CBCS SCHEME

15MEB305

USN ☐☐☐☐☐☐☐☐☐☐

Third Semester B.E. Degree Examination, Dec.2018/Jan.2019
Machine Tools and Operations

Time: 3 hrs.   Max. Marks: 80

Note: *Answer FIVE full questions, choosing one full question from each module.*

Module-1

1   a. With a neat sketch show major parts of the centre lathe.   (06 Marks)
    b. Describe the following:
        (i)   Sensitive drilling machine.
        (ii)   Deep hole drilling machine   (10 Marks)

OR

2   a. Explain principal parts of column and knee type milling machine.   (08 Marks)
    b. With the help of block diagram, explain the working of a centre type cylindrical grinding machine.   (08 Marks)

Module-2

3   a. Explain the following machining process with neat sketches: (i) Reaming (ii) Boring.   (08 Marks)
    b. Explain the following milling methods:
        (i)   Straddle milling
        (ii)   End milling   (08 Marks)

OR

4   a. With sketches pertaining to relative motions between tool and work piece, explain the following shaper operations:
        (i)   Machining horizontal surface.
        (ii)   Machining vertical surface.
        (iii) Machining angular surface.   (12 Marks)
    b. Explain broaching process with illustration.   (04 Marks)

Module-3

5   a. What are the desirable characteristics of cutting tool materials?   (04 Marks)
    b. With a neat sketch briefly, explain the following for a single point cutting tool:
        (i)   Back rake angle.
        (ii)   End clearance angle.
        (iii) Side rake angle.
        (iv)   Side relief angle.   (12 Marks)

OR

6   a. Explain the effect of machining parameters on surface finish.   (06 Marks)
    b. List the various functions of a cutting fluid in metal cutting.   (05 Marks)
    c. Determine the machining time required for machining of a work 350 mm long and 50 mm diameter in a lathe. The cutting speed is 30 m/min and the feed rate is 0.4 mm per revolution.   (05 Marks)

Module-4

7 a. Briefly explain the different types of chips produced during metal cutting with neat sketches.
(09 Marks)

   b. In an orthogonal cutting operation of a material with yield strength of 250 N/mm^2. The following data is obtained:

   Rake angle of the tool = 15 degree
   Uncut chip thickness = 0.25 mm
   Width of chip = 2 mm
   Chip thickness ratio = 0.46
   Friction angle β = 40 degree

   Determine the shear angle ϕ, the cutting force component and resultant force on the tool.
(07 Marks)

OR

8 a. Give the difference between orthogonal cutting and oblique cutting with neat sketches.
(08 Marks)

   b. With aid of suitable sketches, explain clearly the concepts of upmilling and down milling.
(08 Marks)

Module-5

9 a. Explain the types of tool wear with necessary sketches.
(09 Marks)

   b. A mild steel bars of diameter 50 mm are to be turned at over length of 160 mm with a depth of cut of 1.5 mm, feed of 0.2 mm/rev at 230 rpm by HSS tools. If the tool life equation is given, $VT^{0.2}f^{0.3}d^{0.12} = 50$

   Determine how many components may be turned before regrinding the tool.
(07 Marks)

OR

10 a. Explain the effect of process parameters on tool life.
(08 Marks)

    b. Explain machinability.
(04 Marks)

    c. Explain effect of variations in cutting speed on various cost factors.
(04 Marks)

* * * * *