



Name :

Roll No. :

Invigilator's Signature :

CS/M.Tech (PE)/SEM-2/PEM-201/2010

2010

**AUTOMATION IN MANUFACTURING SYSTEMS
AND PROCESSES**

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.*

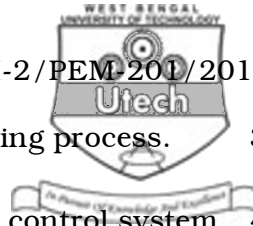
Answer any five questions. $5 \times 14 = 70$

1. a) How does the Group Technology (GT) play an important role in implementation of integrated automation less system ? 3
- b) With example, discuss about the method of GT using graphical techniques. 6
- c) Compare retrieval type CAPP with generative type CAPP. 5
2. a) Briefly describe different components of computer aided production planning and control. 7
- b) What are the differences between a single machine tool and a machine tool system ? 3
- c) Discuss from economic point of view the applicability of a universal machine tool and a mass production machine tool. 4



3. a) State the differences between hard automation and flexible automation. 3
- b) What are the special features of a Swiss lathe ? Show also a skematic diagram of it. 6
- c) Compare the bar feeding mechanisms of a semiautomatics with an automatic machine. 5
4. a) "Full flexible manufacturing systems are no longer popular; but some modular and cellular versions of the FMS are applied nowadays." – Explain. 5
- b) Draw the basic building block of an FMS. 3
- c) Briefly describe the tool handling block and its working. 6
5. a) What is meant by B-T-R type DNC ? 2
- b) Compare the uses of RTV and AS/RS. 3
- c) Prepare a process plan (including the tooling list) and make a part programme to make the below – mentioned job out of a ϕ 100 \times 100 mm low carbon steel rolled bar. 9

Fig. 1



6. a) State the use of CNC in EDM and forging process. 3
- b) Draw a control scheme of an Adaptive control system. 4
- c) List the toolings used and make the part programme (APT) to manufacture the plate shown in Fig. 2 from a MS plate of $\phi 200 \times 10$ mm size. 7

Fig. 2

7. a) State the uses of CMM. Describe its working principle. 2 + 5
- b) How does monitoring of a process line be effected when the pipings are to maintain some specified pressure and flow rate ? 7
8. a) Show the work envelop of a typical 4-D-O-F robotic system. 3

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- b) Describe the forward and inverse kinematics of the robotic system shown in Fig. 3

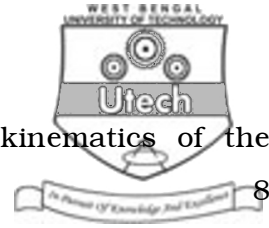


Fig. 3

- c) Design a gripper to handle a piece of rexin cloth. 3
9. Write short notes on any *four* of the following : $4 \times 3\frac{1}{2}$
- i) AGV
 - ii) CAT
 - iii) Robot vision
 - iv) D-H principle
 - v) Expert system application in manufacturing
 - vi) Canned cycle.
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