CBCS SCHEME

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15ME35B/15MEB305

Third Semester B.E. Degree Examination, Jan./Feb. 2023
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. Define Machine Tool. Explain the classification of Machine tools with suitable example. **(08 Marks)**

b. Give the classification of lathes and explain any three types of lathe. **(08 Marks)**

OR

2 a. Define Milling. With a neat sketch, explain Column and Knee type Milling machine. **(06 Marks)**

b. With a neat sketch, explain Cylindrical Grinding Machine. **(06 Marks)**

c. What are the advantages , disadvantages and applications of Broaching. **(04 Marks)**

Module-2

3 a. What is Machining? Explain with a neat sketch, the following Operations on lathe :
i) Facing ii) Plain Turning iii) Knurling. **(08 Marks)**

b. List the operations that can be performed on drilling machine. Explain any three operations, with neat sketches. **(08 Marks)**

OR

4 a. With neat sketch, explain the comparison of Up – milling and Down – milling. **(06 Marks)**

b. With neat sketch, explain any two types of Shaping Machine Operations. **(06 Marks)**

c. Explain with a neat sketch, explain the following :
i) Slab Milling ii) End Milling. **(04 Marks)**

Module-3

5 a. Explain briefly the characteristics of a cutting tool materials. **(04 Marks)**

b. Explain the Geometry of single point cutting tool, with a neat sketch. **(08 Marks)**

c. Explain the different types of cutting tool materials. **(04 Marks)**

OR

6 a. Explain the parameters affecting surface finish. **(08 Marks)**

b. Give the Machining equation expression for cutting speed, depth of cut and Machining time for turning. **(06 Marks)**

c. What are the factor affecting feed of turning? **(02 Marks)**

Module-4

7 a. Differentiate between Orthogonal and Oblique cutting with neat sketches. **(08 Marks)**

b. With neat sketch, explain the different types of chips produced during machining operations. **(08 Marks)**

OR

8 a. Explain the Thermal aspects in metal cutting. (06 Marks)

b. During Orthogonal cutting of MS bar at 210 MPM (m/min) with a tool of rake angle 12°, the width of cut and uncut thickness are 1.8mm and 0.2mm respectively. If coefficient of friction between the tool and the chip is 0.55 and shear stress is 390N/mm^2. Calculate

i) Shear Angle.

ii) Cutting and thrust components of the machining force. (08 Marks)

c. Mention the various types of chip breaker. (02 Marks)

Module-5

9 a. Define Tool Wear. Explain with a neat sketch, Crater wear and Flank wear. (08 Marks)

b. Define Tool Life. List out the tool wear mechanisms. Explain any two tool wear mechanism. (08 Marks)

OR

10 a. Briefly explain the factors affecting Tool Life. (08 Marks)

b. The tool life of a turning tool obtained was 40 minutes and 25 minutes at cutting speed of 80m/min and 100m/min respectively. Determine the tool life at 40m/min and 120m/min. (08 Marks)

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