

Manufacturing Science-II

1. Discuss the term "Mechanics of metal cutting" with a suitable sketch.
2. Explain Following Terms:
 - I. Rake angle
 - II. Clearance angle
 - III. Shear angle
 - IV. Shear Plane
 - V. Rake face
 - VI. Flank face
3. Show single point cutting tool with all the relevant angles.
4. Explain orthogonal & oblique system of metal cutting.
5. Show analytically the Shear angle relationship for lathe operation.
6. Explain different types of chips produced in metal cutting with their effect on surface finish of the work piece.
7. Show schematically Merchant's force circle diagram showing various forces acting on single point cutting tool.
8. How power is calculated during metal cutting operations.
9. What is tool life? Discuss various factors affecting tool life
10. Define Surface finish, Waviness & Roughness. Also explain how it can be measured.
11. The following data refers to an orthogonal test:
Chip thickness ratio = 0.56 mm, Feed is 0.2 mm per/rev, Rake angle = 15.
Calculate:
 - (i) Shear angle
 - (ii) Chip thickness ratio
 - (iii) Chip reduction co-efficient.
 - (iv) Shear force.
12. Show analytically the economics of metal cutting.
13. Differentiate Capstan & Turret lathe.
14. Explain Whit worth quick-return mechanism with neat sketch.
15. Differentiate Shaper, Planer & Slotter.
15. Discuss constructional features, operations that can be performed on Milling machine.
16. Compare up-milling & down-milling operation.
17. A 100mm dia cutter having 8 teeth cuts steel at 30 m/min. The depth of cut is taken as 4mm & the table feed ratio is 150 mm/min. Find the length of the chip in up & down Operations.

18. Explain the working of Indexing head used in milling machine.

19. (A) Explain following operations:

- (i) Drilling
- (ii) Boring
- (iii) Reaming
- (iv) Grinding

(b) Explain how grinding wheels are specified.

1. (A) Discuss following operations:

- (i) Dressing
- (ii) Truing
- (iii) Honing
- (iv) Lapping
- (v) Polishing

(b) Explain with neat sketch:

- (i) Surface grinding process.
- (ii) Cylindrical Grinding process.

(c) Discuss with neat sketch working of

- (i) Arc welding.
- (ii) Gas welding.
- (iii) Resistance welding.

20. (A) Explain various welding defects.

(b) What do you mean by the term HAZ?

(c) Explain various thermo dynamic and metallurgical aspects in welding process.

21. (A) Discuss principle in operation & applications of:

- (i) EBM
- (ii) EDM
- (iii) ECM
- (iv) USM
- (v) ASM
- (vi) 1. (A) Explain with neat sketch working of plasma arc welding, expressive welding.
- (vii)
- (viii) (b) Show analytically how Shear angle affects the surface finish of w/p.
- (ix)
- (x) 2. (A) Differentiate Soldering & Brazing operation.
- (xi)
- (xii) (b) Discuss various tool materials in machining.

Q22. Identify and derive the relationship amongst various forces that acts on the cutting tool during turning operation. Which force contributes to the power required during metal cutting?

Q23. Determine the shear angle and various forces acting on the cutting tool during an orthogonal cutting test when $V = 195 \text{ m/min}$, rake angle = 12, $b = 1.75 \text{ mm}$, $t = 0.25 \text{ mm}$, average coefficient of friction = 0.52 and shear stress = 385 N/mm^2

Q24. Explain **any three** methods of taper turning on lathe machine by turning operation.

Q25. Explain various types of milling cutters used in milling operation for cutting various types of profiles.

Q26. (a) What are the major properties required of cutting tool materials? Explain with suitable example.
(b) How does a Reamer differ from a Twist drill? Explain with a neat sketch geometry of a Twist drill.

Q27. Explain the WEAR mechanism of a grinding wheel.

Q28. What are the important factors that need to be considered for specifying a grinding wheel? Explain with suitable examples.

Q29. Explain with the help of neat sketch different types of flames used in Gas welding. How would you identify these flames? What are the specific uses of each of these flames?

Q30. Explain the process of producing Seamless tubes by welding. Also discuss its advantages and limitations.

Q31. Write short notes on the following:

- (a) Truing and Dressing
- (b) Friability
- (c) HAZ and its effect on the weldment