

Diwaliba Polytechnic, UTU
5th sem mechanical DME MCQ

Chapter 1: Introduction	
1. Machine design can be defined as	
a. Creation of new machines only	b. improving existing machines only
c. Both Creation of new machines and improving existing machines	d. None of the above
2. Which of the following are the types of design?	
a. Adaptive design	b. Developed design
c. New Design	d. All the above
3. When the designer mostly adopts the existing design without changes is known as	
a. Adaptive design	b. Developed design
c. New Design	d. False design
4. When some necessary changes are made in some existing design to obtain better design, it is known as	
a. Adaptive design	b. Developed design
c. New Design	d. False design
5. The development of product/machine/equipment which does not exists in the market is known as	
a. Adaptive design	b. Developed design
c. New Design	d. False design
6. Which of the following are the Methods of design?	
a. Rational design	b. Empirical design
c. Industrial design	d. All the above
7. Which design is the mathematical design based on the scientific principles, principles of mechanics, etc.?	
a. Rational design	b. Empirical design
c. Industrial design	d. None of the above
8. Which design is based on the practice and past experience?	
a. Rational design	b. Empirical design
c. Industrial design	d. None of the above
9. Which of the following are some factors affecting machine design?	
a. Geometry and kinematics of machine	b. Type of load and stresses induced
c. selection of material	d. All the above
10. Which of the following is not the property of material	
a. Mechanical	b. Physical
c. Biological	d. Chemical
11. Which of the following is not the mechanical property of material?	
a. Elasticity	b. Electrical Conductivity
c. Plasticity	d. Strength
12. Which of the following are the technological properties of material?	
a. Formability	b. Castability
c. Weldability	d. All the above
13. Which of the following is not the chemical property of the material?	
a. Strength	b. Composition
c. Corrosion	d. Resistance
14. Which of the following type of load is not based on effect on internal structure of member?	
a. Tension load	b. Bending load
c. Twisting load	d. Frictional load
15. Which of the following is not the type of direct load?	
a. Bending load	b. Tensile load

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c. compressive load	d. Shearing load
16. The internal resistance of the body per unit cross section area is known as _____	
a. Force	b. Strain
c. Stress	d. Pressure
17. When two equal and opposite pull force acts along the axis of the body and perpendicular to the cross section, the stress induced is known as _____	
a. Tensile Stress	b. Compressive Stress
c. Shear Stress	d. Bending Stress
18. When two equal and opposite push force acts along the axis of the body and perpendicular to the cross section, the stress induced is known as _____	
a. Tensile Stress	b. Compressive Stress
c. Shear Stress	d. Bending Stress
19. When the external load is acting in the direction, parallel to the cross section and perpendicular to the axis of the body, the stress induced is known as _____	
a. Tensile Stress	b. Compressive Stress
c. Shear Stress	d. Bending Stress
20. When an external load is acting in the lateral direction perpendicular to the axis and it creates the pure bending effect only, the stress induced is known as _____	
a. Tensile Stress	b. Compressive Stress
c. Shear Stress	d. Bending Stress
21. When the machine member is subjected to torque, the material fiber is twisted and the resistance offered by the member is known as _____	
a. Bending stress	b. Torsional shear stress
c. Tensile stress	d. Compressive stress
22. The stress will be Maximum at the neutral axis of beam under pure bending.	
a. True	b. False
23. The torsional shear stress at the center of shaft will be _____	
a. Maximum	b. Minimum
c. Zero	d. Unity
24. The torsional shear stress at the outermost surface of the shaft will be _____	
a. Maximum	b. Minimum
c. Zero	d. Unity
25. When the induced stresses in the machine member are just more than its yield point stress, it will undergo the permanent deformation. This is known as _____	
a. Yielding	b. Fracture
c. Elastic deformation	d. Wear
26. When the induced stress level goes far beyond yield point stress, a crack may develop in the member and finally it can totally break. This is known as _____	
a. Yielding	b. Fracture
c. Elastic deformation	d. Wear
27. When the deformation of the member due to external load is within the elastic limit, it is known as _____	
a. Yielding	b. Fracture
c. Elastic deformation	d. Wear
28. In a Machine assembly, when the relative motion exists between two parts, the fine particles may be removed from the surfaces. This is known as _____	
a. Yielding	b. Fracture
c. Elastic deformation	d. Wear
29. The type of wear occurring due to the quality of surface finish of the surfaces in contact is known as _____	

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a. Adhesive wear	b. Abrasive wear
c. Surface fatigue	d. None of the above
30. The type of wear taking place due to the presence of dust particles between the surfaces in contact is known as _____	
a. Adhesive wear	b. Abrasive wear
c. Surface fatigue	d. None of the above
31. When the surface of component is subjected to fatigue and initiation of crack takes place from the surface, this is known as _____	
a. Adhesive wear	b. Abrasive wear
c. Surface fatigue	d. None of the above
32. The column or long slender member when subjected to compressive load, it undergoes permanent deformation, this is known as _____	
a. Buckling	b. Wear
c. Fatigue	d. Elastic deformation
33. When the machine element is subjected to variable loading, after number of cycles of such load, a fine crack is initiated in the component and further it causes sudden fracture. Such failure is known as _____	
a. Buckling	b. Fatigue
c. Wear	d. Elastic deformation
34. Due to chemical reaction of the metal and alloys with the surroundings, the surface properties of the metals and alloys deteriorate. This is known as _____	
a. Buckling	b. Fatigue
c. Wear	d. Corrosion
35. The localization of high stresses due to irregularities or abrupt change in the cross section of the machine part subjected to external load is known as _____	
a. Wear	b. Corrosion
c. Stress concentration	d. Bending
36. The ratio of failure stress to the allowable stress is known as _____	
a. Factor of safety	b. Factor of Failure
c. Factor of Accuracy	d. None of the above
37. The factor of safety depends on which of the following factors?	
a. Loading conditions	b. Degree of accuracy
c. Degree of safety	d. All the above
38. The obligatory norms to which various characteristics of a product should confirm is known as _____	
a. Production	b. Standardization
c. Costing	d. None of the above
39. Due to standardization _____	
a. Interchangeability is possible	b. Overall cost reduction
c. Mass Production gets easier	d. All the above
40. Preferred numbers are arranged in _____	
a. Geometrical series	b. Random fashion
c. exponential series	d. Logarithmic series
41. There are total _____ basic series.	
a. 3	b. 4
c. 5	d. 6
42. Which of the following are 5 basic series?	
a. R5, R10, R15, R20 and R40	b. R5, R10, R20, R40 and R 80
c. R5, R10, R20, R40 and R 50	d. R5, R10, R20, R40 and R 60

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43. Which of the following materials has maximum brittleness?	
a. Mild steel	b. Cast iron
c. Aluminum	d. Copper
44. The material commonly used for machine tool body is _____	
a. Cast iron	b. Aluminum alloy
c. Cast steel	d. Mild steel
45. The progression ratio for R5 series is _____	
a. 1.6	b. 1.25
c. 1.22	d. 1.06
46. The progression ratio for R10 series is _____	
a. 1.6	b. 1.25
c. 1.22	d. 1.06
47. The progression ratio for R20 series is _____	
a. 1.6	b. 1.25
c. 1.22	d. 1.06
48. The progression ratio for R40 series is _____	
a. 1.6	b. 1.25
c. 1.22	d. 1.06
49. The progression ratio for R80 series is _____	
a. 1.03	b. 1.25
c. 1.22	d. 1.06
50. Method of deciding factor of safety is _____	
a. Factor method	b. Tabular method
c. Both Factor and tabular method	d. None of the above

Chapter 2: Design of machine elements subjected to direct stresses	
1. Which of the following stress is not a direct stress?	
a. Bending stress	b. Tension stress
c. Compression stress	d. Shear stress
2. Which of the following element is subjected to Direct stress?	
a. Cotter joint	b. Knuckle joint
c. Riveted joint	d. All the above
3. Which of the following element is not subjected to direct stress?	
a. Cotter joint	b. Knuckle joint
c. Lever	d. Riveted joint
4. The Cross section of threaded portion (weaker section) of the bolt under tensile axial load will fail under which stress?	
a. Shear Stress	b. Tensile stress
c. Compressive stress	d. Bending stress
5. For standard V – thread the core diameter d_c = _____ times Nominal diameter d.	
a. 0.75	b. 0.9
c. 0.84	d. 0.5
6. The temporary joint used to rigidly join the two co – axial rods subjected to tensile or compressive load and permits no angular movement between the rods is known as _____	
a. Cotter joint	b. Knuckle joint
c. Riveted joint	d. Threaded joint

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7. The temporary joint used to join two co – axial rods subjected to tensile load only and permits slight angular movement between the rods is known as _____	
a. Cotter joint	b. Knuckle joint
c. Riveted joint	d. Threaded joint
8. In cotter joint the joint is obtained by using a wedge-shaped element known as _____	
a. Knuckle pin	b. Cotter
c. Rivet	d. Screw
9. In knuckle joint the joint is obtained by using a circular element called _____	
a. Knuckle pin	b. Cotter
c. Rivet	d. Screw
10. The cotter joint mainly consists of _____ parts	
a. 2	b. 4
c. 3	d. 5
11. The knuckle joint mainly consists of _____ parts	
a. 2	b. 4
c. 3	d. 5
12. The hollow cylindrical end of the cotter joint is known as _____	
a. Socket	b. Spigot
c. cotter	d. Knuckle pin
13. The solid cylindrical end of the cotter joint is known as _____	
a. Socket	b. Spigot
c. cotter	d. Knuckle pin
14. The cotter has taper of _____ on one side of its length.	
a. 10:1	b. 15:1
c. 20:1	d. 24:1
15. In cotter joint, out of the three parts which part is kept relatively weaker compared to other two?	
a. Socket	b. Spigot
c. Cotter	d. Knuckle pin
16. Which joint is used to connect piston rod and cross head of steam engine?	
a. Cotter joint	b. Riveted joint
c. Threaded joint	d. Knuckle joint
17. Which joint is used to connect two parts of split flywheel?	
a. Knuckle joint	b. Cotter joint
c. Riveted joint	d. Threaded joint
18. The cotter joint cannot be used to connect the rods which are subjected to _____	
a. Linear motion	b. Tensile force
c. Rotary motion	d. Compressive force
19. Which joint permits slight angular movement between the two rods?	
a. Cotter joint	b. Knuckle joint
c. Riveted joint	d. Threaded joint
20. Which joint permits little offset between the axes of the rods?	
a. Knuckle joint	b. Cotter joint
c. Riveted joint	d. Threaded joint
21. The cotter is inserted _____ to the axis of the joint.	
a. Parallel	b. Inclined
c. Perpendicular	d. Any of the above

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22. To obtain the dimension of particular element, the failure under stresses is considered at its _____	
a. weakest section	b. Strongest section
c. Always near end of the element	d. Always near center of the element.
23. Tension failure of spigot rod under tensile load is considered at the cross-section area near _____	
a. Near the end of the rod	b. Along the slot
b. Near the spigot collar	d. Centre of spigot
24. The spigot near slot will fail (tear) at the area parallel to the applied tensile load under _____	
a. Single shear	b. Double Shear
c. Bending stress	d. Twisting
25. The cross-section area of spigot collar under the action of compressive load will undergo _____	
a. Crushing failure	b. Tensile failure
c. Shear failure	d. Twisting failure
26. The cross-sectional area near slot of socket under tensile load will undergo	
a. Crushing failure	b. Tensile failure
c. Shear failure	d. Twisting failure
27. The slot near socket collar will fail (tear) at the area parallel to the applied tensile load under _____	
a. Double shear	b. Single shear
c. Bending	d. compression
28. The cotter under the action of tensile load will undergo _____	
a. Single shear	b. Tensile failure
c. Double shear	d. Twisting failure
29. Which of the following is a part of Knuckle joint?	
a. Socket	b. Spigot
c. Knuckle pin	d. Cotter
30. Which of the following is not a part of knuckle joint?	
a. Single eye end	b. Double eye end
c. Knuckle pin	d. None of the above
31. Which of the following part of knuckle joint is also known as Fork end?	
a. Single eye end	b. Double eye end
c. Knuckle pin	d. None of the above
32. Which of the part of knuckle joint is made weaker compared to other parts?	
a. Single eye end	b. Double eye end
c. Knuckle pin	d. Collar
33. Knuckle pin under the action of tensile load undergoes _____	
a. Single shear	b. Double shear
c. Tensile stress	d. Twisting
34. The weaker section of single and double eye end where the tensile failure takes place is _____	
a. Near the end of rod	b. At the centre
c. Near the eye (hole)	d. Any where
35. The area near single eye and double eye end which is parallel to the tensile load will undergo _____	
a. Single shear	b. Double shear
c. Bending	d. Twisting

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36. The thickness of two ends of double eye end is generally kept _____ the thickness of Single eye end	
a. Equal	b. Double
c. Half	d. 75%
37. There are _____ main types of rivet joints	
a. 2	b. 3
c. 4	d. 5
38. In a rivet joint when the two plates are placed overlapping each other, the joint is known as _____	
a. Butt joint	b. Lap joint
c. Cotter joint	d. Knuckle joint
39. In rivet joint when the two plates are placed side by side in same plane then the joint is known as _____	
a. Butt joint	b. Lap joint
c. Cotter joint	d. Knuckle joint
40. In which of the rivet joint cover plate (strap) is required?	
a. Butt joint	b. Lap joint
c. Both of them	d. None of them
41. Because of tensile load on rivet joint, the failure of plate across the rivet hole is due to _____	
a. Compression	b. Tension
c. Shear	d. Twisting
42. Because of tensile load on rivet joint, the failure of rivet is due to _____	
a. Compression	b. Tension
c. Shear	d. Twisting
43. In lap joint the rivet will fail under _____	
a. Single shear	b. Double shear
c. Tension	d. Twisting
44. In butt joint with single cover plate, the rivet will fail under _____	
a. Single shear	b. Double shear
c. Tension	d. Twisting
45. In butt joint with double cover plate, the rivet will fail under _____	
a. Single shear	b. Double shear
c. Tension	d. Twisting
46. To prevent the tearing of plate on margin in rivet joint, the minimum margin (m) to be maintained is _____	
a. $m = d$	b. $m = 1.2d$
c. $m = 1.5d$	d. $m = 2d$
47. Unwin's formula is used to find the diameter of rivet, when the plate has thickness _____	
a. greater than 5 mm	b. Less than 5 mm
c. greater than 6 mm	d. greater than 8 mm
48. Which equation is correct for Unwin's formula to find diameter of rivet?	
a. $d = 6t$	b. $d = t$
c. $d = 6\sqrt{t}$	d. $d = \sqrt{t}$
49. The screw used to transmit power/load and motion is known as _____	
a. power screw	b. motion screw
c. power bolt	d. power nut

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50. Which of the following are the applications of power screw?	
a. Screw jack	b. UTM
c. In Lathe machines	d. All the above

Chapter 4: Design of machine elements subjected to bending stress and eccentric loading	
1. When any machine element subjected to external load which causes only bending effect is known as _____	
a. Eccentric loading	b. Pure bending
c. Direct loading	d. Twisting
2. Which of the following equation is correct for pure bending?	
a. $\frac{M_b}{I} = \frac{\sigma_b}{y}$	b. $\frac{M_t}{J} = \frac{\tau}{r}$
c. $\frac{M_b}{I} = \frac{\tau}{r}$	d. $\frac{M_t}{I} = \frac{\tau}{y}$
3. Which of the following is correct for Section Modulus?	
a. $\frac{M_b}{I} = \frac{Z}{y}$	b. $\frac{M_t}{J} = \frac{\tau}{r}$
c. $\frac{Z}{I} = \frac{\tau}{r}$	d. $Z = \frac{I}{y}$
4. The moment of inertia for rectangular cross section is given by	
a. $I = \frac{1}{6}bd^3$	b. $I = \frac{1}{12}bd^3$
c. $I = \frac{1}{6}bd^2$	d. $I = bd^3$
5. The section modulus for the rectangular cross section is given by	
a. $Z = \frac{1}{6}bd^3$	b. $Z = \frac{1}{2}bd^3$

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c. $Z = \frac{1}{6}bd^2$	d. $Z = bd^3$
6. The moment of inertia for the circular cross section is given by	
a. $I = \frac{\pi}{6}d^3$	b. $I = \frac{\pi}{64}d^4$
c. $I = \frac{\pi}{16}d^4$	d. $I = \pi d^3$
7. The section modulus for the circular cross section is given by	
a. $Z = \frac{\pi}{6}d^3$	b. $Z = \frac{\pi}{2}bd^3$
c. $Z = \frac{\pi}{32}d^3$	d. $Z = \pi d^3$
8. The moment of inertia for the square cross section is given by	
a. $I = \frac{1}{6}b^3$	b. $I = \frac{1}{12}b^4$
c. $I = \frac{1}{6}b^2$	d. $I = b^4$
9. The section modulus for the square cross section is given by	
a. $Z = \frac{1}{6}b^2$	b. $Z = \frac{1}{12}b^3$
c. $Z = \frac{1}{6}b^3$	d. $Z = b^3$
10. Which of the following elements are designed based on pure bending equation?	
a. Lever	b. Beam
c. Axle	d. All the above
11. Which of the following element is not designed based on pure bending equation ?	
a. Lever	b. Pressure vessel

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b. Beam	d. Axle
12. The device capable to lift heavy load using small effort is known as _____	
a. Lever	b. Pressure vessel
b. Beam	d. Axle
13. Which of the following is not the type of lever based on its fulcrum position?	
a. First order	b. Second order
c. Third order	d. Forth order
14. Which of the following is the type of lever according to its application?	
a. Hand lever	b. Foot lever
c. Both of them	d. None of them
15. Which of the following is the type of simple lever?	
a. Single arm lever	b. Double arm lever
C. Angular lever	d. All the above
16. In first order lever _____	
a. The fulcrum is in between the load and effort	b. The load is in between the fulcrum and effort
c. The effort is in between the fulcrum and load	d. There is no fulcrum
17. In Second order lever _____	
a. The fulcrum is in between the load and effort	b. The load is in between the fulcrum and effort
c. The effort is in between the fulcrum and load	d. There is no fulcrum
18. In Third order lever _____	
a. The fulcrum is in between the load and effort	b. The load is in between the fulcrum and effort
c. The effort is in between the fulcrum and load	d. There is no fulcrum
19. Which is the example of first order lever?	
a. Tong	b. Lemon Squeezer
c. Fork	d. None of the above
20. Which is the example of Second order lever?	
a. Tong	b. Lemon Squeezer
c. Fork	d. None of the above
21. Which is the example of Third order lever?	
a. Tong	b. Lemon Squeezer
c. Fork	d. None of the above
22. The angle between two arms of bell crank lever is _____	
a. 45 deg	b. 60 deg
c. 90 deg	d. greater than 90 deg
23. The angle between two arms of Rocker arm lever is _____	
a. 45 deg	b. 60 deg
c. 90 deg	d. greater than 90 deg
24. The lever with two fulcrums and three arms with different lengths is called _____	
a. single arm lever	b. compound lever
c. angular lever	d. double arm lever
25. For the given lever, based on the applied load (W) and required effort (P), the resultant Reaction (R) on the fulcrum is determined according to parallelogram of forces as	
a. $\sqrt{W^2 + P^2 + 2WP \cos \theta}$	b. $\sqrt{W^2 + P^2 + 2WP \sin \theta}$
c. $\sqrt{W^2 + P^2 + 2WP \tan \theta}$	d. $\sqrt{W^2 + P^2 + 2 \cos \theta}$

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26. Due to the resultant reaction force, the fulcrum pin of lever is designed considering the	
a. Shear failure	b. Tensile failure
c. Bearing failure	d. Twisting failure
27. The dimensions of the arms cross section of the lever can be determined using _____	
a. Maximum shear stress	b. Maximum bending moment
c. Maximum tensile stress	d. Maximum compressive stress
28. When the Load (W) and length of two arms are given for a lever, the effort required (P) can be calculated by _____	
a. Taking moment about fulcrum	b. Taking moment about long arm end
c. Taking moment about short arm end	d. Taking Shear about fulcrum
29. The Number of strips with same width and different lengths clamped together is known as _____	
a. Compression helical spring	b. Tension helical spring
c. Torsional helical spring	d. Leaf spring
30. Which of the following are the types of Leaf spring?	
a. Cantilever leaf spring	b. Semi elliptical leaf spring
c. Full elliptical leaf spring	d. All the above
31. The leaf spring whose shape is like a cantilever is known as	
a. Cantilever leaf spring	b. Semi elliptical leaf spring
c. Full elliptical leaf spring	d. Cantilever beam
32. The leaf spring whose shape is like a semi ellipse is known as	
a. Cantilever leaf spring	b. Semi elliptical leaf spring
c. Full elliptical leaf spring	d. None of the above
33. When two semi elliptical leaf spring with opposite radii of curvature assembled together, they form a	
a. Cantilever leaf spring	b. Semi elliptical leaf spring
c. Full elliptical leaf spring	d. None of the above
34. Which of the following are the applications of Leaf springs?	
a. In automobile vehicle like truck, bus, etc.	b. In railway wagons
c. In Earth moving machineries	d. All the above
35. Leaf spring are not used in _____	
a. Trucks	b. Buses
c. Railway wagons	d. Bikes
36. When the line of action of load does not coincide with the geometric axis of the machine element, but it is at some short offset distance, that load is known as _____	
a. Tensile load	b. Compressive load
c. Eccentric load	d. Shear load
37. The Eccentricity is defined as _____	
a. Perpendicular distance between load axis and geometric axis	b. parallel distance between load axis and geometric axis
c. Angular distance between load axis and geometric axis	d. Length of geometric axis
38. Which of the following element is subjected to eccentric loading?	
a. Bracket	b. Column
c. Clamps	d. All the above
39. Which of the following is not subjected to eccentric loading?	
a. Bracket	b. Clamps
c. Cotter	d. Column

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40. Due to eccentric load, the element is subjected to _____	
a. Both direct and bending stress	b. Only direct stress
c. Only bending stress	d. Torsion stress
41. Because of eccentricity the section along with direct stress is also subjected to _____	
a. Torsional stress	b. Bending stress
c. Both of them	d. None of them
42. The bending stress induced will be distributed, at fibers above and below the neutral axis in the form of	
a. Tensile and compressive stress	b. Shear stress
c. Only compressive stress	d. Only tensile stress
43. When Bolted connections are used in the assembly of brackets, pillar cranes, machine frames, etc. which are under eccentric loading, then bolts are subjected to _____	
a. Tensile load	b. Compressive load
c. Eccentric load	d. Shear load
44. In order to prevent the leakage of the fluid from the bolted joints of the vessels, the bolts are _____	
a. Initially tightened to required degree of tightness	b. Bolts are welded
c. Bolts are set loose	d. None of the above
45. The initial tightening of the bolts is also known as _____	
a. Loosening	b. Preloading
c. Prestressing	d. Both preloading or prestressing
46. For designing the bolt (d) considering the effect of initial tightening (P_i), the simple empirical equation used is _____	
a. $P_i = 1800 d$	b. $P_i = 2800 d$
c. $P_i = 2850 d$	d. $P_i = 2000 d$
47. Which of the following is the correct importance of Preloading?	
a. Reduces the locking effect	b. Prevents loosening of joints due to vibrations
c. Reduces the fatigue strength of the joint	d. Increases the leakage through joints
48. When the joints are subjected to variable loading, the permissible stresses for the bolts are derived based on their _____	
a. Endurance limit	b. Elastic limit
c. Plastic limit	d. Fracture limit
49. In bikes, the Gear shifter and the rear brakes are the example of _____	
a. Hand lever	b. Foot lever
c. Both hand and foot lever	d. None of the above
50. In bikes, the clutch lever and front brake lever are examples of _____	
a. Hand lever	b. Foot lever
c. Both hand and foot lever	d. None of the above