# Flashcards

## C:\Users\Hp\Downloads\cricil\lecture notes\2025 - ME 312 - MAN TECH 2 -Set 2.pdf

**Q1. What are the basic machining operations mentioned in the lecture?**

A1. Shaping, planing, drilling, milling, and grinding.

**Q2. What are the two types of machining considered in the lecture?**

A2. Orthogonal and oblique machining.

**Q3. What are the two models used to analyze the shear zone in orthogonal machining?**

A3. Thin shear plane model and thick shear plane model.

**Q4. When is Merchant's thin shear plane model applicable?**

A4. Cutting at very high speeds.

**Q5. What is one assumption of Merchant's analysis?**

A5. The tool is perfectly sharp. (Other assumptions are also valid answers.)

**Q6. What is Fv in Merchant's analysis?**

A6. Force perpendicular to the primary tool motion (thrust force).

**Q7. What is a key factor in the form stability of cutting tools?**

A7. Proper selection of tool material.

**Q8. How much harder should a tool be than the workpiece?**

A8. 35 to 50% harder.

**Q9. What happens to the apparent strength of a material as cutting speed increases?**

A9. It increases.

**Q10. What is a desirable property of an ideal tool material?**

A10. High hot hardness. (Other properties are also valid answers.)

**Q11. What is the earliest type of tool steel mentioned?**

A11. Carbon tool steels.

**Q12. What is the approximate maximum cutting speed for carbon tool steel?**

A12. 5 m/min.

**Q13. What alloying element improves high temperature strength and wear resistance?**

A13. Molybdenum (Mo).

**Q14. What is the approximate maximum cutting speed for High-Speed Steel (HSS)?**

A14. 30 m/min.

**Q15. What technique can be used to manufacture HSS tools?**

A15. Powder Metallurgy.

**Q16. What are Stellites used for?**

A16. Cutting non-ferrous metals.

**Q17. When were cemented carbides invented?**

A17. 1926.

**Q18. What is a common binder used in cemented carbides?**

A18. Cobalt (Co).

**Q19. What is a benefit of adding titanium carbide (TiC) to cemented carbides?**

A19. Increased hot hardness and wear resistance.

**Q20. What is a common coating material used on coated carbides?**

A20. Titanium nitride (TiN).

## C:\Users\Hp\Downloads\cricil\lecture notes\ME 312 Slides Set 1.pdf

**Q1. What are the three main components of the course evaluation?**

A1. Quizzes and project (25%), Mid-sem (35%), End-sem (40%).

**Q2. What are the three primary manufacturing processes mentioned in the lecture?**

A2. Casting, Metal forming, Metal removing (machining).

**Q3. What is the primary advantage of metal removing (machining)?**

A3. Achieving desired size, shape, and surface finish.

**Q4. What is the role of a cutting tool in machining?**

A4. It removes excess material by direct mechanical contact.

**Q5. What is the role of a machine tool in machining?**

A5. It provides the necessary relative motions between the cutting tool and workpiece.

**Q6. Who invented the engine lathe?**

A6. Henry Maudsley in 1794.

**Q7. Who invented the horizontal boring machine?**

A7. John Wilkinson in 1774.

**Q8. What is the primary cutting motion responsible for?**

A8. Cutting action.

**Q9. What is the secondary or feed motion responsible for?**

A9. Gradually feeding the uncut portion.

**Q10. What is the first stage of metal deformation in chip formation?**

A10. Elastic and then plastic compression.

**Q11. What is chip curl?**

A11. The resultant curvature of the chip after sliding over the tool rake face.

**Q12. Under what conditions are continuous chips formed?**

A12. Machining steel or ductile metals at high cutting speeds (1.0 m/s), sharp cutting edge, small uncut chip thickness, large rake angle, and less friction.

**Q13. Under what conditions are discontinuous chips formed?**

A13. Machining brittle materials, deformation by fracture, high depths of cut, low cutting speeds, and small rake angles.

**Q14. What is a built-up edge (BUE)?**

A14. Particles of chip adhering to the tool rake face near the tool tip due to high friction.

**Q15. Under what conditions are continuous chips with BUE formed?**

A15. Medium speed, high feed rate, and low rake angle.

**Q16. What is the defining characteristic of a continuous chip?**

A16. Ductility of the metal flows along the shear plane instead of rupture.

**Q17. What is the defining characteristic of a discontinuous chip?**

A17. Deformation by fracture, resulting in discontinuous segments.

**Q18. What type of chip formation is associated with unstable cutting force?**

A18. Discontinuous chips.

**Q19. What are the recommended texts for the course?**

A19. 1. G Boothroyd, Fundamentals of Metal Cutting Machine Tools; 2. A Ghosh and A K Mallik, Manufacturing Science; 3. P C Pandey and C K Singh, Production Engineering Sciences; 4. M C Shaw, Metal Cutting Principles; 5. G K Lal, Introduction to Machining Science.

**Q20. What is the instructor's email address?**

A20. snj@iitg.ac.in

**Q21. What are the two types of relative motion between the tool and workpiece?**

A21. Primary (cutting) motion and secondary (feed) motion.