

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

**CLASS: M.Tech
BRANCH: Prod & Ind Engg.**

**SEMESTER : Ist
SESSION : MO/2025**

SUBJECT: PE511 COMPUTER INTEGRATED MANUFACTURING

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.
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Q.1(a)	Discuss the role of Computer Integrated Manufacturing (CIM) in achieving seamless coordination between manufacturing and non-manufacturing functions. Analyze the architectural challenges in implementing a full CIM environment.	[5] 01	03
Q.1(b)	Critically evaluate the mechanisms through which computerized material management systems (such as automated warehousing, real-time inventory tracking, and robotic handling) affect supply-chain responsiveness.	[5] 01	03
Q.2(a)	Evaluate various work transport systems used in manual assembly lines (such as conveyor systems, moving pallets, and manual push systems). Discuss how transport system selection affects cycle time, worker pacing, and work-in-process inventory.	[5] 02	04
Q.2(b)	Discuss the line balancing problem in both manual and automated assembly lines. Analyze how variations in task time, workstation design, and worker skill level contribute to balancing difficulties and inefficiencies.	[5] 02	03
Q.3(a)	Critically analyze the components of an FMS (processing stations, material handling system, computer control system, and tooling system). How does integration among these components affect system reliability and productivity?	[5] 03	04
Q.3(b)	Analyze the design and operational principles of Automated Guided Vehicles (AGVs) and Automated Storage/Retrieval Systems (AS/RS). How do these technologies work together to improve material flow, reduce WIP, and support real-time shop-floor control?	[5] 03	03
Q.4(a)	Analyze the concept of part families in Cellular Manufacturing Systems (CMS). How do similarities in design and manufacturing attributes influence cell formation, workflow efficiency, and resource utilization?	[5] 04	04
Q.4(b)	Discuss different strategies for arranging machines within a GT cell. Analyze how layout patterns (U-shape, inline, loop, and modular) affect productivity, operator utilization, and material-handling efficiency.	[5] 04	03
Q.5(a)	Examine the significance of logical addressing and the Internet Protocol (IP) within the Network Layer. Analyze how IP addressing impacts scalability, routing efficiency, and network security in manufacturing networks.	[5] 05	04
Q.5(b)	Compare and contrast wired LANs (Ethernet) and wireless LANs (Wi-Fi) in manufacturing settings. Analyze how issues such as latency, interference, mobility, and security affect their suitability for CIM applications.	[5] 05	03

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