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B.TECH
(SEM V) THEORY EXAMINATION 2022-23
INDUSTRIAL ENGINEERING

*Time: 3 Hours**Total Marks: 100***Note:** Attempt all Sections. If you require any missing data, then choose suitably.**SECTION A****1. Attempt all questions in brief. 2 x 10 = 20**

- (a) What is productivity?
- (b) Write any four symptoms of a bad plant layout?
- (c) Why dummy activity incorporated in network diagram?
- (d) Does forecasting affects by period of prediction? Justify your answer with suitable examples.
- (e) What do you mean by reorder point in inventory model?
- (f) What do you understand by depreciation? Write the importance of it.
- (g) Differentiate between Method Study and Work Measurement?
- (h) What do you mean by concurrent engineering?
- (i) Why simplex method is preferred over graphical method in linear programming?
- (j) What is transportation model and where it is used?

SECTION B**2. Attempt any three of the following: 10 x 3 = 30**

- (a) Explain Group Technology? Compare the typical process layout with GT layout with suitable example?
- (b) What is material requirements planning (MRP)? Discuss its structure in detail. Also describe JIT manufacturing system.
- (c) Derive the formula of Economic order quantity (EOQ) and its associated total cost?
- (d) Write short note on following?
 - (i) Operation Process Chart
 - (ii) SIMO Chart
 - (iii) Man Machine Chart
- (e) Explain the general structure of an assignment model with suitable example?

SECTION C**3. Attempt any one part of the following: 10 x 1 = 10**

- (a) A company manufactures house hold mixers. The assembly line manufacturing has no. of tasks to be performed according to the precedence requirements given in table. The Company intends to set up an assembly line to produce 80 units per 8 hours shifts. Balance the Assembly line and find (i) Efficiency of line (ii) Draw precedence diagram (iii) Find the desired cycle time (iv) Calculate the theoretical no. of work stations.

Task	Precedence requirement	Task Time (min)
A	--	4
B	--	2
C	--	5
D	A,C	3
E	D	4
F	D	2
G	B,E,F	3
H	G	2

- (b) Explain Flexible Manufacturing systems (FMS)? Elaborate different types of flexibilities in FMS?

4. Attempt any *one* part of the following:

10 x 1 = 10

- (a) A project has the following time schedule:
Construct PERT network and compute
- TL and TE for each event
 - Float for each activity
 - Critical path and its duration

Activity	Time in weeks	Activity	Time in weeks
1 - 2	2	4 - 6	3
1 - 3	2	5 - 8	1
1 - 4	1	6 - 9	5
2 - 5	4	7 - 8	4
3 - 6	8	8 - 9	3
3 - 7	5		

- (b) For the given set of data, evaluate following?
- Three months moving average
 - Exponential smoothing forecast if $\alpha=0.2$ and forecast for Feb. month is 23000

Months	Actual Sales
Feb	19360
March	25450
April	19730
May	21480
June	20770
July	25420
August	23970
September	28350
October	26800

5. Attempt any *one* part of the following:

10 x 1 = 10

- (a) A company manufactures ball-point pens that can be sold at Rs. 15 per piece. Variable cost of the pen is Rs. 10 per unit. If the company has made a total investment in fixed cost to the tune of Rs. 30000, what is the break-even sale for the pen?
Explain ABC analysis & VED analysis in inventory control?

- (b) A particular item has a demand of 9000 units per year. The cost of one procurement is Rs. 100 and the holding cost per unit is Rs. 2.40 per year. The replacement is instantaneous and no shortage is allowed. Determine:
- Economic lot size
 - Number of orders per year
 - Time between orders
 - Total cost per year if the cost of one unit is Rs. 1.50

6. Attempt any one part of the following:

10 x 1 = 10

- What do you mean by Therblig? Name and discuss any 4 therbligs?
 - What is value engineering? What are its uses? Describe the steps involved in value analysis.
- An experienced industrial engineer conducted a direct time study for an acid mining operation. The analyst found cycle time as shown below, rated the observed worker at 80% and used allowance fraction as 0.1. Determine the standard time.

Cycle time (in min.)	No. of cycle observed
2.7	3
2.7	4
2.9	2
3.1	1
3.2	1

7. Attempt any one part of the following:

10 x 1 = 10

- A company produces two types of items P and Q that require gold and silver. Each unit of type P requires 4g silver and 1g gold while that of type Q requires 1g silver and 3g gold. The company can produce 8g silver and 9g gold. If each unit of type P brings a profit of 44 Rs. and that of type Q 55 Rs. Determine the number of units of each type that the company should produce to maximize the profit. What is the maximum profit?
- Optimize the below transportation problem using Vogel's approximation and MODI method.

Factory	Warehouse				Capacity
	D	E	F	G	
A	42	48	38	37	160
B	40	49	52	51	150
C	39	38	40	43	190
Requirement	80	90	110	220	500