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17ME45B/17MEB405

Fourth Semester B.E. Degree Examination, Aug./Sept.2020
Machine Tools and Operations

Time: 3 hrs.

Max. Marks: 100

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

Module-1

1 a. Define Machine Tool. How machine tools are classified? **(08 Marks)**
   b. With a neat sketch, explain the specification of lathe. **(08 Marks)**
   c. Differentiate between upmilling and down milling. **(04 Marks)**

OR

2 a. Draw a neat sketch of a lathe and briefly explain its parts. **(10 Marks)**
   b. Draw a neat sketch of a drilling machine and explain construction. **(10 Marks)**

Module-2

3 a. List out the different types of motions in machine tool. **(08 Marks)**
   b. Differentiate between shaper and planer machine tool. **(08 Marks)**
   c. Explain briefly about the effect of machining parameters. **(04 Marks)**

OR

4 a. List out the different lathe operations. Explain any two of them. **(08 Marks)**
   b. List out the different milling operations. Explain Gang-milling and End milling operations. **(08 Marks)**
   c. Explain the working principal of cylindrical grinding machine. **(04 Marks)**

Module-3

5 a. Briefly discuss the characteristics of cutting tool materials. **(08 Marks)**
   b. With a neat sketch, explain the geometry of single point cutting tool. **(08 Marks)**
   c. Mention the functions of cutting fluids. **(04 Marks)**

OR

6 a. List out the different types of cutting tool materials. Explain H.S.S. and cemented carbide. **(08 Marks)**
   b. Briefly explain the nomenclature of drill bit with a neat sketch. **(06 Marks)**
   c. List out the different types of cutting fluids. Explain any two of them. **(06 Marks)**

Module-4

7 a. Briefly explain the different types of chips formed during metal cutting process. **(08 Marks)**
   b. Draw a merchant's circle diagram, mention its notations and state its assumptions. **(08 Marks)**
   c. The following details relates to an orthogonal cutting operation. Feed = 1.25mm/rev, chip thickness = 2mm, rake angle of tool = 10°. Calculate the chip thickness ratio and shear angle. **(04 Marks)**

OR

8 a. Explain orthogonal and oblique cutting in metal cutting process. **(08 Marks)**
   b. With a neat sketch, explain mechanics of drilling operation. **(06 Marks)**
   c. Index 87 divisions on a work piece using compound indexing. **(06 Marks)**

Module-5

9 a. Define tool wear. Explain the forms of tool wear. **(08 Marks)**
   b. Explain briefly about different choices to minimize the cost of tool life and production time. **(06 Marks)**
   c. A 50mm bar of steel was turned at 284rpm and tool failure occurred after 10min. The speed was changed to 232rpm and the tool failed in 60min of cutting time. What cutting speed should be used to obtain 30min of tool life? **(06 Marks)**

OR

10 a. Briefly discuss about the effect of cutting parameters on tool life. **(08 Marks)**
   b. Explain the Taylor's tool life equation. **(06 Marks)**
   c. Briefly explain the tool wear mechanisms. **(06 Marks)**

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