



**SNS College of Technology, Coimbatore-35.**  
**(Autonomous)**  
**Department of Mechanical Engineering**



**Subject Name:** Design of Machine Elements

**Faculty Name:** Mr.R.Karthikeyan AP/Mech

1.	For brittle materials having static load, factor of safety is given as the ratio of _____	
	a. endurance strength and design stress	b. design stress and allowable stress
	c. working stress and allowable stress	d. ultimate strength and design stress
2.	The application factor depends on _____	
	a. prime mover	b. hours of operation per day
	c. machine driven	d. all of the above
3.	What are assumptions made during stress analysis of curved beams?	
	a. The material is nonisotropic	b. The material is non homogeneous
	c. The material obeys hooke's law	d. All of the above
4.	Which of the following statements is/are true?	
	a. The bending stress distribution in bending of straight beams is nonlinear	b. The bending stress distribution in bending of curved beams is hyperbolic
	c. The neutral axis coincides with geometrical axis during bending of curved beams	d. All of the above
5.	Which factors are responsible for the failure of a component due to buckling?	
	a. Yielding	b. Plastic deformation
	c. Elastic instability	d. All of the above
6.	Which formula is used if slenderness ratio $L_c / K < X$ , where $X = \sqrt{(2\pi^2 E / S_{yc})}$ ?	
	a. Euler's formula	b. J. B. Johnson formula
	c. Rankine formula	d. None of the above
7.	Calculate diameter of shaft using maximum principle stress theory, when equivalent bending moment of $900 \times 10^3$ N-mm acts on the shaft when maximum tensile stress does not exceed $50$ N/mm <sup>2</sup> and equivalent torque of $700$ N-m acts on it.	
	a. 56.80 mm	b. 52.24 mm
	c. 50 mm	d. None of the above
8.	Stress concentration in cyclic loading is more serious in	
	a. Ductile materials	b. Brittle materials
	c. Equally serious in both cases	d. Depends on other factors

9.	Endurance limit or fatigue limit is the maximum stress that a member can withstand for an infinite number of load applications without failure when subjected to	
	a. Dynamic loading	b. Static loading
	c. Combined static and dynamic loading	d. <b>Completely reversed loading</b>
10.	Match the following Group 1 items with Group 2 items and select the correct option	
	1. Size factor ----- A. $K_c$	
	2. Load factor ----- B. $K_g$	
	3. Temperature factor ----- C. $K_b$	
4. Reliability factor ----- D. $K_d$		
	a. 1 – B, 2 – A, 3 – D, 4 – C	b. <b>1 – C, 2 – A, 3 – D, 4 – B</b>
	c. 1 – D, 2 – B, 3 – A, 4 – C	d. 1 – D, 2 – C, 3 – A, 4 – B
11.	To predict failure in design components which failure criteria is not assumed, when mean stress and stress amplitude are nonzero?	
	a. Goodman criterion	b. Soderberg criteria
	c. Gerber criteria	d. <b>None of the above</b>
12.	Calculate fatigue stress concentration factor, when theoretical stress concentration factor is 1.62 and notch sensitivity is equal to 0.9	
	a. <b>1.558</b>	b. 3.358
	c. 1.162	d. None of the above
13.	Which of the following equations is correct for Soderberg Criteria?	
	a. $(\sigma_m / S_{ut}) + (\sigma_a / S_e) = (1 / N_f)$	b. $(\sigma_m / S_{ut}) - (\sigma_a / S_e) = (1 / N_f)$
	c. <b><math>(\sigma_m / S_{yt}) + (\sigma_a / S_e) = (1 / N_f)</math></b>	d. $(\sigma_m / S_{ut}) - (\sigma_a / S_e) = (1 / N_f)$
14.	Notch sensitivity (q) is given by the equation _____ where $K_f$ = fatigue stress concentration factor and $K_t$ = theoretical stress concentration factor	
	a. $(K_f + 1) / (K_t - 1)$	b. <b><math>(K_f - 1) / (K_t - 1)</math></b>
	c. $(K_f + 1) / (K_t + 1)$	d. $(K_f - 1) / (K_t + 1)$
15.	Line joining $S_{yt}$ (yield strength of the material) on mean stress axis and $S_e$ (endurance limit of the component) on stress amplitude axis is called as _____	
	a. Goodman line	b. <b>Soderberg line</b>
	c. Gerber line	d. None of the above
16.	Calculate weld size if weld throat thickness for the fillet weld is 8.2 mm	
	a. 10 mm	b. 14.20 mm
	c. 16.4 mm	d. <b>12 mm</b>
17.	Which formula is used to calculate shear strength of butt weld?	
	a. <b><math>P = \tau h l</math></b>	b. $P = \tau h l^2$
	c. $P = \tau h^2 l$	d. None of the above

18.	The objective of caulking in a riveted joint is to make the joint	
	a. Free from corrosion	b. Stronger in tension
	c. Free from stress	d. Leak-proof
19.	Which of the following statements is/are false?	
	1. Under fatigue load, casted structures are stronger than welded structures	
	2. Welding cannot produce complicated structures	
	3. Welding can join dissimilar materials	
4. Rivetted joints produce light weight constructions as compared to welded joints		
	a. Statement 1 and Statement 3	b. Statement 1, 2 and Statement 4
	c. Statement 1, 2 and Statement 3	d. All the above statements are false
20.	Which among the following is a knuckle joint?	
	a. Tension link in bridge structure	b. Foundation bolt
	c. Both a. and b.	d. None of the above
21.	When a coupler nut is subjected to crushing stress, crushing failure can be avoided if	
	a. crushing stress induced is more than permissible crushing stress in the nut	b. permissible crushing stress is more than crushing stress induced in the threads
	c. crushing stress induced is equal to permissible crushing stress	d. all of the above
22.	Calculate torque required to overcome thread friction if axial load of 8 kN acts on a power screw having double start square threads of 30 mm mean diameter. Friction angle and lead angle are $7^\circ$ and $9^\circ$ respectively	
	a. 68.81 N-m	b. 41.90 N-m
	c. 34.40 N-m	d. Insufficient data
23.	In power screws, if friction angle $\Phi$ is less than lead angle $\lambda$ , then the screw undergoes _____	
	a. over hauling	b. self locking
	c. both a. and b.	d. none of the above
24.	In designing a flange coupling, the pitch circle diameter of bolts is taken as (where $d$ = Diameter of the shaft)	
	a. $2d$	b. $3d$
	c. $4d$	d. $5d$
25.	According to A.S.M.E code what is the allowable shear stress for a shaft without keyway effect, which has ultimate tensile strength and yield strength of $300 \text{ N/mm}^2$ and $150 \text{ N/mm}^2$ respectively	
	a. $45 \text{ N/mm}^2$	b. $54 \text{ N/mm}^2$
	c. $40.5 \text{ N/mm}^2$	d. None of the above
26.	A shaft transmits power of 30 kW. According to maximum principle stress theory and shear theory diameter of shaft is 70 mm and 73 mm respectively. Tensile stress acting on the shaft is 50 Mpa. What will be the shaft diameter to transmit power?	
	a. 65 mm	b. 70 mm
	c. 73 mm	d. Insufficient data

27.	Torsional Shear Stress is the stress induced when a component is subjected to equal and opposite _____.	
	a. forces acting in perpendicular direction	b. couples acting in perpendicular direction
	<b>c. couples acting in parallel planes</b>	d. forces acting in parallel direction
28.	Determine the diameter of the bolts used in rigid flange coupling if transmitted torque is 270N-m, pitch circle diameter=125mm and four bolts are emplace in the coupling. Permissible shear stress in the bolts is 70N/mm <sup>2</sup> .	
	a) 3.8mm	b) 3.6mm
	<b>c) 4.4mm</b>	d) 4mm
29.	Find the shear stress in a flange at the junction of hub in rigid flanged coupling if torsional moment is 2980N-m and diameter of hub being 125mm. Also the thickness of flange is 25mm.	
	a) 6.77N/mm <sup>2</sup>	b) 10.24N/mm <sup>2</sup>
	<b>c) 4.84N/mm<sup>2</sup></b>	d) 4.22N/mm <sup>2</sup>
30.	If shaft diameter is 30mm and number of pins emplaced are 6, then the diameter of the pin will be?	
	a) 6.4mm	b) 5.6mm
	c) 5.9mm	<b>d) 6.1mm</b>
31.	Which type of springs have only active coils?	
	a. Helical compression springs	<b>b. Helical tension springs</b>
	c. Both a. and b.	d. None of the above
32.	Solid length for helical compression springs having square and ground ends is given as _____	
	<b>a. (n + 2)d</b>	b. (n + 3)d
	c. (n + 1)d	d. None of the above
33.	What is the Wahl's factor if spring index is 6?	
	a. 1.477	b. 0.995
	<b>c. 1.252</b>	d. None of the above
34.	Free length for helical compression springs having square ends is given as _____	
	a. pn + 2d	<b>b. pn + 3d</b>
	c. 2(p + d)	d. pn + 4d
35.	Which of the following statements is/are true? 1. In volute springs, number of active coils gradually decreases as load increases 2. Stiffness of spring decreases as number of coils decreases in conical springs 3. Torsion springs are generally spiral 4. Helical torsion springs are used in automobile starters	
	a. Statements 1 and 3	b. Statements 2, 3 and 4
	<b>c. Statements 1, 3 and 4</b>	d. All of the above

36.	Mass of _____ required to neutralize one gram of lubricating oil is called as neutralization number.	
	a. potassium hydroxide	b. calcium hydroxide
	c. magnesium hydroxide	d. None of the above
37.	The cracks in helical springs used in railway carriages usually start on the inner side of the coil because of the fact that	
	a. It is subjected to a higher cyclic loading than the outer side	b. It is subjected to a higher stress than the outer side
	c. It is more stretched than the outer side during the manufacturing process	d. It has a lower curvature than the outer side
38.	When comes down to stress reduction, which one is preferred?	
	a. Solid flywheel	b. Split flywheel
	c. Both have equal stresses	d. Cannot be determined
39.	Which of the following is not true for cast iron flywheels?	
	a. Excellent damping	b. Cheap
	c. Given complex shape	d. Sudden failure
40.	When the driving torque is more than load torque, flywheel is _____	
	a) Accelerated	b) Decelerated
	c) Constant velocity	d) Can't be determined
41.	The rolling contact bearings are known as	
	a. Thick lubricated bearings	b. Plastic bearings
	c. Antifriction bearings	d. Thin lubricated bearings
42.	A sleeve bearing of inch dimensions is numbered as XXYY-ZZ, using the SAE numbering system. What does YY represents.	
	a. Internal diameter in sixteenths of inch	b. Internal diameter in inch
	c. External diameter in sixteenths of inch	d. External diameter in inch
43.	Babbitt is used	
	a. Usually to make integral bearings	b. to not to damage the journal bearing during direct contact
	c. to collect any contaminants in the lubrication	d. All of the above
44.	The lubrication in which load of bearing is carried solely by a film of fluid and there is no contact between the two bearings surface is called	
	a. Full film condition	b. Boundary condition
	c. Dry condition	d. None of the above
45.	The attitude angle and eccentricity ratio are dependent on the	
	a. Direction	b. Speed of rotation
	c. The load	d. All of the above

46.	Oil whirl in journal bearing can be prevented by	
	a. Providing an obstacle to whirling fluid	b. Providing stabilizing load to minimize whirl
	c. Both 'a' and 'b'	d. None of the above
47.	Which of the following design eliminate the oil whirl completely?	
	a. Tilting pad	b. Pressure dam
	c. Stabilizing force	d. All of the above
48.	In angular contact bearings, ____ bearings are required to take thrust load in both directions.	
	a. 1	b. 4
	c. 3	d. 2
49.	A self-excited vibration of the journal is called	
	a. Oil whirl	b. Shaft whirl
	c. Journal whirl	d. Bearing whirl
50.	The expected rating life of roller bearings rotating at 1000 r.p.m. is 30000 hours and equivalent dynamic load of 4000 N acts on it. What is the basic dynamic capacity of the bearing?	
	a. 26000.12 N	b. 30000.23 N
	c. 37900.22 N	d. 48657.61 N