

# CBCS SCHEME

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15ME35B/15MEB305

## Third Semester B.E. Degree Examination, Jan./Feb.2021 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. Draw the block diagram of planar machine and label all major parts. (08 Marks)  
b. Give the detailed specification of grinding machine. (08 Marks)

OR

- 2 a. Draw the neat sketch of Broaching Tool and explain briefly Broaching Operation. (06 Marks)  
b. Classify briefly Machine Tools. (04 Marks)  
c. With neat sketch explain specifications of Lathe. (06 Marks)

### Module-2

- 3 a. With neat sketch, explain relative motion of Tool and Work piece in Boring operation. (05 Marks)  
b. Define cutting speed, feed and depth of cut with equation and units. (06 Marks)  
c. Explain End Milling Operation with neat sketch. (05 Marks)

OR

- 4 a. Explain the relative motion of tool and work piece in threading in lathe with single point cutting tool, with neat sketch. (06 marks)  
b. With neat sketch, explain drilling and reaming operation. (04 marks)  
c. What is Indexing? Explain briefly with neat sketch compound indexing. (06 Marks)

### Module-3

- 5 a. Explain the properties and composition of High Speed Steel and Cemented Carbide Tool Material. (08 Marks)  
b. Draw 3-views of single point cutting tool and show various angles. (05 Marks)  
c. Name six cutting fluids used for machining. (03 Marks)

OR

- 6 a. Define Roughness, Waviness and Lay. (06 Marks)  
b. A mild steel plate of dimensions  $400 \times 800 \times 30$  is to be shaped along its wider face. The ratio of return time to cutting time is 2 : 3 and feed per cycle is 2 mm. Tool approach and over travel respectively are 50 mm each. Calculate the machining time required for machining the given plate with HSS Tool. Assume cutting speed = 24 m/min. (10 Marks)

### Module-4

- 7 a. With suitable sketches, explain different types of chips produced during machining. (07 Marks)  
b. What are the assumptions made by Earnst Merchant's theory? (03 Marks)  
c. The following data refer to an orthogonal cutting process. Chip thickness 0.62 mm, feed 0.2 mm/rev, Rake angle  $15^\circ$ . Calculate chip reduction coefficient and shear angle. (06 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. With neat sketches, explain the difference between orthogonal cutting and oblique cutting. (06 Marks)
- b. Derive an expression for shear plane angle  $\phi = \frac{\pi}{4} - \frac{\beta}{2} + \frac{\alpha}{2}$  with respect to orthogonal cutting. (10 Marks)

**Module-5**

- 9 a. Explain with sketches Flank Wear and Crater Wear. (06 Marks)
- b. Explain briefly Wear mechanism of cutting tool. (04 Marks)
- c. Discuss the effect of cutting parameters on Tool life with equations. (06 Marks)

OR

- 10 Write short notes on: (05 Marks)
- a. Choice of feed. (06 Marks)
- b. Choice of cutting feed. (06 Marks)
- c. Machining at maximum efficiency. (05 Marks)

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