

Roll No.

Total No. of Pages : 02

Total No. of Questions : 08

M.Tech.(PE) (Sem.-1st)

METAL CUTTING

Subject Code : PE-502

Paper ID : [E0442]

Time : 3 Hrs.

Max. Marks : 100

INSTRUCTION TO CANDIDATES :

1. Attempt any FIVE questions out of EIGHT questions.
2. Each question carry TWENTY marks.

1. a) Write the tool signatures of a single point cutting tool in ORS and NRS systems. Illustrate all the SPCT elements with different views in both the systems. (12)

mechanics of chip formation in case of turning operation.

What factors facilitate the chip formation process? Explain. (8)

2. a) What do you understand from effective rake angle and shear angle? Establish the relationship to find the shear angle. (4+6)

- b) Define and explain the significance of chip reduction coefficient. Describe the effect of cutting speed, depth of cut, feed and rake angle on chip reduction coefficient. (10)

3. What types of dynamometers are used for forces measurement in machining? Explain them briefly. Describe the constructional details and use of a strain gauge type three dimensional milling dynamometer. (20)

4. a) Explain temperature distribution at chip tool interface and discuss any one method of experimental determination of chip tool interface temperatures. (10)

- b) How is tool life specified? State the factors which affect tool life and explain the tool failure criteria that could be used for limiting tool life. (10)

5. a) Explain the cutting tool failure because of plastic fracture. What means are used for the assessment of plastic deformation? Explain their causes. (10)
- b) What do you mean by form stability? Describe the cutting tool form stability criterion at elevated temperature and high cutting speeds. (10)
6. a) What are the sources of heat generation in metal machining processes? Explain temperature distribution phenomenon at chip tool and tool work interface. (6)
- b) What will be the usefulness of Merchant's Circle Diagram? Explain with an illustration. Describe the effect of wear land on the force system existing at the chip tool interface. (14)
7. a) Discuss the mechanics of grinding, lapping and honing processes. (10)
- b) Explain the impact of grain size, bond and structure of the grinding operations. (10)

operations.

ns on following:

- i) Flank and crater wears
- ii) Hot machining
- iii) Grinding wheel wear and testing of grinding wheel. (6+8)