



026

Study Programme	: BTech Hons in Engineering
Name of the Examination	: Final Examination
<b>Course Code and Title</b>	<b>: DMX 6301 Industrial Engineering</b>
Academic Year	: 2022-2023
Date	: 10 February 2024
Time	: 0930-1230 hrs
Duration	: 3 hours

#### General instructions

1. Read all instructions carefully before answering the questions.
2. This question paper consists of 05 questions. All questions carry equal marks.
3. **Answer all 05 questions.**
4. Use the table attached at the end of the question paper to **answer Q3.**

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Q1.

- (a) What are the areas that should be analyzed before formulating the corporate strategy of an organization (4 Marks)
- (b) Differentiate between the terms “manufacturing strategy” and “corporate strategy” as applicable to a production organization of your choice (6 Marks)
- (c) What is PESTEL analysis? (4 Marks)
- (d) Explain PESTEL analysis emphasizing the importance of analyzing each factor in strategic decision making in the dynamic business environment.

(6 Marks)

- Q2. (a) Work study is beneficial for the workers as well as management. Explain how work study is beneficial for workers giving at least three reasons.? (6 Marks)
- (b) What are the factors that must be considered when selecting a job for method study? Explain main three factors. (6 Marks)
- (c) Give two examples each for “productive activities” and “nonproductive activities” you may identify during a work study. (4 Marks)
- (d) What are the actions you may take as the work study manager, for reducing nonproductive activities. (4 Marks)
- Q3. (a) Discuss **why or why not** MRP system is the complete solution for improving organization material and resource planning? (6 Marks)
- (b) Product X is made of three (2) units of Y and Two (3) units of Z. Y is made of four(3) units of A and two (4) units of B. Z is made of two (2) units of A and three C3) units of C.

Lead time as given below:

Product	X	Y	Z	A	B	C
Lead Time(Weeks)	1	2	2	2	1	1

- (i) Draw the Product structure tree (BOM) (4 Marks)
- (ii) If 100 units of X are needed in week ten (10), develop a Material Requirement Plan
- (a) when there are currently no on hand in stock (5 Marks)
- (b) when there are currently on hand in stock 50X, 40Y, 30Z, 50A,100B and 400C. (5 Marks)

**(Use the MRP sheets attached at the end of the question paper to answer Q3)**

- Q4. (a). Explain following terms used in time study.
- i. Observed time.
  - ii. Basic time
  - iii. Standard time
- (6 Marks)
- (b). Explain the need of three of the allowances you may consider when calculating the standard time for an activity in machine operation in a manufacturing plant.
- (6 Marks)
- (c). Introduction of an ERP systems in a business organization needs many factors to be considered. Name three of such factors.
- (4 Marks)
- (d). State at least three possible causes for failure of ERP systems
- (4 Marks)

Q5. (a) Explain the importance of linear programming techniques in management decision making?

(4 Marks)

- (b) A glass manufacturer produces two types of products Type A and Type B. These two products should be processed in three machines M1, M2 and M3. Processing time of each product at each of the plants is given in the Table below.

Machine	Production time per batch, (hours)		Production time available per week, (hours)
	Type A	Type B	
M1	1	0	4
M2	0	2	12
M3	3	2	18
Profit per batch (\$)	3000	5000	

- (i) Determine and define the decision variables
  - (ii) Formulate the objective function
  - (iii) Formulate each constraints
  - (iv) Find the number of Type A and Type B items manufactured in a batch to maximize the profit.
- (5 marks)

Item		Week									
		1	2	3	4	5	6	7	8	9	10
X (LT=1)	Gross Requirement										
	On Hand ( )										
	Net Requirement										
	Planned Order receipts										
	Planned Order release										
Y (LT=2)	Gross Requirement										
	On Hand ( )										
	Net Requirement										
	Planned Order receipts										
	Planned Order release										
Z (LT=2)	Gross Requirement										
	On Hand ( )										
	Net Requirement										
	Planned Order receipts										
	Planned Order release										
A (LT=2)	Gross Requirement										
	On Hand ( )										
	Net Requirement										
	Planned Order receipts										
	Planned Order release										
B (LT=1)	Gross Requirement										
	On Hand ( )										
	Net Requirement										
	Planned Order receipts										
	Planned Order release										
C (LT=1)	Gross Requirement										
	On Hand ( )										
	Net Requirement										
	Planned Order receipts										
	Planned Order release										

Item		Week									
		1	2	3	4	5	6	7	8	9	10
X (LT=1)	Gross Requirement										
	On Hand ( )										
	Net Requirement										
	Planned Order receipts										
	Planned Order release										
Y (LT=2)	Gross Requirement										
	On Hand ( )										
	Net Requirement										
	Planned Order receipts										
	Planned Order release										
Z (LT=2)	Gross Requirement										
	On Hand ( )										
	Net Requirement										
	Planned Order receipts										
	Planned Order release										
A (LT=2)	Gross Requirement										
	On Hand ( )										
	Net Requirement										
	Planned Order receipts										
	Planned Order release										
B (LT=1)	Gross Requirement										
	On Hand ( )										
	Net Requirement										
	Planned Order receipts										
	Planned Order release										
C (LT=1)	Gross Requirement										
	On Hand ( )										
	Net Requirement										
	Planned Order receipts										
	Planned Order release										

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