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 :
(i) Straddle milling
(ii) Reaming
(iii) Plain turning **(06 Marks)**

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 tuning 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)**

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