

**Fourth Semester B.E. Degree Examination, June/July 2017**  
**Machine Tools and Operations**

Time: 3 hrs.

Max. Marks: 80

*Note: Answer FIVE full questions, choosing one full question from each module.*

**Module-1**

- 1 a. Define machine tool. Give classification of machine tool. (06 Marks)  
 b. With neat sketch, explain various parts of lathe machine. (10 Marks)

**OR**

- 2 a. Explain with neat sketch working principle of drilling machine. (04 Marks)  
 b. Sketch and label principle parts of shaper. (06 Marks)  
 c. Explain briefly constructional features of milling machine with neat sketch. (Column and knee type) (06 Marks)

**Module-2**

- 3 a. What is machining? Give classification of machining processes. (06 Marks)  
 b. With neat sketches, explain working and auxiliary motions in machine tools. (10 Marks)

**OR**

- 4 a. List the operations performed on a lathe and explain any four operations with neat sketches. (08 Marks)  
 b. Explain briefly with neat sketches of any five drilling machine operations. (08 Marks)

**Module-3**

- 5 a. Describe properties and characteristics of cutting tool materials. (04 Marks)  
 b. With neat sketch, explain principal angles of a single point cutting tool. (06 Marks)  
 c. Explain briefly Twist drill nomenclature with neat sketch. (06 Marks)

**OR**

- 6 a. Mention the basic requirements of cutting fluids. (04 Marks)  
 b. Discuss briefly about types of cutting fluids used in metal cutting process. (06 Marks)  
 c. List the parameters affecting the surface finish and explain them briefly. (06 Marks)

**Module-4**

- 7 a. A workpiece of 80 mm diameter and 120 mm length is held between centres and turned in 2 passes. If the approach length is 10 mm and over travel is 6 mm find machining time. Assume cutting speed as 0.4 m/sec and feed 0.4 mm/rev. (08 Marks)  
 b. Calculate the machining time required to reduce 60 mm diameter shaft to 50 mm diameter for a length of 1500 mm with depth of cut of 2 mm for rough cut and 1 mm for finish cut. The following details are given:  
 i) Cutting speed = 30 m/min  
 ii) Feed = 0.5 mm/rev  
 iii) Approach length = 5 mm  
 iv) Overrun length = 5 mm  
 v) Number of passes = 3 (2 rough cut + 1 finish cut) (08 Marks)

**OR**

- 8 a. A 63.5 mm diameter plain milling cutter having 6 teeth is used for face milling a block of aluminium 18 cm long and 3 cm wide. The spindle speed is 1500 rpm and the feed is 0.125 mm/tooth. Determine:
- Table feed in mm/min
  - Cutting time. **(08 Marks)**
- b. Evaluate cutting speed and machining time for the plain (slab) milling operation for the following data:
- Diameter of milling cutter = 100 mm  
Cutting speed = 500 rpm  
Depth of cut = 5 mm  
Table feed = 100 mm/min  
Length of workpiece = 50 cm  
Number of teeth in the cutter = 8. **(08 Marks)**

**Module-5**

- 9 a. Explain briefly causes for the tool failure/wear with sketches. **(08 Marks)**  
b. Discuss about tool wear mechanisms which are responsible for causing wear. **(08 Marks)**
- OR**
- 10 a. Mention the factors affecting tool life and explain them briefly. **(08 Marks)**  
b. A tool life of 80 minute is obtained at a speed of 30 mpm (m per min) and 8 minute at 60 m per min. Determine the following:
- Tool life equation
  - Cutting speed for 4 minute tool life. **(08 Marks)**

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