Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/B.Tech(ME/PE)/SEM-7/ME-701/2009-10

2009

ADVANCED MANUFACTURING TECHNOLOGY

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

GROUP – A
(Multiple Choice Type Que tions)

1. Choose the correct alternatives for any *ten* of the following : $10 \times 1 = 10$

   i) Rapid prototyping technology can be used for
      a) cutting of plastic od
      b) bone transplantation in medical technology
      c) crushing alloy steel
      d) drilling operation in steel plate.

   ii) ECM is a kind of
      a) mechanical process
      b) thermoelectric process
      c) electrochemical process
      d) chemical process.

   iii) Rank order clustering technique can be used for
      a) creating process chart
      b) grouping machine cells
      c) material flow detection
      d) finding out critical path of process sequence.

iv) AJM cannot be efficiently used for machining
   a) ceramic plate b) boron carbide block
   c) elastomer materials d) mild steel plate.

v) The sequence followed for reverse engineering process is
   a) existing product ∅ data collection ∅ modelling ∅ drawing ∅ manufacturing
   b) conceptualization ∅ design ∅ drawing ∅ manufacturing
   c) copying and reproducing
   d) none of these.

vi) CAPP is fully integrated with
   a) CAD and CAM b) only CAD
   c) only CAM d) none of these.

vii) For making a hole of 0·08 mm in diameter, the best process to use is
   a) AJM b) PAM
   c) WJM d) LBM.

viii) Production flow analysis is a technique used in relation with
   a) high speed machining b) GT
   c) reverse engineering d) rapid prototyping.

ix) PAM can be used for machining
   a) electrically conductive material
   b) electrically non-conductive material
   c) both electrically conductive and non-conductive materials
   d) none of these.

x) Diamond tools should be used for high speed machining of
   a) cast iron jobs b) mild steel jobs
   c) aluminium jobs d) carbide jobs.

xi) Wire-EDM can be used for machining

a) copper plate b) diamond plate

c) glass cube d) a blind hole.

xii) In flexible manufacturing system

a) GT machine cells are highly automated

b) machines are not allowed to move

c) very complicated jobs cannot be manufactured

d) AGV are not in use.

xiii) Stereolithography is a

a) CAPP process

b) CAD system tool

c) type of measuring instrument

d) rapid prototyping process.

xiv) Robotic arm is an integrated par of

a) FMS b) CMM

c) CAD d) LBM.

GROUP – B

(Short Answer Type Questions)

Answe any *three* of the following. 3 × 5 = 15

2. What is concurrent engineering ?
3. Explain the concept of 'Reverse Engineering'. Under what circumstances is it recommended ?
4. 'A dielectric is used in EDM whereas an electrolyte is used in ECM'. Justify. Explain the principle of metal removal by AJM.
5. Highlight the role of mobot (8) FMS.
6. What is high speed machining ? Outline its advantages.

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. 3 × 15 = 45

7. a) Define Computer Integrated Manufacturing (CIM). Explain CIM wheel mentioning the components.

b) Illustrate the steps involved in CIM implementation.

c) Describe the principle of operation of AGV. 7 + 4 + 4

8. a) Elucidate the various facets of flexibility in relation to FMS.

b) Portray the 'Tool Management' system by a block diagram. How is a cutting tool identified automatically in FMS environment ?

c) What is meant by DFMA ? Why on-line inspection is advantageous over off-line inspection ? 5 + 5 + 5

9. a) What is Group Technology ? Explain the concept of 'Composite Part Approach' in regard to GT.

b) Mention the characteristic features of OPITZ part coding system.

c) Write down the procedural steps of Generative Manufacturing Process (GMP). 5 + 4 + 6

10. a) Briefly describe the different important parts of an ultrasonic machining unit

b) Describe how frequ ncy and amplitude of vibration and abrasive diameter affect the MMR in USM.

c) Draw the diff rent types of concentrators used in USM.

7 + 6 + 2

11. a) With the aid of neat sketch, briefly describe LBM process. Write the advantages and application of this p ocess also.

b) Starting from the basics, prove that the ECM process is self-regulatory and linear MRR approaches the feed rate. (4 + 2 + 2) + 7

12. a) Write short notes on Plasma Arc Machining (PAM).

b) What is abrasive jet machining ? Explain briefly with schematic diagram.

c) What is computer networking ? Illustrate your answer.

5 + 5 + 5