

--	--	--	--	--	--	--	--	--	--

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 $\beta = 40$ 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)
