Duration: - 03 Hours **Total marks assigned to the paper: - 80**

N.B.: (1) Question No. 1 is **compulsory**.
(2) Attempt any **three** questions from remaining **five** questions.
(3) Clearly mention the **assumption** made if any.
(4) **Figures** to the **right** indicate **full** marks.

Q1. Solve **Any four** **(20)**

(a) Explain Geometric Modeling **(05)**

(b) Discuss the types of CNC. **(05)**

(c) Explain color model. **(05)**

(d) Explain AVG. **(05)**

(e) Explain Product life cycle with CAD overlay **(05)**

Q2. **(a)** Find out the raster locations by Bresenham's algorithm for the end points of a Straight line (15, 10), (27, 16).Also Plot the pixel positions. **(08)**

(b) What is B- rep and CSG type solid modelling? Explain with example. **(12)**

Q3. **(a)** A 2-D triangle is defined by its vertices A (0, 2), B (1, 3), and C (0, 4). Obtain the concatenated transformation matrix for the following transformations: **(12)**

1. Rotation through 30° in direction about point (0, 4) and
2. Translation by 3 units in X- direction and 2 units in Y– direction.

(b) Explain CIM wheel with an industrial applications. **(08)**

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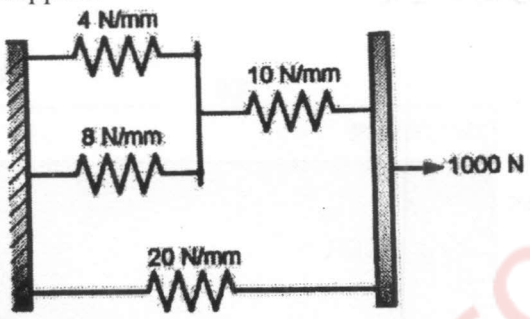
Q4. **(a)** Figure shows a cluster of four springs. One of the assembly is fixed and a force of 1000 N is applied at the other end. Using the finite element method, determine: **(12)**

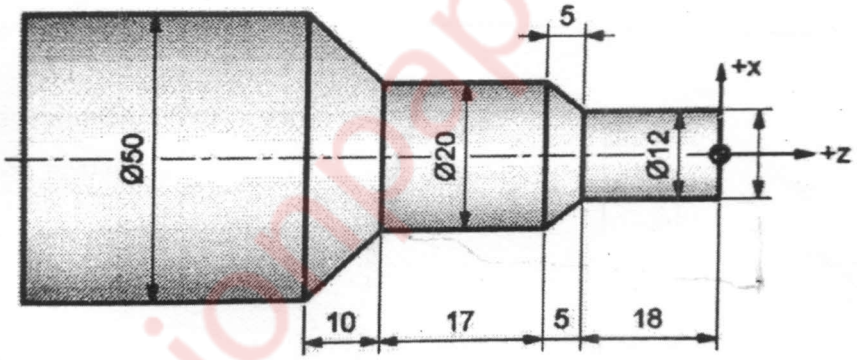
1. the deflection of each spring
2. the reaction force a support.



(b) Write short note on windowing and clipping. Explain Cohen sutherland algorithm for line clipping. **(08)**

Q5. **(a)** Write a complete manual part program for machining the component shown in the figure. **(10)**

Assume speed and feed on turning centre are 400 rpm and 0.35 mm/rev respectively.



(b) Explain the following: **(10)**

1. Product data exchange
2. Feedback devices used in CNC

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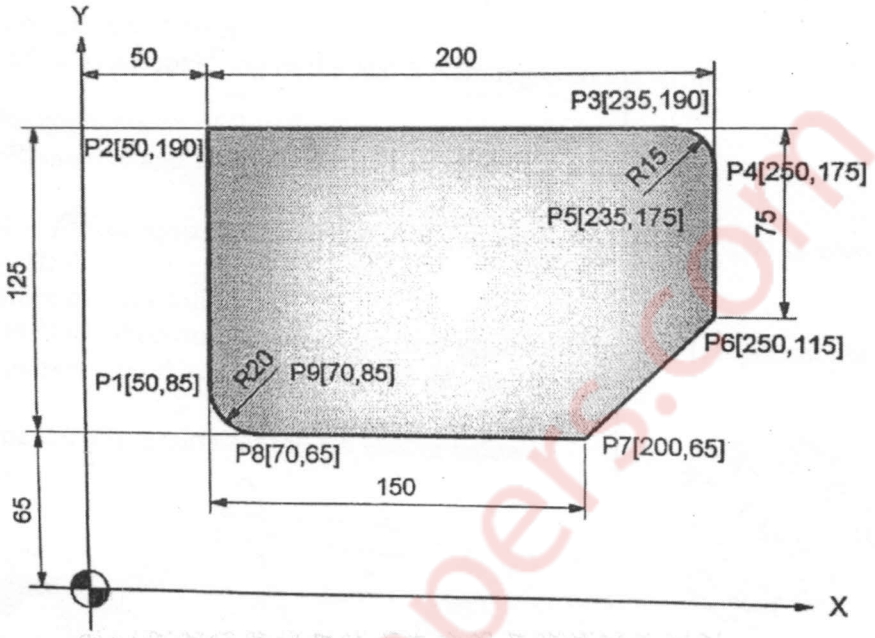
Q6. **a.** Write a complete APT program for the following part geometry as shown in figure. The component is 5mm thick. (Assume suitable feed and speed) **(10)**



b. Explain the following: (Any Two) **(10)**

1. FMS layout
2. AS/RS
3. Group Technology

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