BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: B.Tech **SEMESTER : VII/ADD**
BRANCH: CSE/EEE/ECE/BT/CIVIL/CHAMICAL **SESSION : MO/2025**

SUBJECT: PE417 PRODUCTION MANAGEMENT

TIME: 3 Hours **FULL MARKS: 50**

INSTRUCTIONS:
1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
***4*. Before attempting the question paper, be sure that you have got the correct question paper.**
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

			CO	BL
Q.1(a)	Define Plant Location. Explain the factors influencing the selection of an ideal plant location.	[5]	1	2
Q.1(b)	What are material flow patterns? Explain different types of flow patterns used in layout design.	[5]	1	2
Q.2	ABC manufacturer manufactures car keys. Their demand forecasting for the 12 months starting from January 2026 is given in the following table. There are currently 20 workers working at the company. Each worker can manufacture 15 items in a month. The hiring and training cost is INR 4000 per worker. However, if they require to layoff an employee, they need to pay INR 8000. The standard production cost is INR 3000 per key. If they use overtime to manufacture any key, then an addition of INR 600 per key will be charged due to overtime labor cost. The holding cost is INR 75 per key per month. The backorder cost is INR 1200. They will not have any key left at the end of December 2025. Using this information, calculate total cost for the next 12 months by using both level and chase strategy and suggest which one have the minimum cost.	[10]	2	3

Month	Demand
January	210
February	440
March	600
April	300
May	480
June	610
July	560
August	800
September	200
October	400
November	380
December	540

Q.3(a)	What is shortest Processing Time rule? How it is different from Earliest Due Date rule? What is the Johnson's rule's modification for three machine flow shop problem?	[4]	3	2
Q.3(b)	Find the optimal sequence of the following jobs which minimizes the total makespan. Also calculate the minimum makespan, considering the starting point at time t=0.	[6]	3	3

Jobs	Machine 1(hour)	Machine 2(hour)	Machine 3(hour)
J1	3	4	6
J2	8	3	7
J3	8	4	5
J4	9	3	5
J5	8	4	6

PTO

Q.4(a)	What are the differences between the two inventory management systems: ABC and VED	[2]	4	2
Q.4(b)	A product has a monthly demand of 200. The ordering cost is INR 50 per order. The holding cost is 25% of its price per year. The price of the product however varies with the quantity ordered, as follows: i) if the ordering quantity is below 400, the price of the product is INR 10 ii) if the order quantity is greater than equal to 400, 5% price discount is available per item. iii) if the order quantity is greater than equal to 700, 10% price discount is available per item. With this information, calculate which order quantity will minimize the total annual cost for the item.	[8]	4	3
Q.5	Write short notes on any **FOUR** of the following: a) Push and Pull System, b) Wastes in Lean Manufacturing, c) Kanban, d) Value Stream Mapping, e) Continuous Improvement	[2.5×4]		

:::::25/11/2025:::::M