

Ref. No Ex/PG/PROD E/T/112B/33/2017  
M.PRODUCTION ENGG 1<sup>ST</sup> SEMESTER EXAMINATION 2017  
PRODUCTUION AND INVENTORY CONTROL SYSTEMS

THREE HOURS

FULL MARKS 100

Answer any five questions

- 1(a) Explain with suitable examples the different types of models those are used in Production System.. (6)
- (b) With the help of an example of your own explain the Cause and Effect diagram. (4)
- (c) Explain with the help of suitable examples discuss briefly how overlapping management activities likely occur among the production processes. Hence indicate the guide lines to solve the problem.. (6)
- (d) Explain group ideation (4)
- 2(a) Explain briefly the importance of forecasting in production system. (6)
- (b) Quarterly unit demands for a product are given below :

YEAR	SUMMER	AUTUMN	WINTER	SPRING
2011	78	90	88	60
2012	89	70	76	65
2013	65	75	100	55
2014	80	60	86	65
2015	88	57	110	60

- Using four point moving average technique determine the seasonal adjusted index for each quarter. (8)
- (c) Explain in connection with time series analysis  
(a) trend  
(b) cycles (6)
- 3(a) Explain briefly with examples the different types of depreciation. (5)

- (b) Presently ABC & Co. Ltd. , a manufacturing unit is operating at 70% plant capacity. Another large retail store is willing to sell the product of ABC & Co. Ltd. , under its own brand name. Under this circumstances the retail store has to use extra accessories which will increase variable production cost by 6% and the tentative agreement will increase the production to full capacity of the plant. As a result of which the selling price of extra 30% of output will be only 79% of the of the total price. Again to exceed 75% capacity of plant an assembly line will have to be introduced where fixed cost are 35% higher and variable cost 8% greater. The present plant operating conditions are :

Output : 72,500 unit per year ( 70% plant capacity)

Price : Rs 130 per unit

Variable cost : Rs 60 per unit

Fixed cost : Rs 4,000,000

Should it be justified to operate the plant under 100% capacity ? (8)

- (c) Why is the present worth comparison method associated with co terminated project and the annual cost method with repeated project? (5)

- (d) Explain the term Capital recovery factor ( CRF) (2)

- 4(a) Briefly discuss the different types of depreciation accounting methods.. (5)

(b)

A machine was purchased on January 1 , 2016 for Rs 8000 /- It is expected have an economic life of the machine is 9 years and a salvage value of Rs 3000 /- Compare the depreciation charge of the machine during 3 rd year and 7 th year by the following method :

i) Double declining balance depreciation method

ii) Sum of digit depreciation method (8)

- (c) Discuss briefly with the aid of neat diagram the Gantt chart for perpetual scheduling and periodic scheduling. (7)

- 5(a) Design and justify an acceptance sampling plan to protect the consumer from more than 8% defective with a risk of 10% . The producer is expected to provide lots with 1 % defectives and if it is done plan should accept material at least 95 % of the items. Each lot contains 5000 items of the same type. (8)

- (b) Explain graphically the effect of cost of error and cost of vigilance on the cost of quality control. (5)

- (c) Discuss with neat sketches sequential sampling plan and double sampling plan (7)

**MASTER OF PRODUCTION ENGG. EXAMINATION, 2017**  
(1<sup>st</sup> Semester)  
**SUBJECT – PRODUCTION & INVENTORY CONTROL SYSTEM**

Time: Three hours

Full Marks: 100

6. (a) Explain briefly various situations creating a stockout condition in a continuous inventory policy. Suggest preventive measures for overcoming those conditions. 6
- (b) Represent an Inventory Pattern considering one planned shortage situation per cycle, production rate and other assumptions. Formulate the mathematical equation for inventory cost per unit time. 4
- (c) Consider an inventory situation in a bookstore where orders are made for the examination booklets in boxes of one gross. Annual demand is even through the year and known with certainty to be 600 boxes. Lead-time is known to be exactly one month. The cost of placing an order is Rs. 16/- and annual carrying charges are 36 percent of the average inventory value. The wholesaler gives the bookstore a quantity discount as follows:

Quantity (Boxes)	Price per box (in Rs.)
1-49	7.50
50-99	7.35
100 or more	7.00

Establish the economic operating policy.

10

7. A production unit has an annual demand for 2000 bottles of acetylene. Each bottle costs Rs.1200/-; order and inspection costs are Rs.60/- per order, holding costs are Rs.18/- per bottles per year based on the average inventory level. The unit operates 200 days per year. Interruption to the production causes opportunity costs of Rs.5/- per bottle for each day, it is unavailable. The estimated variability in lead-time is given below:

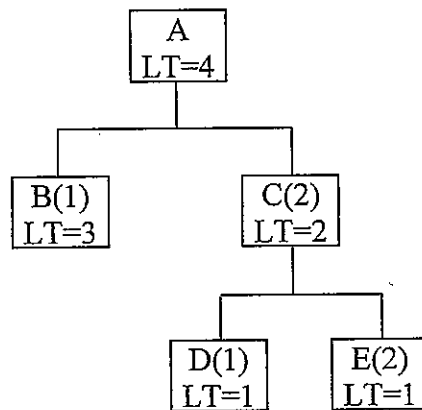
Lead Time (days)	4	5	6	7	8	9	10
Probability	0.10	0.15	0.25	0.20	0.15	0.10	0.05

Determine the total inventory cost and optimal order size.

20.

8. (a) What are the major objectives which can be attained through MRP system? Explain the role of Material Requirements Planning. 8

(b) Develop an MRP plan for product 'A' with the product structure tree exhibited in Fig. 1. There are orders for 103 units of product 'A' in period 8<sup>th</sup>. The on-hand inventory level of each item are A=19, B=12, C=35, D=5 and E=35. A safety stock of five units is maintained on product 'A' and with no safety stock on other components. Additionally, 10 units of the 18 units on hand product of 'A' are already allocated. There are no scheduled receipts of any item. The lot size of 'A' 'B' and 'C' is the same as net requirements while the lot size of 'D' is 200 units and 'E' is 500 units. What should be the size of the orders for each item and when the order should be released? 12



LTPD AQL %	4.51 to 5.60	5.61 to 7.10	7.11 to 9.00	9.01 to 11.2	11.3 to 14.0	14.1 to 18.0	18.1 to 22.4
0.451 to 0.560	80 1	60 1	60 1	50 1	15 0	15 0	10 0
0.561 to 0.710	100 2	80 1	50 1	50 1	40 1	10 0	10 0
0.711 to 0.900	100 2	80 2	50 1	40 1	40 1	30 1	7 0
0.901 to 1.12	120 3	80 2	60 2	40 1	30 1	30 1	25 1
1.13 to 1.40	150 4	100 3	60 2	50 2	30 1	25 1	25 1
1.41 to 1.80	200 6	120 4	80 3	50 2	40 1	25 1	20 1
1.81 to 2.24	300 10	150 6	100 4	60 3	40 2	30 2	20 1
2.25 to 2.80	<i>n</i> <i>c</i>	250 10	120 6	70 4	50 3	30 2	25 2
2.81 to 3.55	<i>n</i> <i>c</i>	<i>n</i> <i>c</i>	200 10	100 6	60 4	40 3	25 2
3.56 to 4.50	<i>n</i> <i>c</i>	<i>n</i> <i>c</i>	<i>n</i> <i>c</i>	150 10	80 6	50 4	30 3
4.51 to 5.60	<i>n</i> <i>c</i>	<i>n</i> <i>c</i>	<i>n</i> <i>c</i>	<i>n</i> <i>c</i>	120 10	60 6	40 4

VALUES OF *n* AND *c* FOR SINGLE SAMPLING PLANS WHERE  $\alpha = 5\%$   $\beta = 10\%$