

22569

24225

3 Hours / 70 Marks

Seat No.

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- Instructions* –
- (1) All Questions are *Compulsory*.
 - (2) Answer each next main Question on a new page.
 - (3) Illustrate your answer with neat sketches wherever necessary.
 - (4) Figures to the right indicate full marks.
 - (5) Assume suitable data, if necessary.
 - (6) Use of Non-programmable Electronic Pocket Calculator is permissible.
 - (7) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

- 1. Attempt any FIVE of the following:** **10**
- a) State any four functions of PPC.
 - b) State importance of Operations Research. (Any Four points)
 - c) Define Work study.
 - d) List down any four Lean manufacturing tools.
 - e) Define Safety stock.
 - f) State whether following projects comes under CPM or PERT.
 - i) A well-known top construction company is constructing cement bridge connecting east and west of a city above railway lines.
 - ii) R&D project of Hydrogen fuel-based car which will fly at 100 km/hr.
 - g) List down types of production system.

P.T.O.

2. Attempt any THREE of the following: **12**

- a) Define sales forecasting and list down basic steps in calculating forecasting.
- b) There are 5 jobs, each of which has to go through the machines A and B in the order AB. The processing times (in hours) are given as

JOB	J1	J2	J3	J4	J5
Machine A	2	4	5	7	1
Machine B	3	6	1	4	8

Calculate Optimal sequence of above five operations for minimum total elapsed time. **(Only optimal sequence)**

- c) List down any four therbligs with their symbol, color and definition.
- d) Explain factors affecting Plant Location.

3. Attempt any THREE of the following: **12**

- a) Differentiate between Process layout and Plant layout. (Any four points)
- b) Define Productivity and explain any one productivity improvement techniques.
- c) Explain MRP-I with neat diagram considering below points.
(Definition, Objectives, Diagram of Input and Output of MRP-I, four Advantages)
- d) The actual demand for a product in a company is 79 units. The previous forecast and exponential smoothening constant are 84 units and 0.25 respectively. Calculate forecast for next period. (in units)

4. Attempt any THREE of the following: **12**

- a) An item can be purchased for Rs. 100. The ordering cost is Rs. 200 and the inventory carrying cost is 10% of the item cost per annum. If the annual demand is 4000 units, calculate the economic order quantity (in units).
- b) Explain SIMO Chart.

- c) Write short on Method study considering below points.
(Definition, Objectives, Basic Procedure, state different Charting techniques)
- d) Differentiate between Lean Manufacturing and Agile manufacturing.
(Any four points)
- e) Define Process Planning and list down procedural steps for Process Planning.

5. Attempt any TWO of the following:

12

- a) In a time study the observed time is 0.75 min., performance rating factor is 110% and allowances are 20% of the normal time. Calculate standard time.
- b) Prepare Two handed process chart for assembling Nut and Bolt.
- c) Define Gantt chart and schematically draw Gantt chart for your final year project (Capstone Project Planning). (Assume suitable data if necessary)

6. Attempt any TWO of the following:

12

- a) Activities A to K required to complete a project. The time estimates and immediate predecessors of these activities are given in the table. Construct network diagram and find critical path of the given project.

Activity	Time (hours)	Immediate predecessors
<i>A</i>	2	—
<i>B</i>	3	—
<i>C</i>	2	—
<i>D</i>	4	<i>A</i>
<i>E</i>	5	<i>B</i>
<i>F</i>	4	<i>B</i>
<i>G</i>	3	<i>C</i>
<i>H</i>	10	<i>D, E</i>
<i>I</i>	5	<i>F</i>
<i>J</i>	8	<i>G</i>
<i>K</i>	3	<i>H, I, J</i>

- b) Explain the concept, principles, advantages and limitations of Agile manufacturing.
- c) A company plans to manufacture and sell two products X and Y. These two products require the use of 3 different raw materials, A, B and C which are available in limited quantities. The profit per unit of products X and Y is 5 and 6 units of money respectively. The other relevant data are given below:-

Raw material	Units of raw material needed for making one unit of Product		Total units of raw material available
	X	Y	
A	2	3	18
B	2	1	12
C	3	3	27

The company wants to determine the product-mix that would maximize the total profit. Formulate as a linear programming problem and determine the capital product-mix graphically.
