

**4E2052**

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[Total No. of Pages : 2]

**4E2052**

**B. Tech. IV Semester (Main/Back) Examination 2012**  
**Mechanical Engineering**  
**4ME4 Machining And Machine Tools**  
**Common for ME, PI and AE**

**Time : 3 Hours****Maximum Marks : 80****Min. Passing Marks : 24****Instructions to Candidates:**

Attempt any **five questions** selecting **one question** from **each unit**. All questions carry **equal marks**. (Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly).

**Unit - I**

1. a) Explain geometry of single point cutting tool and show the significance of each angle. (8)
- b) An orthogonal cutting of steel is done with  $10^\circ$  rake tool, with a depth of cut 2 mm and feed rate of 0.20 mm/rev. The cutting speed is 200 m/min. The chip thickness ratio is 0.31. The vertical cutting force is 1200 N and the horizontal cutting force is 650 N. Calculate from the Merchant's theory, Shear force and normal force along shear plane and coefficient of friction. (8)
2. a) What are the conditions that would allow formation of different types of chips? (8)
- b) In an orthogonal cutting test with a tool of rake angle  $10^\circ$ , the following observations were made.  
Chip thickness ratio = 0.3  
Horizontal component of the cutting force = 1290 N  
Vertical component of the cutting force = 1650 N  
Find out shear plane angle and coefficient of friction at the chip tool interface. (8)

**Unit - II**

3. a) Explain functions of cutting fluid, and methods of application of cutting fluids. (8)
- b) How do you calculate the time for machining during milling and shaping? (8)
4. a) Write short note on tool wear and concept of tool life. (8)



- b) If in turning of a steel rod by a given cutting tool (material and geometry) at a given machining condition ( $s_0$  and  $t$ ) under a given environment (cutting fluid application), the tool life decreases from 80 min to 20 min. due to increase in cutting velocity,  $V_c$  from 60 m/min to 120 m/min., then at what cutting velocity the life of that tool under the same condition and environment will be 40 min.?  
(8)

### Unit - III

5. Write short note on

- i) Honing
  - ii) Lapping
  - iii) Wheel loading and glazing
  - iv) Wheel dressing (16)
6. Differentiate capstan and turret lathe. What do you understand by operational planning and sequence of operations? (16)

### Unit - IV

7. a) What are the methods of thread manufacturing? Explain any one method in detail. (8)
- b) Explain gear finishing processes in brief. (8)
8. a) What is the principle and applications of form gear method and generation method. (8)
- b) Describe gear hobbing with neat sketches. (8)

### Unit - V

9. a) What do you mean by HVFM? Explain explosive forming in detail. (8)
- b) Write short note on
- i) Electro hydraulic forming
  - ii) Magnetic pulse forming (8)
10. a) What are human factors in machine equipment safety. What are the measures to be taken for reduction of industrial noise? (8)
- b) What are precautions to be taken by operators for safe working on lathe and drill machines? (8)