UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, Dec-2017

Program Name: B- Tech (PIE & Mechanical)   **Semester – VI**
I
Course Name : CAD/CAM   **Max. Marks   : 100**
Course Code : GNEG 363   **Duration   : 3 Hrs**
No. of page/s: 02

Sec – A

Attempt All   **(5 x 4)**

1. List and describe various activities involved in product development. (5)
2. Write down the advantages to be gained by the adoption of CAM. (5)
3. Specify different types of elements used in FEM. (5)
4. What do you understand by the Implicit and Parametric representation of curves? (5)

Sec – B

Attempt All

5. A 3-D parametric cubic curve has the start and end points at **P**0 (0, 0, 0) and **P**1 (4, 0, 0) and the end tangents are (1, 0, 0) and (0, 1, 0).
   (a) Find the parametric equation of the curve and
   (b) If the end tangents have the magnitudes α and β show some results of the variation in curve shape due to changes in α and β. (15)

OR

Consider the assemblage of three springs as shown below. Calculate the displacement of the nodal points 2 and 3. Also calculate forces at node 1 and 4 taking force at 3 equal to 0.
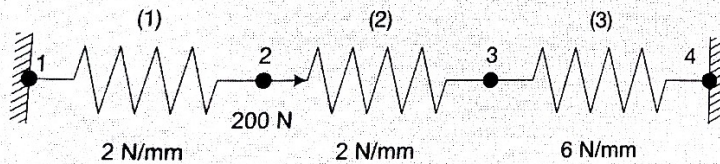
6. A square with an edge length of 10 units is located in the origin with one of the edges at an angle of 30^0 with the +X-axis. Calculate the new position of the square if it is rotated about the Z-axis by an angle of 30^0 in the clockwise direction. (15)
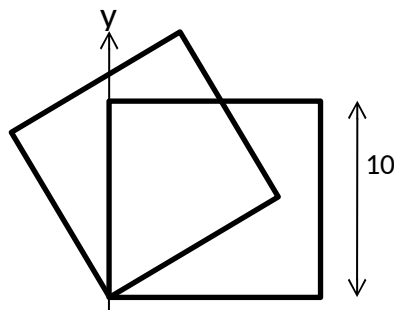
30^0

7. Explain the concept of floating datum and set point with reference to CNC part programming. What is their relationship? Explain how they are used in programming in ISO format. (10)
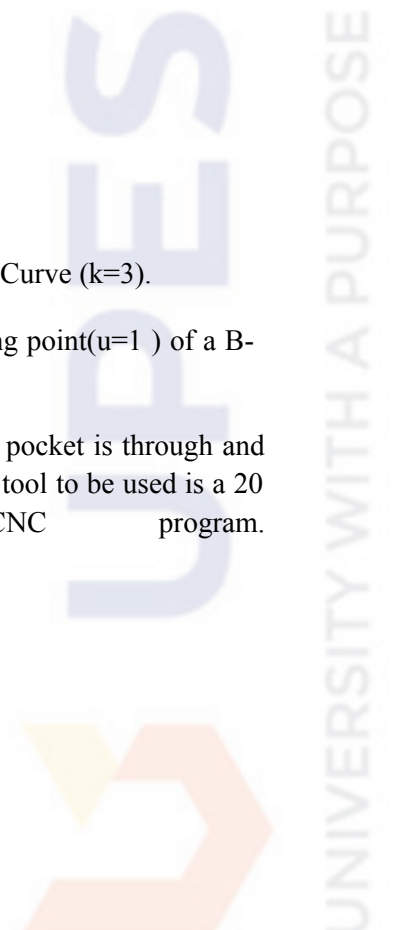
Sec – C
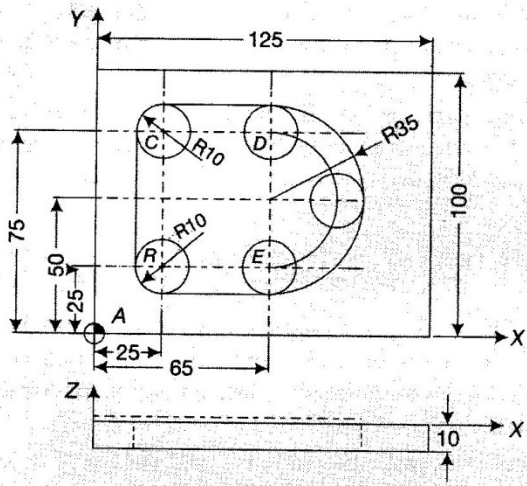
Attempt All (20 x 2)

8. For the four bar truss shown in figure below, determine displacement at the nodes and the stresses in each member. Area of cross-section of each member is 150 mm^2.
Take E = 300 GPa.
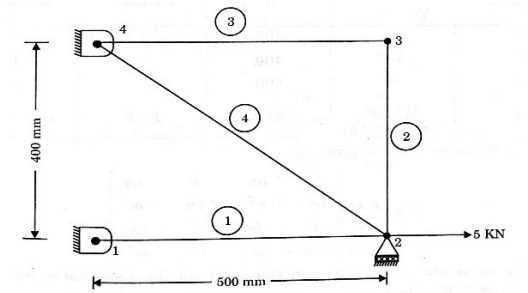
OR

(a) Derive the expressions for the blending functions for quadratic B-Spline Curve (k=3).

(b) Find the magnitude of tangent vector at starting point (u=0) and ending point(u=1) of a B-spline curve for N=3 and K=3

9. Component to be machined is shown in Fig. below. It is assumed that the pocket is through and hence only the outside is to be machined as a finish cut of the pocket. The tool to be used is a 20 mm diameter slot drill. Write CNC program. (20)