

### **Subjective questions on MET-10**

1. What do you understand by machine design? What are the various factors affecting design of a machine component.
2. What are the mechanical properties of materials, explain in brief.
3. What are the various mechanical hot working processes, explain in brief.
4. What are the various mechanical cold working processes, explain in brief.
5. What is a key, explain various type of keys used as per their shape.
6. Prove that for a sunk key to be equally strong in case of shear failure as in case of crush failure it should be a rectangular sunk key.
7. What are various type of screw threads as per their shape, describe.
8. How a threaded fastener is designated, explain.
9. What is a shaft coupling, what is its advantage?
10. Explain various types of fast and flexible couplings.
11. Draw section of fast coupling having shaft diameter of 20 mm. take other dimension as per standard calculation factors.
12. What is welding, what are the advantages and disadvantages of welding joints?
13. What are the various type of welding method, explain.
14. Calculate the strength of double transverse fillet joint. Consider plate thickness "t" and max. allowable shear stress as " $\sigma$ ".
15. Calculate the strength of single transverse fillet joint. Consider plate thickness "t" and max. allowable shear stress as " $\sigma$ ".
16. Describe arc welding process in detail, what are the welding defects observed in case of arc welding.
17. What is gas welding? What the processing of gas is welding? Explain about different type of flames produced during gas welding process.
18. What is a rivet? What are its various types as per shape? Describe following terms:-
  - a) Pitch
  - b) Back pitch
  - c) Diagonal pitch
  - d) Margin
19. What is a cam, what is various type of cam according to shape and follower motion?
20. Describe following terms for radial cams
  - a) Base circle
  - b) Pitch circle
  - c) Prime circle
  - d) Trace point
21. Describe following terms for radial cams
  - a) Pitch point
  - b) Pitch curve
  - c) Max pressure angle

22. Draw the cam profile for following conditions :-  
*Follower type = Knife edged, lift = 50mm; base circle radius = 50mm; out stroke with SHM, for 60° cam rotation; dwell for 45° cam rotation; return stroke with SHM, for 90° cam rotation; dwell for the remaining period.*
23. What is limit and tolerance? What are various types of fits used in mechanical systems?
24. What are the forms of leaf spring? What does the term “uniform strength” in the context of leaf spring mean? What is “nipping” in a laminated spring?
25. What are methods of orthographic projection for drawing of a machine component?
26. The dimensions of mating parts according to basic hole system are as follows.
- |      |          |       |          |
|------|----------|-------|----------|
| Hole | 25 mm    | shaft | 24.97 mm |
|      | 25.02 mm |       | 24.95 mm |
- Calculate the hole tolerance and shaft tolerance and allowance.
27. Write short notes on a) interchangeability b) tolerance c) allowance d) fits
28. Enumerate the various types of riveted joints and rivets.
29. State the basic difference between manual welding, semi automatic welding and automatic welding.
30. What do you understand by single start and double start threads? Define following terms  
 a) Major diameter b) minor diameter c) pitch and d) lead