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18ME35A/18MEA305

Third Semester B.E. Degree Examination, July/August 2022
Metal Cutting and Forming

Time: 3 hrs.

Max. Marks: 100

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

Module-1

- 1 a. With neat sketch, explain briefly the working of a lathe machine. (08 Marks)
b. Explain the concept of oblique and orthogonal cutting with neat sketch. (06 Marks)
c. Draw a Merchant's circle diagram using usual notations and state the assumptions. (06 Marks)

OR

- 2 a. Briefly explain the different types of chips produced during metal cutting with neat sketches. (08 Marks)
b. Explain, Knurling, Turning, Facing and Boring operations performed on lathe machine. (06 Marks)
c. A bar of 90 mm diameter is reduced to 87.6 mm by cutting tool while cutting orthogonally. If the mean length of the cut chip is 88.2 mm, find the cutting ratio. If the rake angle is 15° , what is the shear angle? (06 Marks)

Module-2

- 3 a. With a neat sketch, explain briefly the working of a horizontal milling machine. (08 Marks)
b. Explain following milling operations with relevant sketches:
(i) Form milling (ii) Gang milling. (06 Marks)
c. With a neat sketch, explain briefly the working of drilling machine. (06 Marks)

OR

- 4 a. With a neat sketch, explain the constructional features of a centreless grinding machine. (08 Marks)
b. Difference between shaping and planing machine. (06 Marks)
c. Differentiate up milling and down milling with sketch. (06 Marks)

Module-3

- 5 a. With neat sketch, explain crater wear and flank wear. (08 Marks)
b. List the various types of cutting fluids used in metal cutting, briefly explain. (06 Marks)
c. Define tool life. Explain the factors which affect the tool life. (06 Marks)

OR

- 6 a. A tool life of 80 minutes is obtained at a speed of 30 mpm and 8 minutes at 60 mpm. Determine the tool life equation and cutting speed for 4 minutes tool life. (08 Marks)
b. What is machinability? List out the machinability criteria. (06 Marks)
c. What do you understand by economics of machining? How do you evaluate machining cost? (06 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.

Module-4

- 7 a. With neat sketches, explain the classification of metal working processes on the basis of force applied. (08 Marks)
b. Distinguish between the hot working and cold working process. (06 Marks)
c. Explain different types of forging defects. (06 Marks)

OR

- 8 a. Explain the following rolling mills:
(i) Two high mill
(ii) Cluster mill
(iii) Tandem mill
(iv) Three high mill. (08 Marks)
b. Define extrusion process and explain hydrostatic extrusion process with a neat sketch. (06 Marks)
c. With a neat sketch, explain a tube drawing process. (06 Marks)

Module-5

- 9 a. Define, piercing, blanking, bending and stretch forming, process with a neat sketch. (08 Marks)
b. What are different types of bending dies? How to calculate bending force? (06 Marks)
c. Define Embossing, Coining and shearing in sheet metal working. (06 Marks)

OR

- 10 a. Explain with neat sketch,
(i) Progressive die.
(ii) Compound die. (10 Marks)
b. Explain different types of defects in deep drawn products. (05 Marks)
c. Write a note on die and punch material in sheet metal forming. (05 Marks)
