CBCS SCHEME

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15ME45B/15MEB405

Fourth Semester B.E. Degree Examination, Dec.2019/Jan.2020
Machine Tools and Operations

Time: 3 hrs. Max. Marks: 80

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

Module-1

1 a. What are machine tools? Briefly explain the types of Lathe. **(08 Marks)**

b. Differentiate any 8 differences between centre, turret and capstan lathes. **(08 Marks)**

OR

2 a. What is milling? Explain horizontal spindle column and knee type milling machine. **(08 Marks)**

b. Define Grinding. With a neat sketch explain centreless grinding machine. **(08 Marks)**

Module-2

3 a. What machining operations can be performed on Lathe, explain any 4 with neat sketch. **(08 Marks)**

b. Explain with a neat sketch, the process of
(i) Broaching (ii) Grinding
(iii) Tapping (iv) Threading **(08 Marks)**

OR

4 a. With a neat sketch explain
(i) Form milling (ii) Slot milling
(iii) Gang milling (iv) Angular milling **(08 Marks)**

b. With a neat sketch explain any 4 operations that can be performed on Drilling machine. **(08 Marks)**

Module-3

5 a. List and explain any four types of cutting tool materials. **(08 Marks)**

b. What are cutting fluids, list the functions and types of cutting fluids. **(08 Marks)**

OR

6 a. Briefly explain the terms and Angles of a single point cutting tool. **(08 Marks)**

b. What is surface finish? List and discuss the factors affecting surface finish. **(08 Marks)**

Module-4

7 a. With a neat sketch, compare between Oblique and Orthogonal cutting. **(08 Marks)**

b. With a neat diagram, explain the Basic elements of machining. Explain two different types of chip formation. **(08 Marks)**

OR

8 a. By the help of Merchant's circle diagram derive expressions to calculate all forces. **(08 Marks)**

b. In an orthogonal cutting process the following data were obtained:
Chip length obtained = 96 mm Uncut chip length = 240 mm
Rake angle used = 20° Depth of cut = 0.6 mm
Horizontal component of cutting force = 2400 N
Vertical components of cutting force = 240 N.
Calculate for the given data:
(i) Shear plane angle (ii) Chip thickness
(iii) Friction Angle (iv) Resultant cutting force **(08 Marks)**

Module-5

9 a. Explain the different tool wear mechanisms. **(08 Marks)**

b. What is tool failure? Explain the types of tool failures. **(08 Marks)**

OR

10 a. What is tool life? Explain the factors affecting the tool life. **(08 Marks)**

b. The following equation for tool life is given for a turning operation $VT^{0.13}f^{0.77}d^{0.37} = C$ at V = 30 m/min, f = 0.30 mm/rev and depth of cut d = 2.5 mm. Calculate the change in tool life if the cutting speed, feed, depth of cut are increased by 25% individually and also taken together. **(08 Marks)**

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