Name : ....

Roll No. : ....

Invigilator's Signature : ....

CS/B.TECH(AUE)/SEM-7/AUE-715/2012-13

2012

CAD/CAM AND MODERN MANUFACTURING METHODS

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 the following :   10 × 1 = 10

    i)   The type of layout suitable for the concept, principles

         and approaches of 'group technology' is

         a)   Product layout

         b)   Job-shop layout

         c)   Fixed position layout

         d)   Cellular layout

         e)   none of these.

ii) The disadvantage of the product layout is

a) high initial investment for the specialised facilities

b) skilled labour to operate machines

c) production time is longer, requiring more goods in inventory

d) high cost of inspection

e) costly and complex production control.

iii) The instructions on the tape of NC machines is prepared in the form following system

a) numeric   b) alpha-numeric

c) binary number   d) binary coded decimal

e) Coded form.

iv) A low cost unit can be obtained by following

a) Product layout

b) Functional layout

c) Automatic material handling equipment

d) Specification of operations

e) Minimum travel time plan.

v) Point to point system of numerical control can be applied only to the conventional

    a) drilling machines or jig boring

    b) milling machines

    c) shaping operations

    d) lathe

    e) grinder.

vi) NC machines is operated by

    a) feedback system

    b) output-input model

    c) a series of coded instructions

    d) digitizing

    e) numerical control.

vii) Process layout is best suited where

    a) specialization exists

    b) machines are arranged according to sequence of operations

    c) few number of non-standard units are to be produced

    d) mass production is envisaged

    e) bought out items are more.

viii) Following machine should be specified when complex parts in short run quantities with variations have to be produced

    a)   copying

    b)   NC machines

    c)   transfer machines

    d)   electrochemical milling machines.

ix) Production flow analysis (PFA) is a method of identifying part family that uses data from

    a)   engineering drawing   b)   production schedule

    c)   bill of materials   d)   route sheets.

x) The preparatory code G01 indicates

    a)   circular interpolation clockwise

    b)   rapid traverse

    c)   circular interpolation anticlockwise

    d)   linear interpolation.

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

2. Write DDA algorithm for linear interpolation for graphics terminals.

3. Determine the equation of a cubic spline using Bernestein polynomial as basis function.

4. Describe with necessary figures the most common GT cell configurations.

5. Explain the principal components of CIM database and its functional classification.

6. Write a short note on DNC.

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

7. a) What are the basic types of geometrical transformation can be applied to an object in Cartesian coordinate. Derive relationship for geometric rotation and translation in *x-y* plane.

   b) A square with an edge length of 10 units is located on the origin with one of the edge at an angle of 30° with the *x*-axis. Calculate the new position of the square if it is rotted about *z*-axis by an angle 30° in the clockwise direction.

   c) Write short notes on surface modelling.   5 + 5 + 5

8. a) Explain the term 'Group Technology'. Write a shot note on composite parts.

b) Explain with neat sketch stereo lithography RP technique.

c) A cubic Bezier curve is defined by the control points (0, 0), (4, 3), (8, 4) and (12, 12). Find the equation of the curve. (4 + 1) + 5 + 5

9. a) Classify flexible manufacturing system (FMS) according to the level of flexibility and number of machines. Explain the different components of FMS.

b) Apply the rank order clustering technique to the part machine incidence matrix in the following table to identify logical part families and machine groups. Parts are identified by letters and machines are identified numerically.

Machines	Parts					
	A	B	C	D	E	F
1	1				1	
2				1		1
3	1	1				
4			1	1		
5		1			1	
6			1	1		1

(3 + 5) + 7

10. a) What is computer integrated manufacturing ? What are the benefits of using CIM ?

   b) What is the communication network structures used in CIM database ? Explain the basic structures in detail.

   c) Four machines are used to produce a family of parts to be arranged in a GT cell. The Form-To data for the parts processed by the machines are shown in the table below. Additional information is that 50 parts enter the machine grouping at machine 3, 20 parts leave after processing at machine 1 and 30 parts leave after machine 4. Determine

   i) the most logical sequence of machines for this data

   ii) the flow diagram of the data showing where and how many parts enter and leave the system

   iii) the percentage of in sequence move and percentage of back tracking moves in the solution .

	To :	1	2	3	4
From :	1	0	5	0	25
	2	30	0	0	15
	3	10	40	0	0
	4	10	0	0	0

(1 + 3) + 3 + 8

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