



CBCS SCHEME

21ME42

Fourth Semester B.E./B.Tech. Degree Examination, Dec.2024/Jan.2025 Machining Science and Jigs and Fixtures

Time: 3 hrs.

Max. Marks: 100

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

Module-1

- 1 a. Define machining process and briefly explain different methods of machining. (04 Marks)
- b. List different types of lathes and how do you specify a lathe machine tool. (06 Marks)
- c. Sketch and explain radial drilling machine construction. (10 Marks)

OR

- 2 a. List and explain any two milling operations. (08 Marks)
- b. Give the broad classification of shapers and list the advantages of shaper. (06 Marks)
- c. Define CNC machine and list the advantages and limitations of CNC machines over conventional machines. (06 Marks)

Module-2

- 3 a. Sketch and explain the nomenclature of single point cutting tool and the effect of tool angles in turning process. (08 Marks)
- b. Sketch and explain different types of chips formed in machining process. (06 Marks)
- c. In orthogonal cutting of a 50 mm diameter MS bar on a lathe machine, following data was recorded : Rake angle = 15° , cutting speed 100 m/min, feed 0.2 mm/rev. Cutting force = 180 N, Feed force = 60 N and chip thickness is 0.3 mm. Calculate the following :
i) Shear plane angle ii) Shear force iii) Cutting power. (06 Marks)

OR

- 4 a. Draw the merchant circle diagram and derive the Earn's Merchant equation by enlisting assumptions. (10 Marks)
- b. List the characteristics of cutting fluids. (04 Marks)
- c. Explain different methods used for applying cutting fluids. (06 Marks)

Module-3

- 5 a. List and explain various factors affecting tool life. (08 Marks)
- b. Define Machinability and what are the criteria for evaluating machinability. (04 Marks)
- c. Explain different types of tool wear with a neat sketch. (08 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and/or equations written eg, 42+8 = 50, will be treated as malpractice.

OR

- 6 Explain the following :
i) Abrasive flow machining
ii) Lapping and Honing process
iii) Electroplating
iv) Anodizing

(20 Marks)

Module-4

- 7 a. Sketch and explain the working principle of ultrasonic machining process. (08 Marks)
b. Explain the effect of various process parameters on the performance of abrasive jet machining. (06 Marks)
c. List the advantages, limitations and applications of laser beam machining. (06 Marks)

OR

- 8 a. Sketch and explain the working principle of electro-chemical discharge hybrid (ECDM) machining process. (10 Marks)
b. Sketch and explain the working principle of wire electrode discharge machining (WEDM) process. (10 Marks)

Module-5

- 9 a. List the important differences between jigs and fixtures. (06 Marks)
b. Sketch and explain different types of jigs. (08 Marks)
c. Explain the various factors to be considered in the design of jigs and fixtures. (06 Marks)

OR

- 10 a. Sketch and explain milling fixture used for gear cutting operation. (10 Marks)
b. Sketch and explain Turning fixture. (10 Marks)

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