Unit-II

S.No		Questions	BT	CO	
Part – A (Short Answer Questions)					
1		Explain the following method of stress concentration i) Drilled holes, ii) Using large fillet radius, iii) Added grooves.	L2	CO2	
2		Explain the modified Goodman diagram for tensional shear stresses.	L1	CO2	
3		Explain briefly about the causes of stress concentration	L1	CO2	
4		Draw the S-N curve for ferrous and nonferrous components	L2	CO2	
5		Explain about static strength design based on fracture toughness	L2	CO2	
6		What information do you obtain from Soderberg diagram?	L2	CO2	
7		Define stress concentration along with its causes. Write any one method to reduce stress concentration.	L1	CO2	
8		What are the principal causes of stress concentration?	L1	CO2	
9		Differentiate the theoretical stress concentration factor and fatigue stress concentration factor.	L2	CO2	
10		Illustrate how the stress concentration in a component can be reduced	L1	CO2	
Part – B (Long Answer Questions)					
11	a)	Explain Goodman Method for combination of stress.	L1	CO2	
	b)	A 50 mm diameter shaft is made from carbon steel having ultimate tensile strength of 630MPa.It is subjected to a torque which fluctuates between 200 N-mt-800 N-m using Soderberg method, calculate the factor of safety. Assume suitable values for any other data needed.	L3	CO2	
12	a)	Explain Soderberg Method for combination of stress.	L2	CO2	
	b)	A steel cantilever is 200 mm long. It is subjected to an axial load which varies from 150 N (compression) to 450 N (tension) and also a transverse load at its free end which varies from 80 N up to 120 N down. The cantilever is of circular cross- section. It is of diameter 2d for the first 50 mm and of diameter d for the remaining length. Determine its diameter taking a factor of safety of 2. Assume the following values: Yield stress=330 MPa, Endurance limit in reversed loading=300 MPa, correction factors=0.7 in reversed axial loading and 1.0 in reversed bending, Stress concentration factor=1.44 for bending and 1.64 for axial loading, size effect factor=0.85, Surface effect factor=0.90 ,Notch sensitivity=0.90	L3	CO2	
13	a)	Explain the Methods of reducing stress concentration with neat sketch	L2	CO2	
	b)	A hot rolled steel shaft is subjected to a torsion moment that varies from 330 N-m clockwise to 110 N-m counterclockwise and an applied bending moment at a critical section varies from 440N-m to -220 N-m. The shaft is of uniform cross section and no keyway is present at critical section. Determine the required shaft diameter. The material has an ultimate strength of 550 MN/m^2 and yield strength of 410 MN/m^2. Take the endurance limit as half of the ultimate strength, factor of safety is 2, size factor=0.85 and surface finish factor of 0.62.	L3	CO2	
14	a)	Explain the Endurance or fatigue limit with neat sketch	L2	CO2	
	b)	A machine component is subjected to a flexural stress which fluctuates between +300 MN/m^2 and -150 MN/m^2.Determine the value of minimum ultimate strength 1.Good relation 2.Soderberg take yield strength=0.55 Ultimate strength ;Endurance strength=0.5 Ultimate and factor of safety=2.	L3	CO2	
15	a)	With neat sketch completely reversed and repeated stress.	L2	CO2	
	b)	A bar of circular cross- section of 500 mm length is supported freely at its two ends. It is acted upon by a central concentrated cyclic load having a minimum value of 20 kN and a maximum value of 50kN.Determine the diameter of bar by taking a factor of safety of 1.5,size effect of 0.85, surface finish factor of 0.9. The material properties of bar is given by: ultimate strength of 650MPa, yield strength of 500MPa and endurance strength of 350MPa.	L3	CO2	