

**ASSIGNMENT: UNIT V**  
**BASICS OF MECHANICAL ENGINEERING**

1. How do you classify materials for engineering use?
2. What are the factors to be considered for the selection of materials for a particular machine elements? Discuss.
3. Enumerate the most commonly used engineering materials and state at least one important property and one application of each.
4. Why are metals in their pure form unsuitable for industrial use?
5. Define 'mechanical property' of an engineering material. Name any six mechanical properties, give their definitions and one example of the material possessing the properties.
6. Define the following properties of a material:  
(i) Ductility, (ii) Toughness, (iii) Hardness, and (iv) Creep.
7. Distinguish clearly amongst cast iron, wrought iron and steel regarding their constituents and properties.
8. How cast iron is obtained? Classify and explain different types of cast irons.
9. How is grey cast iron designated in Indian standards?
10. Discuss the effect of silicon, manganese, sulphur and phosphorus on cast iron.
11. Define plain carbon steel. How it is designated according to Indian standards?
12. Define alloy steel. Discuss the effects of nickel, chromium and manganese on steel.
13. What are the common materials used in Mechanical Engineering? How can the properties of steel be improved?
14. Name the different alloying elements added to steel to make alloy steels and their effect on the steel. Give at least one example of each.
15. Give the composition of 35 Mn 2 Mo 45 steel. List its main uses.
16. Write short notes on free cutting steel, and stainless steel.
17. Select suitable material for the following cases, indicating the reason;
  - a) A shaft subjected to variable torsional and bending load;
  - b) Spring used in a spring loaded safety valve;
  - c) Nut of a heavy duty screw jack; and
  - d) Low speed line-shaft coupling.
18. Select suitable materials for the following parts stating the special property which makes it most suitable for use in manufacturing:

1. Turbine blade,	2. Bush bearing,	3. Dies,
4. Carburettor body,	5. Keys (used for fastening),	6. Cams,
7. Heavy duty machine tool beds,	8. Ball bearing,	
9. Automobile cylinder block,	10. Helical springs.	
19. Suggest suitable materials for the following parts stating the special property which makes it more suitable for use in manufacturing:

a) Diesel engine crankshaft;	b) Automobile tyres;	c) Roller bearings;
d) High pressure steam pipes;	e) Stay bar of boilers;	f) Worm and worm gear;
g) Dies;	h) Tramway axle;	i) Cam follower;
J) Hydraulic brake piston.		
20. Write short notes on high speed tool steel and spring steel.
21. Write short note on the different types of bearing metals.

23. Discuss the important non-metallic materials of construction used in engineering practice.
24. What do you understand by composite materials? Give some examples of composite materials with their applications.
25. What are the reasons for making composite materials.

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**ASSIGNMENT UNIT – VI**  
**BASIC MECHANICAL ENGINEERING**

1. Describe in brief the process of oxyacetylene welding and enumerate its advantage.
2. What do you mean by manufacturing Process? Classify manufacturing process and explain?
3. Sketch different type of weld joints?
4. Describe the appearance and properties of :  
I. Neutral flame    ii. Reducing flame    iii. Oxidizing flame
5. How oxygen and acetylene hoses are distinguished and what is the difference in construction of cylinders for two gases?
6. Why it is important to clean the surfaces to be welded?
7. What are the common defects in the welded joints?
8. How is electric arc applied for welding purpose? Sketch an arc welding circuit.
9. What is spot welding and how does it differ from roll spot welding and the projection welding?
10. Why a flux is used in welding operations. What purpose they serve?
11. Explain the principle, working, and application of Oxy – acetylene Gas Welding? Draw neat sketch?
12. Make a sketch of a Centre lathe and label its main parts.
13. List the various operations which may be performed on a Centre lathe.
14. Describe at least three methods of taper-turning on a Centre lathe.
15. Sketch single point cutting tools commonly used on a lathe. Label it.
16. What is the function of split nut, lead screw in the lathe? When we engage the split nut.
17. Why quick return motion is provided in shapers and planers?
18. Sketch the quick return motion mechanism used in shaping machines and explain how stroke is adjusted to suit a particular job.
19. Make a sketch of a planning machine and explain how vertical and horizontal surfaces of a work piece can be planed simultaneously.
20. Make a sketch of a twist drill with a taper shank. What part of the drill is used for cutting?
21. How is the twist drill fitted in the drilling machine?
22. Describe the various kinds of drilling machines, you are familiar with.
23. Write brief notes on:  
(i) Reaming    (ii) Core drilling    (iii) Counter boring.
30. Can 'tapping' be done on a drilling machine? If yes, describe the process in detail.
31. Differentiate between cutting speed and feed.
32. Differentiate between up milling and down milling. Which is preferred and why?
33. Name the operations which can be performed on the milling machine.
34. What do you understand by indexing in milling machine? Name them and write short notes on any two of them.
35. Name the different types of patterns normally used in the casting.
36. Write short note on: shell casting, investment casting.
37. What are the common defects in casting?
38. Write the functions of the riser in the mould.

39. What are the functions of the runner and basin in the mould.
40. What are the pattern allowances? Name them.
41. Name the different types of sands used in the mould.
42. Write short note on green sand and loam sands
43. What do you understand by permeability of sand?
44. What are the defects found in the casting?
45. Differentiate between machining and wrap allowance?
46. What do you mean by pattern? Sketch different types patterns
47. Explain Green Sand Moulding Process? What are different equipment used in the Foundry Shop?

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**ASSIGNMENT: UNIT VII**  
**BASICS OF MECHANICAL ENGINEERING**

1. State the need for precision measurements
2. Write a short note on 'Concept of Interchangeability'
3. Define the term 'precision' and 'accuracy' and describe the methods to achieve them.
4. Explain the following gauges: (a) snap gauges (b) plug gauges (c) dial gauges
5. What is the vernier principle? explain the following vernier principles:  
(a) Principle of 0.1 mm vernier. (b) Principle of 0.02 mm vernier.
6. Name the different types of vernier calipers and draw their neat sketches.
7. Explain the construction and working of a vernier height gauge with the help of a neat sketch.
8. State the principle on which micrometers are designed.
9. Explain briefly the construction and working of micrometer with a neat sketch.
10. What are the common errors in the micrometers, how can they be corrected.
11. Explain with the help of diagram the principle of a sine bar.
12. What precautions should be taken while using sine bars?
13. Write short note on go and not go gauges.
14. What is the comparator?
15. What are the essential parts of comparators?
16. What is the purpose of a comparator?
17. How are comparators classified?
18. Name the important mechanical comparators and explain