



UNIVERSITY OF RUHUNA

Faculty of Engineering

End-Semester 6 Examination in Engineering: November 2017

Module Number: ME6304

Module Name: Production Planning and Control

[Three Hours]

[Answer all questions, each question carries twelve marks]

Q1 Production Planning and Control (PPC) is a set of functions concerned with the effectively utilization of limited resources, management of the material flow, and create profit for the organization by satisfying the customer demand.

a) Explain, the importance of making accurate PPC decisions of

- Forecasting
- Capacity planning
- Inventory management
- Scheduling

for increasing the profit of a mobile phone manufacturer?

[4.0 Marks]

b) Explain some of the consequences of poor technology forecasting by providing an example.

[2.0 Marks]

c) Demand for a particular product of ABC company is shown in the Table Q1.c. Forecast the expected demand for the next year January by using the simple exponential smoothing average method by considering $\alpha = 0.3$ and $\alpha = 0.5$. Out of two forecasts, which one you accept, justify your answer.

Table Q1.c

Period	Month	Demand
01	January	37
02	February	40
03	March	41
04	April	37
05	May	45
06	June	50
07	July	43
08	August	47
09	September	56
10	October	52
11	November	55
12	December	54

[6.0 Marks]

Q2 Assume, you are the "Capacity Planning Manager" of a global Apparel Manufacturer, whose portfolio of business with the revenue of USD 1.8 million. Currently your organization has 40 manufacturing facilities in Sri Lanka and its export market is mainly based on Europe and United States of America (USA).

a) You have received a feedback from the sales team in USA that, they have an issue with the lead time of selected garments as the customer is expecting to deliver them within 5-10 working days and the raw materials for these selected garments are imported from USA, thus Sri Lankan based manufacturing facilities are not able to deliver these garments on time. As the "Capacity Planning Manager", discuss potential solution to the problematic issue forwarded by the USA sales team.

[4.0 Marks]

b) Following Table Q2.b indicates the variation of fixed cost and variable cost for setting up an Apparel Manufacturing facility. Provide your recommendations to select the location for the new Apparel Manufacturing facility considering total product cost variation of each location.

Table Q2.b

Location	Fixed Cost \$	Variable Cost \$
A	350,000	5
B	170,000	25
C	100,000	40
D	250,000	20

[4.0 Marks]

c) Discuss the important factors to be considered in plant layout design for the Apparel Manufacturing facility

[4.0 Marks]

Q3 a) Explain the scope of material management for a manufacturing organization by using an example.

[2.0 Marks]

b) Provide an overview on "Purchasing Parameters"

[3.0 Marks]

c) What are the different cost components associated with inventory

[2.0 Marks]

d) A manufacturing company has a demand of 30,000 units per year for a particular component. The cost per unit is 5 Rupees, and it costs 40 Rupees to place an order and process the delivery. The inventory carrying cost is estimated as at 0.9 of the average inventory investment. Determine,

- I. Economic order quantity
- II. Optimum number of orders to be sold per annum
- III. Minimum cost of inventory

[5.0 Marks]

- Q4 a) Discuss the type of assembly systems and the factors considered for selecting suitable assembly system for a selected production process. [4.0 Marks]
- b) Table Q3.b illustrates Tasks & Immediate Predecessors for pizza production process. Assume that the required production rate is 60 pizzas per hour

Table Q3.b

Task	Task Time (Seconds)	Description	Tasks that must precede
A	50	Roll dough	-
B	5	Place on cardboard backing	A
C	25	Sprinkle cheese	B
D	15	Spread Sauce	C
E	12	Add pepperoni	D
F	10	Add sausage	D
G	15	Add mushrooms	D
H	18	Shrink wrap pizza	E,F,G
I	15	Pack in box	H

- I. Draw a precedence diagram
- II. Determine cycle time
- III. Determine the theoretical minimum number of workstations
- IV. Compute efficiency and balance delay

[5.0 Marks]

- c) Compare the advantages and limitations of the use of manual and automatic assembly process.

[3.0 Marks]

- Q5 a) Explain the objectives of production planning and control

[2.0 Marks]

- b) Describe the key phases of production planning and control

[2.0 Marks]

- c) Discuss the applications of forward scheduling and backward scheduling.

[2.0 Marks]

- d) Foley, Inc, has received an order for 70 units of product A and 50 units of product S, so to be delivered in 10 weeks. The product structure trees for products A and S are shown in Fig.Q5.d Foley has on hand (available) 300 units each of components C and E; there is no stock on hand on order for other components, Determine

- I. The planned order release for products A and S

- II. After planning the conditions stated in part I, Foley receives a request for an

additional order of 50 units of product S. The Foley sales representative wants to know if she can promise delivery within 9 weeks or earlier if possible, to the potential customer. As the production planner, realizing that your assembly operation can, at most, work on assembling 50 units of product S at any given time, what is your response to the sales representative's inquiry?

[6.0 Marks]

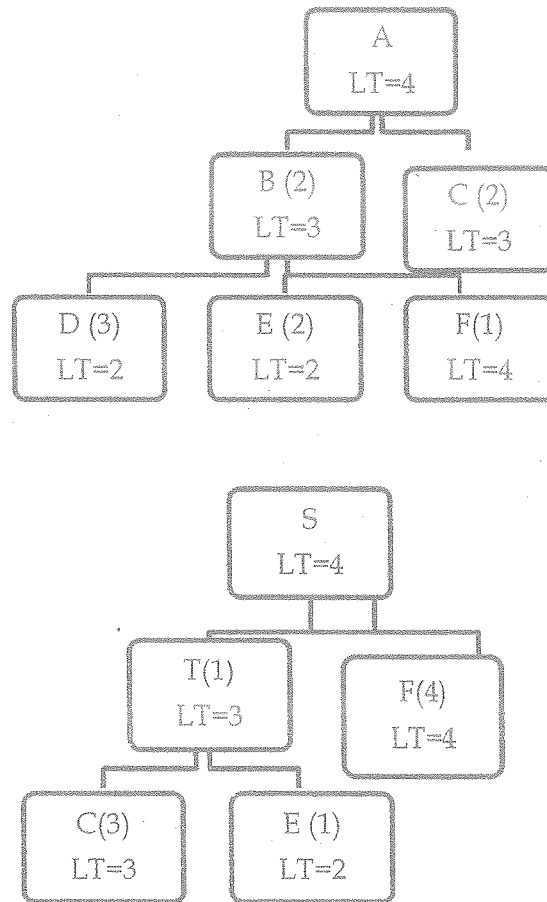


Fig.Q5.d