CBCS SCHEME

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17ME45B/17MEB405

ACHARYA INSTITUTE OF TECHNOLOGY
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Date.....
BANGALORE

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.

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.

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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