Name : ………………………………………………………………

Roll No. : …………………………………………………………

Invigilator's Signature : ……………………………………

CS/B.Tech (ME/PE)/SEM-7/ME-701/2010-11
2010-11
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 Questions)

1.   Choose the correct alternatives for any *ten* of the following :

$10 \times 1 = 10$

i)   Which item best describes a CAM technology ?

   a)   Numerical control   b)   Documentation

   c)   Drafting   d)   Geometric modelling.

ii)   Group technology brings together and organizes

   a)   Common parts, problems and tasks

   b)   Automation and tool production

   c)   Documentation and analysis

   d)   Parts and simulation analysis.

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iii) The real brain of artificial intelligence is

    a) Recursive technology

    b) Bubble memory

    c) The expert system

    d) Scotopic system.

iv) The integration of CAD and CAM is

    a) CIM   b) CAE

    c) CNC   d) Robots.

v) CAM and CAM are linked through

    a) A common databas and communication system

    b) NC tape programming and automated design

    c) Assembly automation and tool production

    d) Parts production and testing.

vi) MRR in ECM depends on

    a) Hardness of work material

    b) Atomic weight of work material

    c) Thermal conductivity of work material

    d) Ductility of work material.

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vii) Which of the following materials cannot be machined by EDM ?

a) Steel   b) WC

c) Titanium   d) Glass.

viii) As the stand-off distance increases, the depth of penetration in AJM

a) Increases

b) Decreases

c) Does not change

d) Initially increases and then remains steady.

ix) Keeping all the other parameters constant in AWJM abrasive water jet velocity increases with

a) Increasing traverse velocity of the job

b) Decreasing mass flow rate of the abrasive

c) Decreasing stand-off distance

d) Increasing mass flow rate of the abrasive.

x) Tool USM is generally made of

a) Glass   b) Ceramic

c) Carbides   d) Steel.

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xi) EBM is operated at

a) Atmospheric pressure

b) At 1·2 bar pressure above atmosphere

c) At 10 – 100 m Torr pressure

d) At 0·01 – 0·001 m Torr pressure.

GROUP – B
(Short Answer Type Questions)
Answer any *three* of the following   3 × 5 = 15

2. What is cloud point data in CAD ?

3. What do you mean by Compute Aided Inspection ?

4. How does chip formation take place in High Speed Machining ?

5. Mention the different types of flexibility in FMS.

6. Explain the conc pt of Variant CAPP method.

GROUP – C
(Long Answer Type Questions)
Answer any *three* of the following.   3 × 15 = 45

7. a) What is LASER ? Describe the various types of LASER.

   b) Describe the working principle of Laser Beam Machining (LBM). What are the major applications of LBM ?

                                        (2 + 3) + (6 + 4)

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8. a) What is production flow analysis (PFA) ? Explain the

procedural steps in PFA.

b) Describe the applications of Group Technology (GT)

briefly.

c) Apply the rank order clustering technique to the part-

machine incidence matrix in the foll wing table to

identify logical part families and machine groups. Parts

are identified by letters and machines are identified

numerically :

	A	B	C	D	E
1	1	0	0	0	0
2	0	1	0	0	1
3	1	0	0	1	0
4	0	1	1	0	0
5	0	0	0	1	0

5 + 5 + 5

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9. a) What is electrolysis ? How is it used in Electrochemical Machining (ECM) process ?

    b) An alloy consists (% by weight) of nickel (72%), chromium (20%), iron (5 %), titanium (0·5%), copper (0·5%), silicon and manganese (1·0% each). The required data have been given in the following table :

Metal	Gram atomic weight	Valency of dissolution (lowest)	Density $\left(g/cm^3\right)$
Nickel	58·71	2	8·90
Chromium	51·99	2	7·19
Iron	55·85	2	7·86
Titanium	47·90	3	4·51
Silicon	28·09	4	2·33
Manganese	54·94	2	7·43
Copper	63 7	1	8·96

    i) Determine the material removal rate (in cm^3/min) when a current of 1000 amp is passed in ECM operation.

    ii) In an ECM operation, the workpiece is of pure iron. Determine the equilibrium gap with the following data :

    Supply voltage = 10V, total over potential = 1·5V, conductivity of electrolyte = 0·2 ohm^{-1}cm^{-1}, feed rate = 1 mm/min.

                                            (3 + 4) + (5 + 3)

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10. a) Explain the sequence of fabrication in Rapid prototyping.

 b) Describe with a neat sketch, Solid Ground Curing.

 c) Differentiate between hard automation and soft automation. 5 + 5 + 5

11. Write short notes on any *three* of the following : 5 + 5 + 5

 a) Coordinate measuring machine

 b) Computer Integrated Manufacturing

 c) Computer Networking.

 d) Computer Aided Qual ty Control.

12. a) Elucidate the various facets of an expert system in relation to artificial intelligence.

 b) Explain the various types of networking methods used for data transmission.

 c) Discuss the limitations of reverse engineering with examples known to you. 5 + 5 + 5

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