INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal, Hyderabad - 500 043

AERONAUTICAL ENGINEERING

DEFINITIONS AND TERMINOLOGY QUESTION BANK

Course Name	:	**STRENGTH OF MATERIALS**
Course Code	:	**ACEB07**
Program	:	**B.Tech**
Semester	:	**IV**
Branch	:	**Civil engineering**
Section	:	**A&B**
Academic Year	:	**2019 – 2020**
Course Coordinator	:	**MrG.Venkateswarlu**

COURSE OBJECTIVES

The course will enable the students to:	
I	Describe the concepts and principles, understand the theory of elasticity including strain/displacement and Hooke's law relationships; and perform calculations, relative to the strength and stability of structures and mechanical components;
II	Define the characteristics and calculate the magnitude of combined stresses in individual members and complete structures; analyze solid mechanics problems using classical methods and energy methods;
III	Analyze various situations involving structural members subjected to combined stresses by application of Mohr's circle of stress; locate the shear center of thin wall beams; and
IV	Calculate the deflection at any point on a beam subjected to a combination of loads; solve for stresses and deflections of beams under unsymmetrical loading; apply various failure criteria for general stress states at points; solve torsion problems in bars and thin walled members;

DEFINITIONS AND TERMINOLOGY QUESTION BANK

S.No	QUESTION	ANSWER	Blooms Level	CO	CLO	CLO Code
MODULE-I STRESSES AND STRAINS						
1	Define Stress	The resistance offered by the body to applied force is called stress.	Understand	CO 1	CLO 1	AAEB04.01
2	Define strain	The ratio of change in dimension to original dimension is called strain.	Remember	CO 1	CLO 1	AAEB04.01
3	What is ductility?	The property of material to draw into thin wires is known as ductility.	Remember	CO 1	CLO 2	AAEB04.02
4	Define Hooke's law.	Hooke's law states that within elastic limit stress is proportional to strain.	Remember	CO 1	CLO 2	AAEB04.02
5	What is isotropic material?	The materials which have the same elastic properties in all directionsare called isotropic materials.	Remember	CO 1	CLO 2	AAEB04.02
6	Define Poisson's ratio.	The ratio of lateral strain to the longitudinal strain is a constant when the material is stressed within the elastic limit is called Poisson'sratio.	Remember	CO 1	CLO 2	AAEB04.02

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7	What is working stress?	The maximum safe stress that a material can carry is called working stress.	Remember	CO 1	CLO 2	AAEB04.02
8	What is factor of safety?	Factor of safety is a ratio of maximum stress withstand by an object to applied stress.	Remember	CO 1	CLO 2	AAEB04.02
9	What is rigidity modulus?	The ratio of shear stress to the corresponding shear strain within the elastic limit is known as modulus of rigidity.	Understand	CO 1	CLO 2	AAEB04.02
10	Define Resilience	The total strain energy stored in a body is known as resilience.	Understand	CO 1	CLO 3	AAEB04.03
11	What is proof Resilience?	The maximum strain energy, stored in a body is known as proof resilience.	Remember	CO 1	CLO 3	AAEB04.03
12	Define modulus of Resilience.	It is defined as the proof resilience of a material per MODULE volume.	Remember	CO 1	CLO 3	AAEB04.03
13	What is torsion?	Torsion is the twisting of an object due to an applied torque.	Remember	CO 1	CLO 3	AAEB04.03
14	What is polar modulus?	Polar modulus is defined as the ratio of the polar moment of inertia to the radius of the shaft.	Remember	CO 1	CLO 3	AAEB04.03
15	What is a creep?	A gradual increase of plastic strain with time at constant load.	Remember	CO 1	CLO 3	AAEB04.03
	MODULE-II BENDING MOMENT AND SHEAR FORCE DIAGRAMS					
1	What is elastic curve?	The line to which the longitudinal axisof the beam bends or deflects or deviates under given load is known as elastic curve.	Understand	CO 2	CLO 4	AAEB04.04
2	Define slope	The slope is defined as at any point on the bent beam is the angle measured in terms of radians to which the tangent at that point makes with the X-axis.	Understand	CO 2	CLO 4	AAEB04.04
3	What is deflection of beam?	The deflection at any point on the axis of the beam is the distance between its position before and after loading.	Understand	CO 2	CLO 4	AAEB04.04
4	Define slope	Slope at any section in a deflected beam is defined as the angle in radianswhich the tangent at the section makes with the original axis of the beam.	Remember	CO 2	CLO 4	AAEB04.04
5	What is a Beam?	Beam is a horizontal structural member subjected to transverse loads perpendicular toaxis.	Remember	CO 2	CLO 5	AAEB04.05
6	What is overhanging beam?	A beam which extends beyond it supports is known as overhanging beam.	Remember	CO 2	CLO 5	AAEB04.05
7	What is shear force?	Shear force is unbalanced vertical force to the left or right of the section.	Remember	CO 2	CLO 5	AAEB04.05
8	What is point of contraflexure?	The point where value of bending moment is zero is called point of contraflexure.	Remember	CO 2	CLO 5	AAEB04.05
9	Define U.D.L	The loads are uniformly spread over a portion or whole area.	Understand	CO 2	CLO 5	AAEB04.05
10	What is concentrated load?	Load acting at a point is known as concentrated load or point load.	Remember	CO 2	CLO 6	AAEB04.06

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11	What is simply supported beam?	A beam supported or resting freely on the supports at its both ends is known as simply supported beam.	Remember	CO 2	CLO 6	AAEB04.06
12	Define bending moment diagram	The diagram which shows the variation of the bending moment along the length of a beam is known as bending moment diagram.	Remember	CO 2	CLO 6	AAEB04.06
13	Define shear force diagram.	The diagram which shows the variation oftheshearforcealongthelengthofthe beam is known as shear force diagram.	Remember	CO 2	CLO 6	AAEB04.06
14	Define U.D.L	The loads are uniformly spread over a portion or whole area.	Understand	CO 2	CLO 6	AAEB04.06
15	What is concentrated load?	Load acting at a point is known as concentrated load or point load.	Remember	CO 2	CLO 6	AAEB04.06
	MODULE-III DEFLECTIONS IN BEAMS, TORSION					
1	Define bending stresses.	The stresses introduced by bending moment are known as bending stresses.	Remember	CO 3	CLO 7	AAEB04.07
2	Define simple bending.	The beam subjected to a constant bending moment and no shear force, then the stresses set up in the beam due to bending moment is said to be simple bending.	Remember	CO 3	CLO 7	AAEB04.07
3	What is neutral layer?	The layer which is neither shortened nor elongated is known as neutral layer or neutral surfaces	Remember	CO 3	CLO 7	AAEB04.07
4	What is moment of resistance?	The compressive and tensile forces acting above and below the neutral axis will have moments. The total moment of these forces about N.A for a section is known as moment ofresistance.	Remember	CO 3	CLO 7	AAEB04.07
5	Define section modulus	The ratio of moment of a sectionabout the neutral axis to the distance of the outermost layer from the neutral axisis called section modulus.	Understand	CO 3	CLO 7	AAEB04.07
6	What is plane of bending?	When the loads are applied in xy plane, a plane of symmetry of the cross section, resulting in beam deflection in that same plane, known as the plane of bending.	Remember	CO 3	CLO 7	AAEB04.07
7	What is moment of inertia?	The mass moment of inertia of a solid measures the solid's ability to resist changes in rotational speed about a specific axis. The larger the mass moment of inertia the smaller the angular acceleration about the axis for a given torque.	Understand	CO 3	CLO 7	AAEB04.07
8	What is web?	The web is vertical section in any type of cross-section which resists the shear forces experienced by the beam.	Remember	CO 3	CLO 8	AAEB04.08
9	What is flange?	The flange is horizontal section in any type of cross-section which resist most of the bending moment experienced by the beam.	Remember	CO 3	CLO 8	AAEB04.08
10	Define direct stress	Direct stress is produced in a body when it is subjected to an axial tensile or compressive load.	Remember	CO 3	CLO 8	AAEB04.08

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11	What is eccentric load?	Eccentric load is the load whose line of action does not pass through the axis of the column or, but passes through a point away from the axis of the column.	Remember	CO 3	CLO 8	AAEB04.08
12	What isprinciple ofsuperposition?	The principle that when two or more forcesactonaparticleatthesametime, the resultant force is the vector sum of the two.	Remember	CO 3	CLO 9	AAEB04.09
13	What is flexural rigidity?	Flexural stiffness is a stiffness of a material when subjected to bending.. mathematically the product of EI is called flexural rigidity.	Remember	CO 3	CLO 9	AAEB04.09
14	What is pure bending?	Pure bending refers to flexure of a beam under constant bending moment.	Remember	CO 3	CLO 9	AAEB04.09
15	What isprinciple Ofsuperposition?	The principle that when two or more forces act on a particle at the same time, the resultant force is the vector sum ofthe two.	Remember	CO 3	CLO 9	AAEB04.09
	MODULE-IV TORSION					
1	Define column	A vertical member of a structure whichis subjected to axial compressive load andis fixed at both of its ends is known as a column.	Remember	CO 4	CLO 11	AAEB04.11
2	What is crippling load?	The load at which the column just buckles (or bends) is called crippling load.	Understand	CO 4	CLO 11	AAEB04.11
3	Define slenderness ratio	The ratio of the length of a column to the least radius of gyration of the column is known as slenderness ratio.	Remember	CO 4	CLO 10	AAEB04.10
4	Define crushing load.	The load at which short column fails is called crushing load.	Remember	CO 4	CLO 11	AAEB04.11
5	What is effective length of a column?	The effective length of a given column with the given end conditions is the length of an equivalent column of the same material and cross-section with hinged ends, and having the value of the crippling load equal to that of the given column.	Remember	CO 4	CLO 10	AAEB04.10
6	What is radius of gyration?	Radius of gyration of a body about an axis is distance such that its square multiplied by the area gives moment of inertia of the area about the given axis.	Remember	CO 4	CLO 10	AAEB04.10
7	Define factor of safety.	The ratio of the critical load to the safe load is known as factor of safety.	Remember	CO 4	CLO 10	AAEB04.10
8	What is beam column?	If the columns also subjected to transverse loads along with axial compressive loads they are known as beam columns.	Remember	CO 4	CLO 10	AAEB04.10
9	What is strut?	Strut is a member of a structure which is not vertical or whose one or both of its ends are hinged or pin joined.	Remember	CO 4	CLO 11	AAEB04.11
10	Define Young's modulus	The ratio of longitudinal stressto longitudinal strain is called Young's modulus or modulus of elasticity.	Remember	CO 4	CLO 11	AAEB04.11

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11	What are Eigen values?	The column will buckle at discrete values of axial load and that associated with each value of buckling load there is a particular buckling mode. These discrete values of buckling load are called Eigen values.	Remember	CO 4	CLO 11	AAEB04.11
12	What is eigen function?	The function associated with eigen values is called Eigen function.	Remember	CO 4	CLO 12	AAEB04.12
13	Define bifurcation point.	If the column is disturbed it would buckle in either of two lateral directions. The point at which this possible branching occurs is called a bifurcation point.	Remember	CO 4	CLO 12	AAEB04.12
14	What isreduced Modulus theory?	The method of predicting critical loads and stresses outside the elastic range is known as the reduced modulus theory.	Remember	CO 4	CLO 13	AAEB04.13
15	What is tangent modulus?	At the point above the elastic limit if the stress is increasing then Young's ModulusEisknownastangentmodulus E_t.	Remember	CO 4	CLO 13	AAEB04.13
	MODULE-V THIN CYLINDERS AND SPHERES					
1	What are body forces?	The forces derived from gravitational and inertia effects are known as body forces.	Understand	CO 5	CLO 14	AAEB04.14
2	What is plane stress?	If all stress components along z-axis are zero then that condition is known as plane stress.	Remember	CO 5	CLO 14	AAEB04.14
3	What are principal stresses?	Principal stresses are the stresses that can act on inclined planes where shear stresses arezero.	Remember	CO 5	CLO 14	AAEB04.14
4	What are principal planes?	The inclines planes on which principal stresses act are called as principal planes.	Remember	CO 5	CLO 15	AAEB04.15
5	What is elasticity?	The property by which a body returns to its original shape after removal of the force is called elasticity.	Remember	CO 5	CLO 15	AAEB04.15
6	What are equilibrium equations?	A solid static body is in staticequilibrium when the resultant force and themoment on each axis is equal to zero. This can be expressed by the equilibrium equations.	Remember	CO 5	CLO 15	AAEB04.15
7	What are compatibility equations?	Compatability equations are those additional equations which can be made considering equilibrium of the structure.	Remember	CO 5	CLO 15	AAEB04.15
8	What is compatibility method?	Displacement method of analysis is known as compatibility method. It is also known as stiffness matrix method.	Remember	CO 5	CLO 15	AAEB04.15
9	What is Airy's Stress function?	The Airy stress function is scalar potential function that can be used to find the stress.	Remember	CO 5	CLO 15	AAEB04.15
10	Define obliquity	The angle made by the resultant stress with the normal of the oblique plane is known as obliquity.	Remember	CO 5	CLO 16	AAEB04.16
11	Where the maximum shear stress does occurs?	The planes which are at an angle of 45^0 or 135^0 with the normal cross-section carry the maximum shear stresses.	Remember	CO 5	CLO 16	AAEB04.16

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12	Define allowable stress	The allowable stress is the maximum stress that is allowed to be applied on a structural material.	Remember	CO 5	CLO 17	AAEB04.17
13	What is Mohr's circle?	Mohr's circle is a graphical method of finding normal, tangential and resultant stresses on an oblique plane.	Remember	CO 5	CLO 17	AAEB04.17
14	Define shear stress.	Shear stress is defined as the component of stress arising from the force vector component parallel to the cross-sectionof the material.	Remember	CO 5	CLO 15	AAEB04.15
15	Define shear force.	Shear force is a force that acts on a plane passing through the body.	Remember	CO 5	CLO 16	AAEB04.16

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