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)**

* * * * *