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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)

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.

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)
