CBCS SCHEME

USN | | | | | | | | | | | **15MEB405/15ME45B**

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

Time: 3 hrs.   Max. Marks: 80

Note: Answer any FIVE full questions.

1   a. Define Machine Tool. Give the classifications of machine tools.   (06 Marks)
    b. Draw the neat sketch of Lathe machine and label its parts.   (06 Marks)
    c. Differentiate between Capstan and Turret lathe.   (04 Marks)

2   a. With a neat sketch, explain the constructional features of radial drilling machine.   (08 Marks)
    b. Explain the constructional features of centerless grinding machine with a neat sketch.
                                                                                     (08 Marks)

3   a. Define machining. Compare traditional and non-traditional machining process.   (06 Marks)
    b. List the operations performed on lathe machine and explain any four operations with neat sketches.   (10 Marks)

4   a. Explain the types of motions in machining process.   (06 Marks)
    b. Explain the following machining processes with neat sketches:
        (i) End milling   (ii) Angular milling   (iii) Shaping   (iv) Broaching   (10 Marks)

5   a. Discuss the requirements of cutting tool materials.   (06 Marks)
    b. Explain the following cutting tool materials with their applications:
        (i) HSS   (ii) Cemented Carbides   (06 Marks)
    c. Write a note on rake angle.   (04 Marks)

6   a. Briefly about the functions and properties of cutting fluids.   (06 Marks)
    b. Discuss the effect of machining parameters on surface finish.   (04 Marks)
    c. Name the types of cutting fluids. Elaborate on chemical cutting fluids with their advantages, disadvantages and applications.   (06 Marks)

7   a. Briefly explain the mechanism ad types of chip formation.   (08 Marks)
    b. Differentiate between up milling and down milling.   (04 Marks)
    c. Give the comparison between orthogonal and oblique cutting process.   (04 Marks)

8   a. Derive the shear angle relationship interms of chip thickness ratio rake angle.   (10 Marks)
    b. The following data refer to an orthogonal cutting process, chip thickness 0.62 mm, feed 0.2 mm, rake angle 15°. Calculate chip reduction coefficient and shear angle.   (06 Marks)

9   a. Define tool life. Explain the tool wear mechanisms.   (08 Marks)
    b. List and explain various parameters which affect the tool life.   (08 Marks)

10 a. Write notes on: (i) Tool failure criteria   (ii) Machinability   (06 Marks)
    b. Brief about elements of cost in machining.   (04 Marks)
    c. A cast iron bar was turned at 50 m/min, for which, the tool life was 3 hours. For the same material at 40 m/min, the tool life was 5 hours. Find the value of constant 'C' and n in the Taylor's tool life equation. Also state the type of tool material based on the value of 'n'.   (06 Marks)