Date	21st May 2007	**Duration**	3 hours
Marks	35	**Component type**	Closed book

Instructions

1. Answer PART A and PART B in sequentially. .
2. Answers to PART A should be brief and sequential, no change in order permitted.
3. Answer in Brief.
4. Provide neat sketches.

PART A   (1X10 = 10)

1. What are the hardware requirements to run CATIA V5R17 software in your desktop?

2. List the contents of a database for a line, circle

3. Why solid models are more reliable than surface and wire frame models.

4. The equation of a plane surface passing through three given non collinear points (P_0, P_1, and P_2) is _____.

5. For the given solid, list the possible different types of surfaces used to model it using surface model.
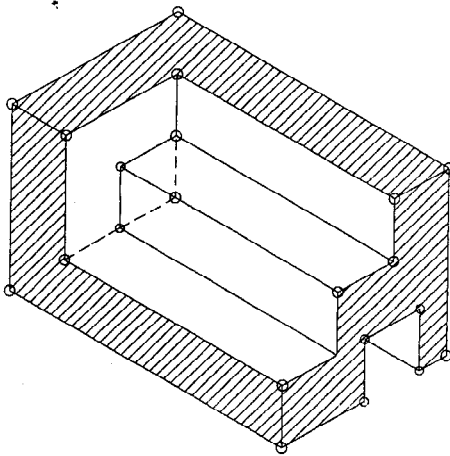

6. Differentiate between a generalized union and a regularized union operator.

7. List the needs for a standardized data exchange system in CAD.

8. List the different types of geometric tolerances.

9. The length of a given curve bounded in its parametric form is represented by the equation _____.

10. Define stiffness matrix.

PART B

1 Find the equation of the Bezier Curve with the following control five (5) points $P_0[2,2,2]$, $P_1[4,6,2]$, $P_2[4,6,6]$, $P_3[4,1,3]$ & $P_4[6,6,6]$. Also find points on the curve for $u = 0, 0.25, 0.5 \text{ and } 1$.

2 Find the length of the B spline developed by the control (5) points $P_0[2,0,0]$, $P_1[2,6,0]$, $P_2[6,6,0] \text{ and } P_3[6,0,0]$. Also calculate the area and the centroid bounded by the B spline and the X axis.

3 A Create a CSG tree for the given solid S shown in figure (2)
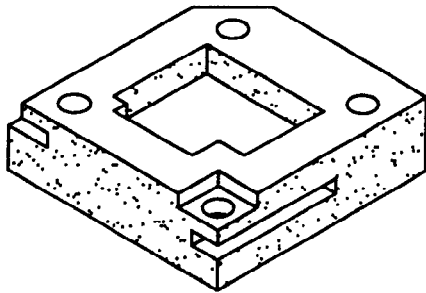
B A Bezier curve is to be translated. Does translating the control point and then (3) generating the curve give the same result as translating the original curve or not? Give reasons.

4 A With examples discuss the various mating conditions used in generating an assembly (2) design

B The plate shown in figure with its nominal dimensions. A tolerance of 0.2mm is (2) acceptable for drilling holes, for a successful assembling of the plate. A tolerance of 0.05mm is allowed on the position of the center of any hole, and another tolerance of 0.025mm in is allowed on the axis of any hole. Re sketch the figure to show these tolerances along with the tolerance zones.
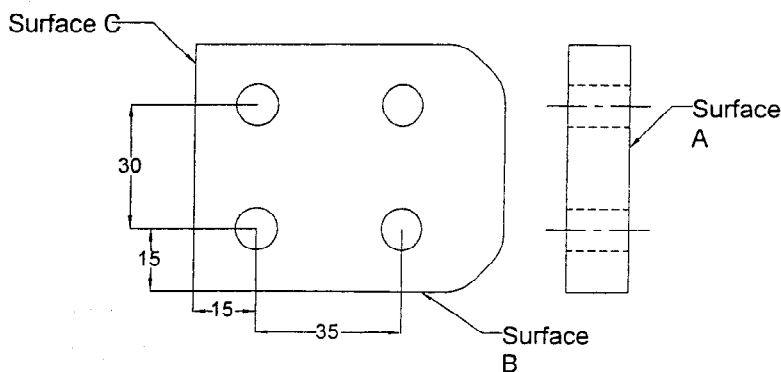
5 Write short notes on
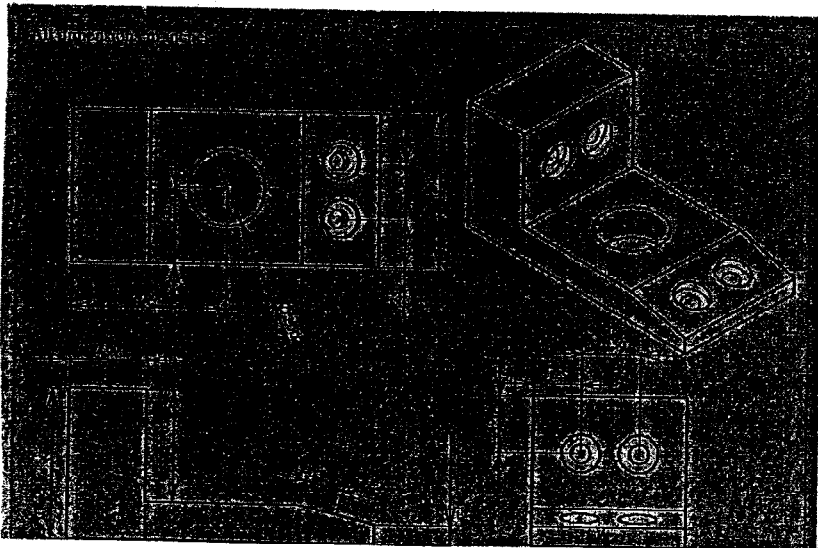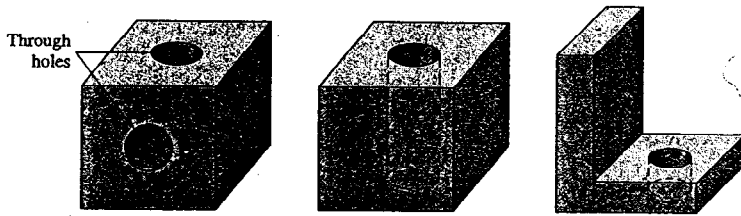   A Weighted Residual method of FEM (2)
   B IGES (2)
   C The Coordinate systems used in CAD (2)

handle for Q(2)
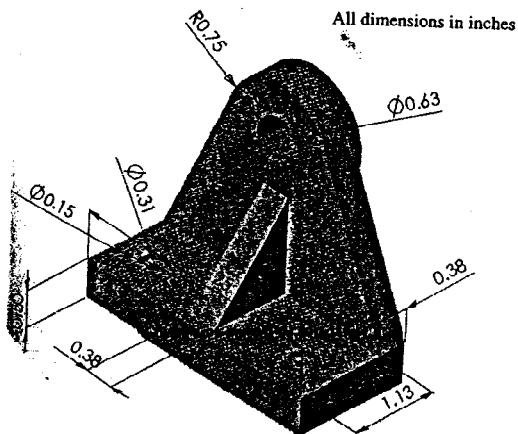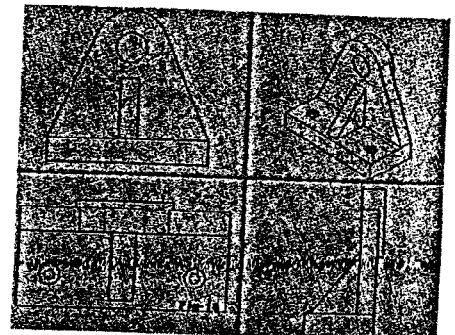
Figures for Q(4)

Through
holes

Figures for Q5

5·1

R0.75

Ø0.63

Ø0.31

Ø0.15

0.38

0.39

1.13

(f) Pipe bracket

5·2

Component Type	Open Book	
Date & Duration	8th April 2007 – 50 minutes	
Weight	15%	

Instructions

1. Answer in brief and sequentially.
2. Draw neat sketch if required

QUESTIONS

1   How are surfaces represented in parametric form?   (1)

2   The handle of joy stick is shown in figure is to be modeled using surface model.   (3)

   Suggest suitable method to develop the object

3   Differentiate between B-spline and Beizer surface.   (2)

4   Check the validity of the following 3D objects using Euler's equation. Also write the   (3)

   construction sequence needed to create them.

5   Sketch the CSG tree for the given objects.   (3)

6   A point P (4,5,8) is translated using the vector $d = 3i + 10j + 6k$, and rotated by 30   (3)

   through the x axis. Find the position of the final point P*. if the point is rotated

   through x axis and then translated by the above vector, will the new position coincide

   with P*.

2   4 vectors   4   16 vectors

8. The number of twist vectors associated with a surface patch is

1   12 vectors   3   8 vectors
2   4 vectors   4   16 vectors

9. Coons are surface patches defined by

1   A singular array of finite points   3   Infinite set of points
2   A m x n array of finite points   4   All above

10. Find the odd member from the list,

1   Ruled surface, tabulated surface & coons   3   Surface of revolution, tabulated surface & plane surface
2   Bezier surface, B-spline & plane surface   4   Offset surface, fillet surface & tabulated surface

11. _____entity is used to develop a surface model of a convergent – divergent nozzle, defined by a set of control points using

1   Surface of revolution   3   Tabulated surface
2   Bezier surface   4   B splines

12. The half space representation for a hollow cylinder is given by two cylindrical half spaces such that:

1   $H_1 = \{(x,y,z): x^2 + y^2 + z^2 < R_1^2\} \& H_2 = \{(x,y,z): x^2 + y^2 + z^2 < R_2^2\} \Rightarrow S = U\left(\bigcap_{i=1}^{n} H_i\right)$

2   $H_1 = \{(x,y,z): x^2 + y^2 + z^2 > R_1^2\} \& H_2 = \{(x,y,z): x^2 + y^2 + z^2 < R_2^2\} \Rightarrow S = U\left(\bigcap_{i=1}^{n} H_i\right)$

3   $H_1 = \{(x,y,z): x^2 + y^2 + z^2 > R_1^2\} \& H_2 = \{(x,y,z): x^2 + y^2 + z^2 < R_2^2\} \Rightarrow S = \cap\left(\bigcap_{i=1}^{n} H_i\right)$

4   $H_1 = \{(x,y,z): x^2 + y^2 + z^2 > R_1^2\} \& H_2 = \{(x,y,z): x^2 + y^2 + z^2 < R_2^2\} \Rightarrow S = U\left(\bigcup_{i=1}^{n} H_i\right)$

13. The Euler's law for definition of topological models is

1   $F - E + V - L = 2(B - G)$ 3 $F - E + L - V = 2(B - G)$
2   $F - E + V - L = 2(G - B)$ 4 $F - V + G - L = 2(B - E)$

14. Solid models are more reliable that surface and wire frame models because

1   They consume more memory space   3   They carry geometrical information about the models
2   They hold both geometrical and topological information of the object   4   They carry only topological information only

15. the operator "MEV" in B-rep modeling means

1   MAKE EDGE, VERTEX   3   MAKE VERTEX, EDGE
2   MAKE EDGE , VERTEX AND FACE   4   ALL ABOVE

ME UC382 – CAD

Date	22.03.07
Evaluation Component	Quiz -1
Weight	10
Component type	Closed book

Instruction

1. Write your answers only in the provided space.
2. No over writing or striking off is allowed
3. Negative marking of 0.25 marks for every wrong answer.

VERSION A

1. **The conditions required to define a cubic spline are**

1	Two end points alone	3	The end points of the curve and the tangents at the end points
2	Tangents at the end points	4	All above.

2. **The plot of a Bezier curve is closed figure which of the following are true**
   A. Minimum of four control points are required to define the curve
   B. The first and the last control points of the curve coincide.

1	Statement A is alone true	3	None of them are true
2	Statement B is alone true	4	Both are true.

3. **Which ·of the following are true for a B-spline curve**
   A. The curve has local control
   B. Convex hull is not a property associate with B-splines.
   C. Close curves cannot be formed.
   D. If "k" equals the number of control points (n+1) then it becomes a Bezier curve.

1	Statements A & D are true	3	Statements A & C are true
2	Statements B & C are true	4	All the above statements are true

4. **C° conditions stand for**

1	Curvature continuity of the curves	3	Slope continuity of the curves
2	Positional continuity of the curves	4	None of the above.

5. **C^{1} conditions stand for**

1	Curvature continuity of the curves	3	Slope continuity of the curves
2	Positional continuity of the curves	4	None of the above.

6. **C^{2} conditions stand for**

1	Curvature continuity of the curves	3	Slope continuity of the curves
2	Positional continuity of the curves	4	None of the above.

7. **A surface patch has _____ to define its orientation**

1	12 vectors	3	8 vectors

BITS Pilani Dubai Campus
Knowledge Village - Dubai
UAE
II Semester – 2006 – 07
ME UC382 – Computer Aided Design (CAD)
TEST – 1

Instructions

1. Answer in Brief
2. Maintain the order while answering the questions.

Date	25.02.07	Time	8.00 to 8.50 am
Component Type	Closed Book	Weight age	15%

Answer All Questions

1. Discuss the benefits of CAD/CAM to Engineering Design as compared to conventional methods. (3)

2. In brief discuss the merits and demerits of the input devices light pen Tablet/stylus, mouse, joystick and track ball. (3)

3. What is meant by Raster Scan? Explain the working of a Raster display. (3)

4. What is the difference between RAM and ROM.? (1)

5. Differentiate between Parametric and non parametric representation curves. (2)

6. Differentiate between analytic curves and synthetic curves. ' (2)

7. List the various types of coordinate system used in modeling (1)

8. List the various types of database used in data handling in CAD/CAM. (2)

9. for the given figure (assume suitable dimension) (3)

     i. Create the model database.
    ii. Obtain the orthographic view of the model
    iii. Obtain the final drawing of the model