



Code No. : 6344/N

FACULTY OF ENGINEERING

**B.E. 3/4 (Mech.) II Semester (New) (Supple.) Examination, December 2009
METAL CUTTING AND MACHINE TOOL ENGINEERING**

Time: 3 Hours]

[Max. Marks: 75

Note : Answer all questions from Part A. Answer any five questions from Part B.

PART – A

(2.5×10=25 Marks)

1. Define rake angle and clearance angle for a typical cutting tool.
2. Sketch Merchant's circle diagram and indicate various forces and angles.
3. What are the desirable properties of cutting fluids ?
4. Define machinability. How metals are rated ?
5. Mention the basic elements that are present in all machine tools.
6. Explain the centerless grinding process.
7. Compare gear shaping and gear hobbing, giving the process and product requirements.
8. Differentiate between a jig and a fixture.
9. What are the main differences between LBM and EBM ?
10. How jig boring is differ from a radial drilling ?

PART – B

(5×10=50 Marks)

11. a) Explain the properties, composition and applications of HSS, carbide and diamond cutting tools. 7
b) Explain the Lee and Shafer shear angle solution. 3
12. a) Explain the chip-tool interface temperature measurement by thermo-couple technique. 5
b) Describe various types of tool wear mechanisms and the associated conditions for tool failure. 5



13. a) Differentiate between shaper and planer. 5
b) Explain the types of abrasives and bonds used for grinding wheels. 5
14. a) Explain broaching and burnishing operations. 5
b) Distinguish between thread rolling and thread milling process. 5
15. a) Explain the various quick clamping devices used in machine tools. 5
b) Explain the principle of USM process with a neat sketch. 5
16. a) For a gear box of 12 speed with minimum speed of 50 rpm and G.P. ratio of 1.4. Design the kinematic scheme of the gear box with a ray diagram standard rpm of the motor is 1440.
b) Distinguish between cylindrical grinding and surface grinding.
17. Write short notes on any two of the following :
a) Electro-Discharge Machining (EDM)
b) Jig boring machine
c) Taylor's tool life and process variables
d) Types of chips and cutting fluids.