

BACHELOR OF PRODUCTION ENGG. EXAMINATION, 2019(2nd Year-2nd Semester)**SUBJECT – Production Management**

Time: Three hours

Full Marks: 100

Answer Question No. 1 and any *three* from the rest.1. Answer (a) and any *four* from the following:

- (a) Define "Production Management". How system concept can be applied to various activities of production as a whole?
Differentiate between "Production System" and "Manufacturing System".
Name three organizations that you are familiar with in respect of inputs, transformation and outputs in the context of three types of transformation process. 12
- (b) Explain management approach to planning, analysis and control of production system. Define quantity control, quality control and productivity control of a production system. 7
- (c) Classify and compare briefly type of industries on the basis of production. Which types of control system are most effective for these basic types of industries? 7
- (d) Differentiate between "Forward Scheduling" and "Backward Scheduling". Explain dynamic priority rule of job sequencing. What are the advantages and limitations of the Assignment method? 7
- (e) Define "Inventory". Identify and explain different cost factors associated with Inventory. Differentiate between Economic Order Quantity (EOQ) and Economic Production Quantity (EPQ). 7
- (f) State alternative situations which may occur in the case of quantity discounts offered for a single price break point system. Describe in brief ABC and VED analysis. 7
- (g) Identify major objectives of Material Requirements Planning (MRP). Explain the flow chart of MRP indicating total feedback control for overall planning. 7

2. Monthly demand in units for last one year is listed below. Determine the forecasted demand for the month of January of the next year using: 5+5+10

- (i) Three periods moving average with the most recent period's demand weighted twice as heavily as each of the previous periods demand,
- (ii) Exponential weighted moving average with smoothing constants as 0.2.
- (iii) Calculate the forecasted demands as much of this period as possible and compare the accuracy of the two forecasts and comment on the utility of these two techniques of forecasting.

Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
215	208	195	200	191	180	185	181	186	205	215	235

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3. (a) Large orders for four parts are to be assigned to four person- machine centers. Some machines are better suited to produce certain parts and their operators are most proficient at producing some parts than others. The cost to produce each part at each center are as follows:

Part	M/C ₁	M/C ₂	M/C ₃	M/C ₄
P ₁	12	9	11	13
P ₂	8	8	9	6
P ₃	14	16	21	13
P ₄	14	15	17	12

- (i) Which part should be assigned to each machine centre? 7
- (ii) Assume that a new machine has been added to the facilities. One old machine is to be phased out. The operator on the old machine will operate the new one if it can produce one of the parts less expensively than the assignment made in part (i). The estimated cost using the new machine is:

Part	P ₁	P ₂	P ₃	P ₄
Production cost at M/C ₅	11	7	15	10

Should the new machine be used? If so, which part should it produce? 8

- (b) Today is the 176th day of the year of production calendar. Sequence the jobs listed below by the critical ratio technique. 5

Jobs :	A	B	C	D	E	F	G
Production calendar date required	190	178	184	181	205	187	184
Processing time remaining (days)	4	2	11	3	18	14	8

4. (a) Deduce the Economic Production Quantity (EPQ) model for manufacturing unit and also identify the major limitations of this inventory model. 8
- (b) A wholesaler forecasts annual sales of 2500 units for one product. Ordering cost in Rs. 12/- per order. Holding cost as a 25% interest are based on the average yearly inventory value. The manufacturer from where the wholesaler acquires the product offers a quantity discount schedule in the following manner:

Unit Price (in Rs.)	Lot size (in unit)
4.00	1-259
3.60	260-999
3.24	1000 and above

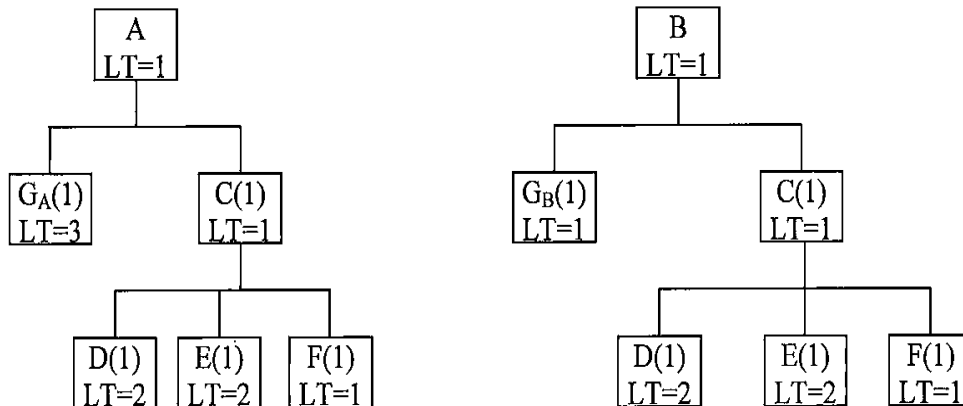
Calculate the most cost effective order size and justify the choice.

5. (a) Identify different constraints which influence grouping of elemental tasks. What is balancing loss? 5
 (b) A company works an 8-hour day for 5 days per week. The production line is operated for only 7 hours per day to allow for needs as rest and delays. Given the information in the table below, determine the theoretical minimum number of stations, if the line is designed for an output of 8400 units per week. Can the theoretical minimum number of stations be attained? Show a schematic of the minimum number of stations. What is the maximum possible efficiency? What is the actual possible efficiency?

5+3+3+2+2

Task	a	b	c	d	e	f	g	h	i	j	k	l	m
Immediate Predecessor :	—	a	b	—	d	e	e	e	c,f,g,h	i	j	k	L
Task time (Seconds)	14	10	30	3	5	15	14	14	6	7	3	4	7

6. (a) The manufacturer of Product 'X' requires the assembly of modules 'a', 'b' and 'c'. Two modules, each of 'a' and 'c' and only one module of 'b' are needed to make one unit of 'X'. The module 'a' is made of subassemblies 'd' (2 needed), 'e' (1 needed) and 'f' (2 needed). 'd' is made from component 'i', 'j' and 'k'. To make one sub-assembly of 'd', two component each of 'i' and 'j' are required 1 of component 'k'. Sub-assembly 'f' needs component 'l' and 'm' (one each). Module 'e' needs sub-modules of 'g' and 'h' in quantities of two units and one unit respectively. Sub-module 'g' is in turn assembled from five units each of components 'i' and 'f'. Item 'i' needs 1 unit each of components 'n' and 'o'.
 (i) Draw the product structure tree, 3
 (ii) If 100 units of 'X' are to be produced, what are the requirements at various levels? 5
- (b) One small scale unit assembles decorative lamps. There are available in two modules 'A' and 'B'. The lamp base assembly (C) consisting of the base (D), the holder (E) and wirecoil (F) in common to both the models. However, the shades or covers (G) for the two models of lamp are different. The lead times are shown in the product structure tree for lamps as follows:



At the Beginning of week 1, the material position is as follows:

On Hand: Base —25 units; Holders — 100 units.

Schedule Receipts: Cover (GB) — 50 units during week 2; Wire-coil—100 units during week 3.

If an order of 100 'A' and 50 'B' is to be filled by the sixth week, calculate the materials requirements plan.