under uncertain market conditions-or can it?
- 4. What changes, if any, will the perishability of the inventory have on the capability of the company in using a level strategy? Consider, for example, a fast food restaurant.
- 5. What are the various subjective forecasting methods? Explain
- 6. Show diagrammatically the Hayes Wheelwright matrix?
- 7. What are the various classifications of layout? Explain any two.
- 8. What are the various types of Priority Decision Rules?

### Section C

**Note: Attempt any three questions. Each question carries 10 marks.**

- 9. Given below is the demand data:

<b>Period</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>
<b>Demand</b>	<b>17</b>	<b>22</b>	<b>23</b>	<b>27</b>	<b>17</b>	<b>18</b>	<b>20</b>	<b>26</b>

Use the regression equation to forecast the demand for period 9.

- 10. Find the optimal order quantity of a product for which the price breaks are as follows:

<b>Quantity(units)</b>	<b>Price per unit(Rs.)</b>
<b><math>0 &lt; Q_1 &lt; 100</math></b>	<b>200</b>
<b><math>101 \leq Q_2 &lt; 200</math></b>	<b>180</b>
<b><math>200 \leq Q_3</math></b>	<b>160</b>

The annual demand of the product is 4800 units, the storage cost is 20 percent of the unit cost and the cost of ordering is Rs. 50 per order.

- 11. A book binder has one printing press, one binding machine and manuscripts of 7 different books. The process is first printing and then binding. The times required for performing binding and printing operations for different books are shown below:

<b>Book</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>
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Binding time(hours)	20	90	80	20	120	15	65
Printing time(hours)	25	60	75	30	90	35	50

Decide the optimum sequence of processing of books in order to minimize the total time required to bring out all the books. Also find the total minimum elapsed time.

12. Amit manufactures 50000 bottles of tomato ketchup in a year. The price per bottle is Rs. 6, the setup cost per production run is estimated to be Rs. 90, the carrying cost amounts to 20 percent of the price per annum. The production rate is 600 bottles per day, and the demand rate is 150 bottles per day. What is the optimal production lot size ( $Q^*$ )?

### Section D

Maximum Marks: 30

Note: Attempt any two questions. Each question carries 15 marks

13. For the below demand data set apply the Wagner-Whitin Algorithm

Period	1	2	3	4
Demand	50	80	180	80

Setup Cost(Ordering Cost) = Rs. 206, Inventory Carrying Cost = Rs. 4 per part period

The formula for the same is given as under:

$$\text{Let } F(t) = \min \left[ \min \left[ s_j + \sum_{h=j}^{t-1} \sum_{k=h+1}^t i_h d_k + F(j-1) \right], s_t + F(t-1) \right]$$

14. Product A is made from two components, B and C. It takes one B and three C's to make a single product A. Component B is made from two parts D's. Component C is made from one part D and 2 part E's. Use this information together with data below to answer the following questions:

Part	Lead Time	Lot Size	On hand	Scheduled Rcpts
A	1	Lot for Lot	50	None
B	1	Lot for Lot	10	None
C	2	200	100	None
D	1	300	120	None
E	2	500	0	500, week 1

a) Make MRP records for A, B, C, D, and E. Production quantities and production start dates for A are: 20 in week 2, 50 in week 4, 30 in week 6, 40 in week 7, 50 in week 9, and 40 in week 11.

Use the below MRP record:

<b>Week</b>	
Gross Requirement	
Scheduled receipts	
Projected Available	
Net requirements	
Planned order receipt	
Planned order release	

**15.** ABC company produces toilet soaps at their works. 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 or four quarters.

Quarter	1	2	3	4
Demand	35	55	60	45

The company has a regular workforce which can produce 35 tonnes of output per quarter. If the workers are allowed to work overtime with the restriction that the extra time cannot be more than 20% of the regular time. The output rate is 25% higher than regular time during overtime but the overtime expenses are 40% more than the regular time. The company subcontracts the soap making and packing operation but only at a cost of 50% premium than the cost of production. The regular time production costs are Rs. 10000/- per tonne.

No shortages are allowed as per company policy. Inventory carrying costs are Rs. 5000/- per tonne per annum.

Design the cost efficient aggregate plan assuming zero starting inventory. Compute the total production cost.