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17ME45B/17MEB405

Fourth Semester B.E. Degree Examination, Feb./Mar.2022

## Machine Tools & Operations

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

### Module-1

- 1 a. Classify the machine tools with an example. (10 Marks)  
b. Define drilling machine, write a neat sketch of Bench Drilling machine. (10 Marks)

OR

- 2 a. Differentiate between Capstan and Turret lathe. (10 Marks)  
b. Explain the constructional features of boring machine. (10 Marks)

### Module-2

- 3 a. List the various machining process on lathe. (05 Marks)  
b. Explain with neat sketch, (i) End milling (ii) Trepanning (iii) Reaming. (15 Marks)

OR

- 4 a. List the various machining process on drilling. (05 Marks)  
b. Explain with neat sketch, (i) Taper turning (ii) Thread milling (iii) Centreless grinding. (15 Marks)

### Module-3

- 5 a. Illustrate the characteristics and applications of, (i) HSS (ii) Ceramics (10 Marks)  
b. Find the time required for drilling a 18 mm hole in a work piece having thickness of 50 mm. Assume cutting speed of 12 meters/minute and feed 0.2 mm/revolution. Neglect the length of approach. (10 Marks)

OR

- 6 a. Explain the various types of cutting fluid with application. (10 Marks)  
b. Evaluate the cutting parameters for slab milling operation for the following data : diameter of milling cutter 100 mm, cutter speed 500 rpm, width of cutter 100 mm, depth of cut 5 mm, table feed 100 mm/min, length of work 50 cm and width of work 80 mm and number of teeth on cutter is 8. Take tool over travel distance = 4 mm. (10 Marks)

### Module-4

- 7 a. Derive an equation for relationship between shear angle ( $\phi$ ), rake angle ( $\alpha$ ) and chip thickness ratio ( $r$ ). (12 Marks)  
b. Compare up milling and down milling. (08 Marks)

OR

- 8 a. Discuss briefly the different types of chips encountered in metal cutting. (10 Marks)  
b. Explain orthogonal cutting and oblique cutting with neat sketch. (10 Marks)

### Module-5

- 9 a. Define tool wear. Explain crater wear and flank wear. (10 Marks)  
b. Define machinability. Discuss the various criteria for determining machinability. (10 Marks)

OR

- 10 a. List and explain effect of cutting parameters on tool life. (10 Marks)  
b. Write a note on : (i) Economics of machining process. (10 Marks)  
(ii) Elements of cost.

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Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and/or equations written eg, 42+8 = 50, will be treated as malpractice.