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Third Semester B.E. Degree Examination, June/July 2023 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. Differentiate between orthogonal and oblique cutting. (04 Marks)
b. Derive an expression for chip thickness ratio in term of rake angle for orthogonal cutting. (10 Marks)
c. In orthogonal turning of a steel bar of 65mm diameter on lathe a feed of 0.8mm was used. A continuous chip of 1.4 mm thickness was removed at rotational speed 85rpm of the work. Calculate the chip thickness ratio, chip reduction ratio and total length of the chip removed in one minute. (06 Marks)

OR

- 2 a. With a neat sketch, explain the construction of turret Lathe (10 Marks)
b. Explain the nomenclature of single point cutting tool. (10 Marks)

Module-2

- 3 a. Explain the construction of Horizontal milling machine with a neat sketch. (10 Marks)
b. Explain the following drilling operations with a neat sketch (10 Marks)
i) Boring ii) Reaming iii) Counter sinking iv) Spot facing.

OR

- 4 a. Explain the construction of shaping machine with a neat sketch. (10 Marks)
b. With a neat sketch, explain the construction and operation of centerless type grinding machine. (10 Marks)

Module-3

- 5 a. Explain tool wear mechanisms. (08 Marks)
b. Explain the function of cutting fluids. (06 Marks)
c. Explain the effect of machining parameters on surface finish. (06 Marks)

OR

- 6 a. Explain Tylor's tools life equation and tool failure criteria. (10 Marks)
b. Explain choice of cutting speed and feed for maximum tool life. (05 Marks)
c. A tool life of 80 minutes obtained at a speed of 30mpm and 8 minutes at 60mpm. Determine the tool life equation. (05 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. Explain the classification of forming process. (06 Marks)
b. Explain the typical forging defects. (06 Marks)
c. Explain with neat sketch the operation and working of double acting steam hammer. (08 Marks)

OR

- 8 a. With a neat sketch, explain different types of rolling mills. (10 Marks)
b. With a neat sketch, explain wire drawing operation. (05 Marks)
c. Explain with a neat sketch direct and indirect extrusion processes. (05 Marks)

Module-5

- 9 a. Define the following :
i) Blanking ii) Punching iii) Piercing iv) Drawing v) Drawing ratio. (10 Marks)
b. With a neat sketch, explain progressive die. (10 Marks)

OR

- 10 a. Explain compound and combination die with a neat sketches. (10 Marks)
b. Define the following :
i) Bending allowance ii) Angle of bend iii) Bending force. (10 Marks)
