



Name :

Roll No. :

Invigilator's Signature :

CS/M.TECH(PE)/SEM-2/PEM-201/2012

2012

AUTOMATION IN MANUFACTURING

Time Allotted : 3 Hours

Full Marks : 70

The figures in the margin indicate full marks.

*Candidates are required to give their answers in their own words
as far as practicable.*

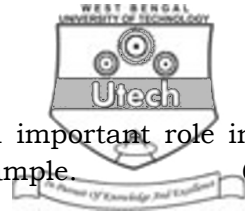
Q. No. 7 and 8 of Group-B are compulsory.

Answer any *three* questions from Group-A.

GROUP – A

Answer any *three* questions.

1. a) State advantages and disadvantages of automation. 2
- b) Differentiate between automatic and semi-automatic machine tools with suitable examples. 2
- c) Discuss the bar feeding mechanism for a Turret or a Capstan Lathe. 5
- d) How is indexing of turret lathe done ? 5
2. a) Discuss the role of Group Technology in a manufacturing facility. State the basic aspects of design and manufacturing based on which part classification is done. 4 + 3
- b) What is the need of CAD-CAM interfacing ? State with examples. How is this interface done ? 4 + 3



3. a) How does an Expert system play an important role in generative CAPP system ? Give an example. 6
- b) State the importance of monitoring of an automated plant. Briefly describe about the sensors or transducers to employ in an automated manufacturing facility for specific purposes. Show the process schematic of a monitoring system. 2 + 4 + 2
4. a) What is meant by interchangeable tool magazine ? Briefly state its principle of operation. 4
- b) Discuss about ATC, APC and AS/RS systems and compare between each type of these systems. 6 + 4
5. a) Schematically show a 5 D.O.F. mobile robot with label and show the work envelope of this robot. 6
- b) Write a short note on different drives for actuation of robots. 4
- c) What is known as *D-H* principle ? Discuss its applications in a robotic system. 4
6. a) For a 3-D.O.F. humanoid arm type robot, show the forward kinematics and reverse kinematic equation deriving from the first principle. 3 + 7
- b) Differentiate between cellular manufacturing with modular manufacturing. In the light of this, discuss FMC and FMM. 4

GROUP – B

Answer question Nos. 7 and 8 compulsorily.

7. Write short notes on any *four* of the following : 4 × 3½
- a) Swiss lathe
- b) Tooling design in hard automation like tool compounding and multiple cuts of tooling
- c) Use of CNC control applied to EDM
- d) Principle of operation of CMM

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- Job A
- Fig. A