

CBCS SCHEME

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21ME42

Fourth Semester B.E. Degree Examination, Dec.2023/Jan.2024 Machining Science & Jigs & Fixtures

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. List the operations carried out on drilling machine and explain any 2 operation with neat sketch. (08 Marks)
- b. Explain the step by step procedure of taper turning operation carried out and lathe machine. (06 Marks)
- c. Define machining process and explain the classification of material removal process. (06 Marks)

OR

- 2 a. Explain with neat sketch, the construction of horizontal milling machine (column × knee type). (08 Marks)
- b. Explain the step by step procedure of machining a rectangular slot of 10 mm wide × 5 mm depth on a rectangular block using shaping machine. (06 Marks)
- c. With neat sketch, explain the following operation : (06 Marks)
- (i) Straddle milling
 - (ii) Reaming
 - (iii) Plain turning

Module-2

- 3 a. Sketch and explain the tool geometry of a single point cutting tool and highlight the significance of different angles. (08 Marks)
- b. Explain the various types of cutting fluids used in metal cutting and state the properties of cutting fluids. (06 Marks)
- c. List out the differences between orthogonal and oblique cutting. (06 Marks)

OR

- 4 a. Briefly explain the different types of chips produced during metal cutting with neat sketches. (08 Marks)
- b. Explain the steps involved in cutting force measurement with dynamometers for turning operation. (06 Marks)
- c. A Seamless tubing 35 mm outside diameter is turned orthogonally on a lathe. The following data is available. Rake angle = 35°, Cutting speed = 15 m/min, Feed = 0.10 mm/rev, Length of continuous chip in one revolution = 50.72 mm. Cutting force = 200 N, Feed force = 80 N. Calculate the co-efficient of friction, shear plane angle, velocity of chip along tool face and chip thickness. (06 Marks)

Module-3

- 5 a. What is machinability? List and explain the variables that affect the tool life. (08 Marks)
- b. Explain with neat sketch, the principal of lapping. (06 Marks)
- c. Explain with neat sketch, the principal of honing. (06 Marks)

OR

- 6 a. Explain with a neat sketch, the various forms of tool wear found in the cutting tools. (08 Marks)
- b. Write a short notes on the following :
- (i) Electroplating
 - (ii) Powder coating.
 - (iii) Liquid coating. (12 Marks)

Module-4

- 7 a. With neat labeled sketch, explain the working of Abrasive water jet machining along with its application. (10 Marks)
- b. Explain the process parameters of USM and list the advantages, limitation of it. (10 Marks)

OR

- 8 a. With neat labeled sketch, explain the working principal of electrical discharge machining. List the various in EDM process and explain any one of them process parameters. (10 Marks)
- b. Explain with neat sketch the working of ultrasonic assisted electric discharge machining along with its advantages. (10 Marks)

Module-5

- 9 a. With neat sketch, explain template jig and leaf jig. (10 Marks)
- b. State the factors to be considered for the design of jigs and fixtures. (05 Marks)
- c. List the difference between jigs and fixtures. (05 Marks)

OR

- 10 a. What is jig and fixture? List and explain the essential features of jigs and fixtures. (10 Marks)
- b. List the different types of fixtures and with neat sketch explain any one type of fixture in detail. (10 Marks)
