(b) Calculate the material removal rate and the electrode feed rate in the electrochemical machining of an Iron surface that is 25 mm × 25 mm in cross-section using NaCl in waster as electrolyte. The gap between the electrode and the work piece is 0.25 mm. The supply voltage is 12 volt DC. The specific resistance of the electrolyte is 3 ohms-cm for iron. Valence Z = 2, atomic weight is 55.85 amu, density = 7860 kg/m^3. **5**

8. (a) Derive the expression for MRR in electro discharge machining process. **5**

(b) Enlist super finishing operation and explain any *one* superfinishing operation. **5**

(Compulsory Question)

9. (a) Derive the expression for shear strain in orthogonal cutting.

(b) Turning operation is performed on cylinder of 50 mm diameter and 200 mm length. Value of the feed is 0.3 mm/rev. Taylor's tool life equation for cutting is given by $VT^{0.2} = 300$. Job loading and unloading time is 2 min. tool change time

July-22-00296

B. Tech. EXAMINATION, 2022

Semester V (CBCS)

MANUFACTURING TECHNOLOGY–II

ME-502

Time : 3 Hours　　　　　*Maximum Marks : 60*

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : Attempt *Five* questions in all, selecting *one* question from each Section A, B, C and D. Q. No. 9 is compulsory.

Section A

1. (a) Deduce the expression of maximum height of surface roughness formed during machining by using sharp tool. **5**

(b) Explain the role of cutting speed, feed and depth of the cut on the surface finish and power consumption during machining. **5**

2. (a) The following data is related to a orthogonal turning process :

Back rake angle = 18°

Width of cut = 3 mm

Chip thickness = 0.5 mm

Feed rate = 0.2 mm/rev

Cutting force = 950 N

Thrust force = 850 N

Find the value of mean shear stress on the shear plane. **5**

(b) Differentiate between orthogonal and oblique cutting. **5**

Section B

3. (a) In a turning operation, tool life was found to be decreased from 32 min to 4 min due to increase in cutting speed from 150 rpm to 600 rpm. What will be the tool life when cutting speed is 300 rpm ? **5**

(b) Differentiate between gear shaving and gear hobbing process. **5**

4. (a) Classify and describe high performance ceramic (HPC) tools used in metal cutting operation. **5**

(b) Differentiate between simple and compound indexing used for manufacturing of gears using milling machine. **5**

Section C

5. (a) Explain the need of jigs and fixtures in machining operations. **5**

(b) Explain the construction and working principle of three dimension turning dynamometer for lathe machine. **5**

6. (a) Discuss general principle of force measurement in metal cutting operation. **5**

(b) Describe the factors consider while designing fixture for Arc welding operation. **5**

Section D

7. (a) Discuss the effect of process parameter on the grinding force and surface roughness in grinding process. **5**

is 2 min. labour cost is 15 Rs./hour and original tool cost 5 Rs./tool. Find Optimum cutting speed, tool life, time/piece and cost/piece, using minimum cost criteria.

(c) Find out the center of pressure and required cutting force for shearing the below mentioned part from the plate having shear strength of 40 kg/mm² and thickness of 2 mm.

7 cm

2 cm

5 cm

3 cm
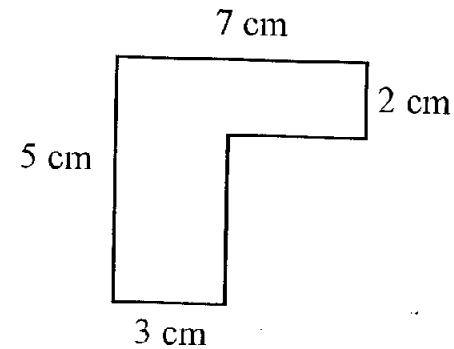
(d) Explain working principle of electron beam machining process.   **5×4=20**