

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

**CLASS: MTECH
BRANCH: AMS**

**SEMESTER : I
SESSION : MO/18**

SUBJECT: PE501 MANUFACTURING AUTOMATION

TIME: 3.00 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) Define 'Automation'. Discuss the significance of automation in Industry with suitable applications. [5]
Q.1(b) Discuss the classification of Automated Manufacturing System's with typical features. [5]
- Q.2(a) What are manufacturing Operations? Discuss the major categories of manufacturing costs? [5]
Q.2(b) A company requires 16000 units of raw material costing Rs. 2 per unit. The cost of placing an order is Rs.45 and the carrying costs are 10% per year per unit of the average inventory. Determine:
(i) the economic order quantity (ii) No. of orders/ year (iii) cycle time and (iv) total inventory cost [5]
- Q.3(a) What are the Automation Principles and Strategies? [5]
Q.3(b) A stepping motor has 200 step angles. Its output shaft is directly coupled to lead screw with pitch = 0.250 in. A worktable is driven by the lead screw. The table must move a distance of 5.00 in from its present position at a travel speed of 20.0 in/min. Determine (a) the number of pulses required to move the table the specified distance and (b) the required motor speed and pulse rate to achieve the specified table speed. [5]
- Q.4(a) What is an Industrial Control System? Explain briefly the types of ICS with examples. [5]
Q.4(b) What are the various types of Industrial Control? Discuss the functions of Adaptive Control? [5]
- Q.5(a) What are the functions of Programmable Logic Controller's (PLCs)? Discuss the components of PLC with examples [5]
Q.5(b) Write a PLC programme giving a suitable example with procedure and ladder circuit diagram. [5]

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