

CBCS SCHEME

17ME45B/17MEB405

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Fourth Semester B.E. Degree Examination, July/August 2021 Machine Tools and Operations

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions.

- 1 a. Explain the classification of Machine Tools with suitable example. (10 Marks)
b. Explain the constructional features and working of center less Grinding machine with a neat sketch. (10 Marks)
- 2 a. Define Drilling. With a neat sketch, explain Radial Drilling machine. (10 Marks)
b. Describe with a neat sketch typical Horizontal shapes. (10 Marks)
- 3 a. Define the term, machining. Explain with neat sketches the various operations can be performed in a lathe. (10 Marks)
b. Explain with neat sketches the types of motions in machining to the following:
i) Internal Turning/Boring
ii) Drilling
iii) Milling
iv) Shaping. (10 Marks)
- 4 a. Explain with neat sketches the machining processes on drilling machine. (10 Marks)
b. With a neat sketch, explain the concept of gear cutting using horizontal milling machine. (10 Marks)
- 5 a. Briefly describe the requirements of cutting tool materials. (10 Marks)
b. i) In brief, describe the functions of cutting fluid.
ii) List out the properties of cutting fluids and brief them. (10 Marks)
- 6 a. Determine the machining time in turning a bar of 76mm diameter to 68mm diameter. The length of the bar is 250mm, feed 0.25mm/rev, cutting speed 60mpm and depth of cut is 2mm. Assume total tool approach and over travel distance is 6mm. Also determine the metal removal rate. (16 Marks)
b. Find the time required for drilling a 20mm diameter hole on a workpiece of thickness 50mm. Neglect the length of approach. The rotational speed of drill bit is 200rpm. Over travel is 10mm. Feed is 0.12mm/rev. (04 Marks)
- 7 a. List the comparison between orthogonal and oblique cutting. (10 Marks)
b. Describe with sketches mechanics of milling process. (10 Marks)
- 8 a. Explain different types of chip formation during machining. (10 Marks)
b. Draw the shear angle relationship and derive the equation.

$$\tan \phi = \frac{r \cos \alpha}{1 - r \sin \alpha}$$

(10 Marks)

- 9 a. Define tool wear. List and describe the various parameters affecting the tool wear on cutting tools. (10 Marks)
b. Define Machinability. Discuss the various criteria considered for determining machinability. (10 Marks)
- 10 a. Discuss the reasons for tool failure. (10 Marks)
b. Discuss the Economics of machining processes. (10 Marks)

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