B.Tech IV Semester (ME-A) Mid Semester Exam- I

PRODUCTION TECHNOLOGY – I

Academic Session: 2024-25

Date: 20-02-2025
Time: 50 minutes
Max. Marks: 15

Note: Attempt all questions. Specify the assumptions and assume suitable data if not given & highlight it. This will carry weightage.

1. Draw the orthographic projections of a single point tool and indicate the various tool angles in ASA system. **03**
2. From the machining performance viewpoint, which type of chip is preferred? Explain your answer with suitable justifications? Also show the conditions which favor such a chip formation. **03**
3. Define tool life and list the various factors affecting it. **02**
4. A single point cutting tool has a zero rake angle and 2° clearance angle. By what percentage would the life of the tool between regrinds be increased if a clearance angle of 8° was provided? **03**
5. In an orthogonal cutting of a steel component with a carbide tool, the following data was obtained.

   Tool rake angle = 10° Chip width = 6mm

   Uncut chip thickness = 0.10mm chip thickness ratio = 0.33

   Horizontal cutting force = 1290 N Vertical cutting force = 1650 N

   Sketch the force diagram and calculate the mean shear stress on the shear plane. **04**

The crank of four bar mechanism is rotating in the counter clockwise direction at a constant speed of 200 rad/s. AB = 100 mm, BC = 450 mm, CD = 200 mm and AD = 350 mm. Center of gravity of link 3 and 4 is at the midpoint, their radius of gyration are 75 mm and 50 mm, and their mass 4 kg and 3 kg respectively. Find the magnitude and the direction of torque at the crank shaft to overcome the inertia of the moving parts.