

2112E050

**BACHELOR OF VOCATION
Mechatronics**

Subject: Manufacturing Automation and Ergonomics

Subject Code: ME-705

Semester: Fifth

December 2021

Theory (External): 35 Marks

Time: 03 Hours

Instructions to the Students

- 1) This Question paper consists of two Sections. All sections are compulsory.
- 2) Section A comprises 10 questions of objective type in nature. All questions are compulsory. Each question carries 1 mark.
- 3) Section B comprises 8 essay type questions out of which students need to do any 5. Each question carries 5 marks.
- 4) Read the questions carefully and write the answers in the answer sheets provided.
- 5) Do not write anything on the question paper.
- 6) Wherever necessary, the diagram drawn should be neat and properly labelled

Roll Number

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SECTION –A (SHORT/OBJECTIVE TYPE QUESTIONS)
(10x1=10 Marks)

- A. Differentiate between hydraulics and pneumatics.
- B. Differentiate between automation and mechanisation.
- C. Elucidate the design and fabrication considerations in a typical automated assembly flow line.
- D. Name the various line balancing methods.
- E. Elucidate the applications of AFM and SEM characterization tools.
- F. How SEM is different from TEM?
- G. What do you mean by work envelope of a robot?
- H. What are the functions of robotic manipulators and effectors.
- I. Define ergonomics and mention its usages.
- J. What is the scope of AI in ergonomics?

SECTION –B (ESSAY TYPE QUESTIONS)

(5x5=25 Marks)

1. What are the typical components of hydraulic and pneumatic circuits? Show them schematically.
2. Explain the various systems and processes of typical assembly lines.
3. What are the flexible assembly lines in manufacturing operations? Why it is called 'flexible'? Name few technologies of Industry 4.0.

4. Draw the schematic diagram of internal circuitry of 'Scanning Electron Microscope' and 'Transmission Electron Microscope'.
5. What do you mean by intelligent robots? Differentiate between a robot and humanoid. Classify the robots.
6. How the ergonomics affect the man-machine interactions and their work efficiency?
7. What do you mean by FMS? What are its features? How it affect the manufacturing cycle?
8. Explain the principle, construction and rules of a typical manufacturing robot.

==END OF PAPER==