INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)
Dundigal,Hyderabad-500043

CIVIL ENGINEERING

TUTORIAL QUESTION BANK

CourseName	:	**STRENGTH OF MATERIALS - II**
CourseCode	:	**ACE004**
Class	:	IV Semester
Branch	:	Civil Engineering
Year	:	2018-19
CourseCoordinator	:	Mr. Suraj Baraik,Assistant Professor, Civil Engineering Department.
CourseFaculty	:	Mr. Suraj Baraik, Assistant Professor, Civil Engineering Department. Mr. K. Tarun, Civil Engineering Department.

COURSE OBJECTIVES:

Thecourseshould enable the studentsto:

I	Relate slope and deflection of beams with its behaviour under various load types
II	Understand energy methods for analyzing the structures.
III	Apply the concepts of cylindrical shells to find the stresses and internal pressure on it.
IV	Analyze a loaded structural member for deflections and failure strength

COURSELEARNINGOUTCOMES:

Students,whocompletethecourse,willhavedemonstrated theabilitytodothefollowing:

ACE004.01	Calculate the slope and deflection for cantilever and simply supported beams under various loads.
ACE004.02	Understand the different methods for deflection of beams with constant and variable moment of inertia.
ACE004.03	Predict the differential equation for the elastic line of a beam.
ACE004.04	Apply Mohr's theorems and moment area methods for simple cases including overhanging beams.
ACE004.05	Understand the concept of conjugate beam method.
ACE004.06	Analyze the strain energy under gradual, sudden, impact and shock loadings simple applications.
ACE004.07	Apply Strain energy in linear elastic system, expression of strain energy due to axial load, bending moment and shear force.
ACE004.08	Understand the energy methods like work energy method, principal of virtual work, unit load method and castigliano's theorem
ACE004.09	Evaluate the deflections of simple beams and pin jointed trusses and concept extended to frames and indeterminate
ACE004.10	Analyze structures using maxwell's theorem of reciprocal deflections and betti's Law.
ACE004.11	Understand the concept of thin seamless cylindrical shells
ACE004.12	Derive the formula for longitudinal and circumferential stresses, hoop, longitudinal and volumetrical strains.
ACE004.13	Analyze Lames theory for thick cylinders,
ACE004.14	Derive the derivation of lames formulae and distribution of hoop and radial stresses across thickness

ACE004.15	Evaluate thick cylinders and compound cylinders for necessary difference of radii under shrinkage and thick spherical shells.
ACE004.16	Analyze propped cantilever and fixed beams using different methods.
ACE004.17	Derive the propped cantilever and fixed beams under various conditions.
ACE004.18	Calculate the deflection of propped cantilever and fixed beams.
ACE004.19	Understand the effect of rotation of a support.
ACE004.20	Explain clapeyron's theorem of three moments.
ACE004.21	Analyze continuous beams with constant and variable moments of inertia with one or both ends fixed, continuous beams with overhang Effects of sinking of supports.
ACE004.22	Calculate the Effects of sinking of supports.
ACE004.23	Possess the knowledge and skills for employability and to succeed in national and international level competitive examinations.

S. No	QUESTIONS	Blooms Taxonomy Level	Course Learning Outcomes
UNIT–I			
DEFLECTIONS OF BEAMS			
Part-A(ShortAnswerQuestions)			
1	Derive an expression for the slope and deflection of a beam subjected to uniform bending moment?	Remember	ACE004.01
2	Prove that the relation that M= EI d^2y/dx^2Where M=bending moment , E= young's modulus , I= M.O.I	Remember	ACE004.01
3	Find an expression for the slope at the supports of simply supported beam, carrying a point load at the centre?	Understand	ACE004.01
4	Prove that the deflection at the centre of simply supported beam, carrying a point load at the centre, is given by $y_c=WL^3/48EI$, where W=point load, L=length of the beam	Understand	ACE004.02
5	Find an expression for the slope and deflection of a simply supported beam, carrying a point load W at a distance of 'a' from left support and at a distance 'b' from right support where a>b.	Understand	ACE004.02
6	Prove that the slope and deflection of a simply supported beam of length L and carrying a uniformly distributed load of w per unit length over the entire length are given bySlope at supports=-$WL^2/24EI$, and deflection at centre=$5WL^3/384EI$ where W=total load=wxL.	Understand	ACE004.02
7	Define Macaulay's method for deflection of beam?	Remember	ACE00402
8	What are the uses of Macaulay's method?	Remember	ACE004.02
9	Find an expression for the deflection at any section of a simply supported beam with an eccentric point load using Macaulay's method.	Understand	ACE004.03
10	What do you understand moment area method?	Remember	ACE004.03
11	Where moment area method is conveniently used?	Remember	ACE004.03

12	Find the slope and deflection of a simply supported beam carrying a point load at the centre? By using moment area method.	Understand	ACE004.03
13	Find the slope and deflection of a simply supported beam carrying a uniformly distributed load over the entire length? By using moment area method?	Understand	ACE004.03
14	Define conjugate beam method.	Remember	ACE004.03
15	Define the term real beam in terms of linear elastic system.	Remember	ACE004.04
16	What is meant by moment of inertia?	Understand	ACE004.04
17	Distinguish betweenreal beam and conjugate beam.	Remember	ACE004.04
18	State Mohr's theorem for beams.	Understand	ACE004.04
19	What is moment area method?	Remember	ACE004.04
20	What are the uses of Macaulay'smethod?	Remember	ACE004.04
	Part-B(LongAnswerQuestions)		
1	A wooden beam 4m long simply supported at its ends, is carrying a point load of 7.25KNat its centre. The cross section of the beam is 140mm wide and 240mm deep. If E for the beam $=6x10^3N/mm^2$.Find the deflection at the center.	Understand	ACE004.01
2	A beam 5m long, simply supported at its ends, carries a point load W at its center. If the slope at the ends of the beam is not exceed 10,find the deflection at the center of the beam.	Remember	ACE004.01
3	Determine i)slope at the left support, ii)deflection under the load and iii)maximum deflection of a simply supported beam of length 10m,which is carrying a point load of 10KN at a distance 6m from the left end.	Remember	ACE004.01
4	A beam of uniform rectangular section 100mm width and 240mm deep is simply supported at its ends.It carries a uniformly distributed load of 9.125KN/m run over the entire span of 4m. Find the deflection at the center if E=1.1x104N/mm2	Understand	ACE004.02
5	A beam of length of 4.8m and of uniform rectangular section is simply supported at its ends. It carries audl of 9.375KN/m runover the entire length. Calculate the width and depth of the beam if permissible bending stress is 7 N/mm2 and maximum deflection is not to exceed 0.95cm.Take E for beam material = 1.05 x 104 N/mm2.	Remember	ACE004.02
6.	Determine using Macaulay's method a) slope at the left support b) Deflection under the load, and c) Maximum deflection of a simply supported beam of length 10m,which is carrying a point load of 10 KN at a distance of 6m from the left end. Take E = 2x 105 N/mm2 and I= 1x108 mm4.	Understand	ACE004.02

7.	A beam of length 10m is simply supported at its ends and carries 2 point loads of 100 KN and 60 KN at a distance of 2m and 5m respectively from the left support. Calculate the deflections under each load. Find also the maximum deflection. Take I= 18 x 108 mm4 and E= 2x105 N/mm2.	Remember	ACE00402
8	A beam of length 20m is simply supported at its ends and carries two point loads of 4KN and 10KN at a distance of 8m and 12m from left end respectively. Calculate :i) Deflection under each load ii) Maximum deflection Take E=2x106 N/mm2 and I=1X109 mm4.	Understand	ACE004.02
9.	A beam of span 8m of uniform flexural rigidity EI=40MN-m2,is simply supported at its ends. It carries a UDL of 15KN/m runover the entire span. It is also subjected to a clockwise moment of 160KN-m at a distance of 3m from the left support. Calculate the slope of the beam at the point of application of the moment.	Understand	ACE004.03
10	A wooden beam 10 m long, simply supported at its ends, is carrying a point load of 15 KN at its centre. The cross section of the beam is 200 mm wide and 300 mm deep. If E for the beam =6x103N/mm2.Find the deflection at the center.	Remember	ACE004.03
11	A beam 3 m long, simply supported at its ends, carries a point load W at its center. If the slope at the ends of the beam is not exceed 10, find the deflection at the center of the beam.	Understand	ACE004.03
12	Determine i) slope at the left support, ii) deflection under the load and iii) maximum deflection of a simply supported beam of length 10m,which is carrying a point load of 20 KN at a distance 12 m from the left end.	Remember	ACE004.03
13	A beam of uniform rectangular section 200 mm width and 300 mm deep is simply supported at its ends. It carries a uniformly distributed load of 15 KN/m run over the entire span of 6 m. Find the deflection at the center if E=1.1x104N/mm2	Understand	ACE004.03
14	A beam of length of 6 m and of uniform rectangular section is simply supported at its ends. It carries anudl of 12 KN/m runover the entire length. Calculate the width and depth of the beam if permissible bending stress is 9 N/mm2 and maximum deflection is not to exceed 1.25 cm. Take E for beam material = 1.05 x 104 N/mm2.	Remember	ACE004.03
15	Determine using Macaulay's method a) slope at the left support b) Deflection under the load, and c) maximum deflection of a simply supported beam of length 12 m, which is carrying a point load of 12 KN at a distance of 8 m from the left end. Take E = 2x 105 N/mm2 and I= 1x108 mm4	Understand	ACE004.04

16	A beam of length 5 m is simply supported at its ends and carries 2 point loads of 50 KN and 25 KN at a distance of 1 m and 3 m respectively from the left support. Calculate the deflections under each load. Find also the maximum deflection. Take I= 18 x 108 mm4 and E= 2x105 N/mm2	Remember	ACE004.04
17	A beam of length 10 m is simply supported at its ends and carries two point loads of 2 KN and 5 KN at a distance of 4 m and 8 m from left end respectively. Calculate i) Deflection under each load ii) Maximum deflection. Take E=2x106 N/mm2 and I=1x109 mm4.	Understand	ACE004.04
18	A beam of span 8m of uniform flexural rigidity EI=40MN-m2, is simply supported at its ends. It carries a UDL of 15KN/m run over the entire span. It is also subjected to a clockwise moment of 200KN-m at a distance of 4m from the left support. Calculate the slope of the beam at the point of application of the moment.	Remember	ACE004.04
19	Derive the slope and deflection of a simply supported beam carrying a uniformly distributed load by mohr's theorem.	Understand	ACE004.04
20	Explain mohr's theorem and derive the slope and deflection of simply supported beam carrying a point load at the centre by mohr's theorem.	Remember	ACE004.04
Part-C(ProblemSolvingand Critical ThinkingQuestions)			
1	Determine the slope and deflection at free end of a cantilever beam of length L carryingpoint load W at its free end using moment area method.	Understand	ACE004.01
2	A beam AB of span L is simply supported at A and B carries a point load W at the centre C of the span .The moment of inertia of the beam section is I for the left half and 2I for right half. Calculate the slope at each end at the centre and the deflection at the centre by using moment area method.	Understand	ACE004.01
3	A beam AB of span L is simply supported at A and B carries a point load W at the centre C of the span .The moment of inertia of the beam section is I/2 for the left half and I for right half. Calculate the slope at each end at the centre and the deflection at the centre by using moment area method.	Understand	ACE004.01
4	Derive equations for slope and deflection at the free end of a cantilever beam of length L carrying point load P at its free end using conjugate beam method.	Remember	ACE004.02
5	Determine the slope and deflection at the free end of a cantilever beam of length L carrying a UDL of W per unit length over the whole span using conjugate beam method.	Understand	ACE004.02

6	A cantilever AB, 2 m long, is carry a load of 20 KN at free end and 30 kN at a distance of 1 m from the free end. Find the slope and deflection at the free end using conjugate beam method. Take E= 200 GPa and I= 150X106 mm4.	Understand	ACE004.02
7	A cantilever AB, 4 m long, is carry a load of 30 KN at free end and 50 kN at a distance of 2 m from the free end. Find the slope and deflection at the free end using conjugate beam method. Take E= 200 GPa and I= 150X106 mm4.	Understand	ACE004.03
8	Derive expression for slope at end points and maximum deflection for simply supported beam carrying u.v.l.	Remember	ACE004.03
9	Determine the slope and deflection at mid span for simply supported beam of length L carrying a moment Mo at its centre.	Remember	ACE004.04
10	A simply supported beam of span 10 m carries a point load of 30 kN at a distance of 4 m from the left end Compute :i) slope at the left ii) deflection at mid span iii) maximum deflection and its location. Take E = 2X105 N/mm2 and I= 6X108 mm4.	Understand	ACE004.04
	UNIT–II		
	DEFLECTIONS BY ENERGY METHODS		
	Part-A(ShortAnswerQuestions)		
1	Define the term Proof resilience.	Remember	ACE004.05
2	What is meant by Strain energy?	Remember	ACE004.05
3	Find an expression for strain energy stored in a body when load is gradually.	Understand	ACE004.05
4	Find an expression for strain energy stored in a body when load is applied suddenly	Understand	ACE004.05
5	Define impact loading for strain energy.	Remember	ACE004.05
6	Find an expression for strain energy stored in a body when load is applied with an impact	Understand	ACE004.06
7	Explain the term gradually applied load.	Remember	ACE004.06
8	Explain the term suddenly applied load.	Remember	ACE004.06
9	What is meant by Maxwell's reciprocal deflection theorem?	Remember	ACE004.06
10	State the first theorem of castigliano.	Understand	ACE004.06
11	State briefly about the betti's law in beams.	Remember	ACE004.07
12	Write short notes on unit load method.	Remember	ACE004.07
13	What are intermediate structures?	Understand	ACE004.07
14	Define deflection of beam.	Remember	ACE004.07
15	Distinguish between trusses and frames.	Understand	ACE004.07
16	What is meant by pin jointed trusses?	Remember	ACE004.07
17	List out the energy methods.	Understand	ACE004.08
18	Define frames and types of frames.	Remember	ACE004.08

19	Explain the term Impact loading.	Remember	ACE004.08
20	State principal of virtual work.	Understand	ACE004.08
Part-B(LongAnswerQuestions)			
1	Derive the expression for strain energy in a body when the load is applied gradually.	Understand	ACE004.05
2	Explain the expression for strain energy in a body when the load is applied suddenly.	Understand	ACE004.05
3	Develop the expression for strain energy in a body when the load is applied with impact.	Remember	ACE004.05
4	A tensile load of 50 KN is gradually applied to a circular bar of 5 cm diameter and 4 m long if the E= 2.0x105N/mm2 determine the strain energy absorbed by the rod	Understand	ACE004.05
5	A simply supported beam carries a point load P eccentrically on the span .Find the deflection under the load.Assume uniform flexural rigidity.	Understand	ACE004.05
6.	A simply supported beam carries a point load P at middle of the span .Find the deflection under the load .Assume uniform flexural rigidity.	Remember	ACE004.06
7.	A cantilever beam carries a point load P at free end .Find the deflection under the load .Assume uniform flexural rigidity.	Understand	ACE004.06
8	A simply supported beam 3 m carries a point load 6 KN eccentrically 1 m from left hand side .Find the deflection under the load .Assume uniform flexural rigidity.	Understand	ACE004.06
9.	A simply supported beam 5 m carries a point load 10 KN at middle of the span .Find the deflection under the load. Assume uniform flexural rigidity.	Remember	ACE004.06
10	A cantilever beam 3m carries a point load 2 kN at free end. Find the deflection under the load .Assume uniform flexural rigidity.	Understand	ACE004.06
11	Explain in detail about betti's law.	Understand	ACE004.07
12	A cantilever beam 6m carries a point load 4 kN at free end. Find the deflection under the load. Assume uniform flexural rigidity.	Remember	ACE004.07
13	Find the deflection at the free end of a cantilever of length L carrying a Point Load of W intensity at the free end. Assume uniform flexural rigidity.	Understand	ACE004.07
14	Find the deflection at the free end of a cantilever of length L carrying a UDL of W per unit run over the whole span. Assume uniform flexural rigidity.	Understand	ACE004.07
15	A simply supported beam 5 m carries a UDL of 1.5 KN/m over the entire span length. Find the maximum deflection under the load. Assume uniform flexural rigidity.	Remember	ACE004.07
16	Find the deflection at the centre of a beam of span L carrying a uniformly distributed load w per unit run over the whole span. Assume uniform flexural rigidity.	Understand	ACE004.07
17	A simply supported beam 6 m carries a point load 10 KN at middle of the span .Find the deflection under the load.Assume uniform flexural rigidity.	Understand	ACE004.08

18	A cantilever beam 2 m carries a point load 2 kN at free end. Find the deflection under the load .Assume uniform flexural rigidity.	Understand	ACE004.08
19	A cantilever beam 4 m carries a point load 2 kN at free end. Find the deflection under the load .Assume uniform flexural rigidity.	Remember	ACE004.08
20	A cantilever beam 2 m carries a point load 4 kN at free end. Find the deflection under the load .Assume uniform flexural rigidity.	Understand	ACE004.08
Part-C(ProblemSolvingand Critical ThinkingQuestions)			
1	Determine the slope and deflection at free end of a cantilever beam of length L carrying point load W at its free end using moment area method.	Understand	ACE004.05
2	A simply supported beam 3 m carries a point load 6 KN eccentrically 1 m from left hand side .Find the deflection under the load.Assume uniform flexural rigidity.	Understand	ACE004.05
3	A simply supported beam 5 m carries a point load 10 KN at middle of the span .Find the deflection under the load.Assume uniform flexural rigidity.	Remember	ACE004.05
4	A cantilever beam 3m carries a point load 2 kN at free end. Find the deflection under the load .Assume uniform flexural rigidity.	Understand	ACE004.06
5	A simply supported beam 6 m carries a point load 6 KN eccentrically 2 m from left hand side. Find the deflection under the load. Assume uniform flexural rigidity.	Remember	ACE004.06
6	Find the deflection at the centre of a beam of span 2L carrying a uniformly distributed load w per unit run over the whole span. Assume uniform flexural rigidity.	Understand	ACE004.06
7	A simply supported beam 6 m carries a point load 9 KN at middle of the span .Find the deflection under the load.Assume uniform flexural rigidity.	Remember	ACE004.07
8	A simply supported beam 8 m carries a point load 20 KN at middle of the span .Find the deflection under the load. Assume uniform flexural rigidity	Understand	ACE004.07
9	Find the deflection at the centre of a beam of span 2L carrying a uniformly distributed load w per unit run over the whole span. Assume uniform flexural rigidity.	Understand	ACE004.07
10	A simply supported beam 4 m carries a point load 9 KN at middle of the span .Find the deflection under the load.Assume uniform flexural rigidity.	Understand	ACE004.08
UNIT-III			
STRESSES IN CYLINDERS AND SPHERICAL SHELLS			
Part-A(ShortAnswerQuestions)			
1	Define the term pressure vessels and thin cylinders.	Remember	ACE004.09
2	Write about circumferential stress.	Understand	ACE004.09
3	What is meant by hoop stress?	Remember	ACE004.09

4	Define volumetric strain and circumferential strain.	Understand	ACE004.09
5	Explain the term longitudinal strain.	Remember	ACE004.09
6	Write the formula for longitudinal stress.	Understand	ACE004.09
7	Define longitudinal stresses in thin cylinder.	Understand	ACE004.10
8	Give the formula for circumferential stress.	Understand	ACE004.10
9	Name the stresses set up in a thin cylinder subjected to internal fluid pressure.	Remember	ACE004.10
10	Find an expression for the change in volume of a thin cylindrical shell subjected to internal fluid pressure.	Understand	ACE004.10
11	Define thick Cylinders in case of pressure vessels.	Understand	ACE004.11
12	Write down the assumptions on lame's theory.	Remember	ACE004.11
13	What do you mean by compound cylinders?	Understand	ACE004.11
14	Find an expression for the radial pressure at any point in case of thick cylinder.	Remember	ACE004.11
15	Find an expression for the hoop stresses at any point in case of thick cylinder.	Understand	ACE004.11
16	What do you mean by lame's equations?	Understand	ACE004.11
17	What are the various methods of reducing hoop stresses?	Remember	ACE004.12
18	Write down the expression for the radial pressure for thick spherical shell.	Remember	ACE004.12
19	Write down the expression for the hoop stresses for thick spherical shell.	Understand	ACE004.12
20	Define thick compound cylinders.	Remember	ACE004.12
Part–B(LongAnswerQuestions)			
1	Derive expression for circumferential stresses.	Remember	ACE004.09
2	A cylindrical pipe of diameter 1.5 m and thickness 1.5 cm is subjected to an internal fluid pressure of 1.2 N/mm2.Determine the longitudinal stress developed in the pipe.	Understand	ACE004.09
3	A cylindrical pipe of diameter 1.5 m and thickness 1.5 cm is subjected to an internal fluid pressure of 1.2 N/mm2.Determine the hoop stress developed in the pipe.	Understand	ACE004.09
4	Determine the formula changes in diameter and volume in thin cylinders.	Remember	ACE004.09
5	A thin cylinder of internal diameter 1.25 m contains a fluid at an internal pressure of 2 N/mm2. Determine the maximum thickness of the cylinder if the longitudinal stress is not exceed 30 N/mm2.	Understand	ACE004.09
6	A thin cylinder of internal diameter 1.25 m contains a fluid at an internal pressure of 2 N/mm2. Determine the maximum thickness of the cylinder if the hoop stress is not exceed 45 N/mm2.	Remember	ACE004.09

7	A thin cylindrical shell of internal diameter 1.5m and length 4m subjected to an internal fluid pressure of 5N/mm2. Determine the change in dimension of the cylinder due to effect of fluid pressure. Take E= 2x 105 N/mm2 and 0.25 as poisson's ratio.	Understand	ACE004.10
8	A cylindrical shell, 3 m long, which is closed at the ends, has an internal diameter of 1 m and a wall thickness of 15 mm. calculatethe circumferential stresses induced and also changes in the dimensions of the shell, if it is subjected an internal pressure of 1.5 N/mm2. If E= 2X105 N/mm2 and poisson ratio = 0.3.	Remember	ACE004.10
9	A cylindrical shell, 3 m long, which is closed at the ends, has an internal diameter of 1 m and a wall thickness of 15 mm. calculatethe longitudinal stresses induced and also changes in the dimensions of the shell, if it is subjected an internal pressure of 1.5 N/mm2. If E= 2X105 N/mm2 and poisson ratio = 0.25.	Understand	ACE004.10
10	Calculate the change in diameter of a thin cylindrical shell 100 cm diameter, 1 cm thick and 5 cm long when subjected to internal pressure of 3 N/mm2. If E= 2X105 N/mm2 andpoisson ratio = 0.3.	Remember	ACE004.10
11	Calculate the change in length of a thin cylindrical shell 100 cm diameter, 1 cm thick and 5 cm long when subjected to internal pressure of 3 N/mm2. If E= 2X105 N/mm2 andpoisson ratio = 0.3.	Understand	ACE004.11
12	Calculate the change in volume of a thin cylindrical shell 100 cm diameter, 1 cm thick and 5 cm long when subjected to internal pressure of 3 N/mm2. If E= 2X105 N/mm2 and poisson ratio = 0.3.	Remember	ACE004.11
13	Determine the maximum hoop stresses across the section pipe of external diameter 600 mm and internal diameter 440 mm, when the pipe is subjected to no internal fluid pressure.	Remember	ACE004.11
14	A thick spherical shell of 400 mm internal diameter is subjected to an internal fluid pressure of 1.5 N/mm2. If the permissible tensile stresses in the shell material is 3 N/mm2, find the necessarythickness of the shell.	Understand	ACE004.11
15	Explain Initial difference in radii at the junction of a compound cylinder for shrinkage	Understand	ACE004.11
16	Explain in detail about stresses in compound thick cylinders	Remember	ACE004.11
17	A cylindrical shell, 5 m long, which is closed at the ends, has an internal diameter of 1.5 m and a wall thickness of 15 mm. calculate the longitudinal stresses induced and also changes in the dimensions of the shell, if it is subjected an internal pressure of 2 N/mm2. If E= 2X105 N/mm2 and poisson ratio = 0.3.	Remember	ACE004.12

18	A shell 5 m long, 930 mm in diameters, is subjected to an internal pressure of 1.1 N/mm2. Take poisson ratio = 0.3.Calculate the change in dimensions.	Remember	ACE004.12
19	A thick spherical shell of 250 mm internal diameter is subjected to an internal fluid pressure of 0.5 N/mm2. If the permissible tensile stresses in the shell material is 3 N/mm2, find the necessarythickness of the shell.	Understand	ACE004.12
20	A cylindrical shell, 6 m long, which is closed at the ends, has an internal diameter of 1.5 m and a wall thickness of 18 mm. calculate the longitudinal stresses induced and also changes in the dimensions of the shell, if it is subjected an internal pressure of3 N/mm2. If E= 2X105 N/mm2 and poisson ratio = 0.3.	Remember	ACE004.12
Part–C(ProblemSolvingand Critical Thinking)			
1	A cylindrical pipe of diameter 2 m and thickness 2 cm is subjected to an internal fluid pressure of 1.2 N/mm2.Determine the longitudinal stress developed in the pipe.	Remember	ACE004.09
2	A cylindrical pipe of diameter 1.5 m and thickness 1.5 cm is subjected to an internal fluid pressure of 1.5 N/mm2.Determine the hoop stress developed in the pipe.	Understand	ACE004.09
3	A thin cylinder of internal diameter 1.5 m contains a fluid at an internal pressure of 2 N/mm2. Determine the maximum thickness of the cylinder if the longitudinal stress is not exceed 30 N/mm2.	Remember	ACE004.10
4	A thin cylinder of internal diameter 1.5 m contains a fluid at an internal pressure of 2 N/mm2. Determine the maximum thickness of the cylinder if the hoop stress is not exceed 45 N/mm2.	Understand	ACE004.10
5	A shell 4 m long, 800 mm in diameters, is subjected to an internal pressure of 1.1 N/mm^2. Take poisson ratio = 0.3. Calculate the change in dimensions.	Remember	ACE004.10
6	A cylindrical shell, 2.5m long, which is closed at the ends, has an internal diameter of 1 m and a wall thickness of 15 mm. calculatethe circumferential stresses induced and also changes in the dimensions of the shell, if it is subjected an internal pressure of 1.5 N/mm2. If E= 2X105 N/mm2 and poisson ratio = 0.3.	Understand	ACE004.11
7	A cylindrical shell, 2.5 m long, which is closed at the ends, has an internal diameter of 1 m and a wall thickness of 15 mm. calculate the longitudinal stresses induced and also changes in the dimensions of the shell, if it is subjected an internal pressure of 1.5 N/mm2. If E= 2X105 N/mm2 and poisson ratio = 0.25.	Understand	ACE004.11
8	Calculate the change in volume of a thin cylindrical shell 120 cm diameter, 1 cm thick and 5 cm long when subjected to internal pressure of 3 N/mm2. If E= 2X105 N/mm2 and poisson ratio = 0.3.	Remember	ACE004.12

9	Determine the maximum hoop stresses across the section pipe of external diameter 400 mm and internal diameter 240 mm, when the pipe is subjected to no internal fluid pressure.	Understand	ACE004.12
10	A cylindrical shell, 5 m long, which is closed at the ends, has an internal diameter of 1.5 m and a wall thickness of 12 mm. calculate the longitudinal stresses induced and also changes in the dimensions of the shell, if it is subjected an internal pressure of 3 N/mm2. If E= 2X105 N/mm2 and poisson ratio = 0.3.	Remember	ACE004.12
UNIT-IV			
INTERMEDIATE BEAMS:PROPPED CANTILEVER AND FIXED BEAMS			
Part – A (Short Answer Questions)			
1	What are the reaction values for propped cantilever beam when it carries point load.	Remember	ACE004.13
2	What are the reaction values for propped cantilever beam when it carries uniformly distributed load.	Understand	ACE004.13
3	Calculate maximum bending momentfor a propped cantilever beam which carries a udl of 10Kn/m for a span of 2m.	Understand	ACE004.13
4	Calculate point of contraflexurefor propped cantilever beam has a 4m length carries point load of 20KN at freeend.	Remember	ACE004.13
5	Difference between cantilever beam and propped cantilever beam.	Understand	ACE004.13
6	Calculate deflection at mid span for a propped cantilever beam of load 10Kn/m for a span of 4m.	Understand	ACE004.14
7	What is the effect of sinking of support for fixed beam.	Remember	ACE004.14
8	What is effect of rotation on a beam.	Understand	ACE004.14
9	Calculate slope and deflection for a fixed beam of load 10Kn/m for a span of 4m.	Remember	ACE004.14
10	Difference between propped cantilever beam andfixed beam.	Understand	ACE004.14
11	A fixed beam of length 3m issubjected to two point loads 9KN at themiddlethird point. CalculateBendingmoment at the fixed end.	Understand	ACE004.14
12	Draw Shear force diagram for a fixed beam carrying an eccentric load.	Understand	ACE004.15
13	Define the term fixed beam with examples.	Remember	ACE004.15
14	What is meant by propped cantilever?	Understand	ACE004.15
15	Explain the term moment of inertia.	Remember	ACE004.15
16	What are the various loading conditions in case of a beam?	Understand	ACE004.15
17	A fixed beam of length 3m issubjected to two point loads 10KN at themiddlethird point.CalculateBending moment at mid pint of beam.	Remember	ACE004.15
18	Draw bending moment diagram for a fixed beam carrying an eccentric load.	Understand	ACE004.16

19	Draw bending moment diagram for a fixed beam carrying a Point load at mid span.	Remember	ACE004.16
20	Explain the term maximum deflection in case of fixed beam.	Understand	ACE004.16
Part – B (Long Answer Questions)			
1	A cantilever of length 10 m carries udl of 800N/m length over the wholelength. The freeend of the cantilever is supported on a prop. The prop sinks by 5mm. If E=3 x105N/mm2 and I=108 mm4, then calculate the prop reaction.	Understand	ACE004.13
2	A cantilever of length 8m carries udl of 2Kn/m run over the wholelength. The cantilever is propped rigidly at the free end. If E=1X105N/mm2 and I=108 mm4, then determine reaction at the rigid prop anddeflection at thecenter.	Remember	ACE004.13
3	A cantilever of length 5m carries a point load of 24kn at its center. The cantilever is propped rigidly at thefree end. Determine the reaction at therigid prop.	Remember	ACE004.13
4	A cantilever of length 4m carries a UDL of 1Kn/m run over the whole span length. The cantilever is propped rigidly at the free end. If thevalue of If E=2X105N/mm2 and I=108 mm4, Determine the reaction at therigid prop and deflection at the center.	Understand	ACE004.13
5	A fixed beam AB, 5m long, carries a point load of 48kn at its center.Themoment of inertia of the beam is 5x107 mm4 andvalue of E forthe beam materials is 2x105 N/mm2.DetermineFixedendmoments at A and B, and Deflection under the load.	Remember	ACE004.14
6	A fixed beam of length 5m carries a point load of 20KN at a distance of 2m from A. Determine the fixed endmoments and deflection under the load, if theflexuralrigidity of the beam is 1x104 KN/m2	Understand	ACE004.14
7	A fixed beam of length 6m carries point loads of 20kn and 15kn at distance 2m and 4m from the left end A. Findthe fixedendmomentsandthereactions at the supports. Draw B.M and S.F diagrams.	Understand	ACE004.14
8	A fixed beam of length 3m carries tow point loads of 30kN each at a distance of 1m from both ends. Determine the fixing moments and draw B.M diagram.	Understand	ACE004.14
9	A fixed beam AB of length 6m carries a uniformly distributed load 3kN/moverthe left half of the span together with a point load of 4kN at a distance of 4.5m from the left end.Determinethe fixing end momentsand support reactions.	Remember	ACE004.15

10	A cantilever of length 8m carries UDL of 0.8Kn/m length overthe length. The freeend of the cantilever is supported on a prop. The prop sinks by 5mm. If E=2X105N/mm2 and I=108 mm4, then calculate the prop reaction.	Understand	ACE004.15
11	A cantilever ABC of length is fixed at theend A and is simply supported at an intermediate support B. The cantilever carries a uniformly distributed load w/unit length overthewholespan. Determine the position of the support B sothatreactions at A and B are equal.	Remember	ACE004.15
12	A beam AB of length L, simply supported at the ends and propped at mid span, carries a udl of w per unitlength. Calculatethe prop reaction and plot the bending moment diagram.	Understand	ACE004.15
13	A cantilever of uniform cross section carries audlw / unitlength. What upwardforcemust be applied at theend to reducethe deflection there to zero?	Remember	ACE004.16
14	A 5m long fixed beam AB is hinged at the point H, 3M fromthe end A, thusformingtwo concentrated cantilever AH and BH. A load of 86KN acts at a distance of 2m from the left end A. Findthe reaction at thehingeandthefixingmoments at A and B. Takes IAH=2IBH.	Understand	ACE004.16
15	Afixed-endedbeamof9mspancarriesudlof15Kn/m(includingitsownweight)andtwopintloadsof200knatthethirdpointinthe span.Assumingrigidendfixing.Findthefixingmoment.	Remember	ACE004.16
Part – C (Problem Solving and Critical Thinking)			
1	Forarigidly fixed beam AB of 5m span carrying udlof 10Kn/m, over the entire span, locatethepoints of contraflexure and drawtheS.F and B.M diagrams.	Understand	ACE004.13
2	A beam built in atboth the ends isloaded with a triangular loadingonits one halfofthe span, the other load half carries no load.Theload gradually increasesfromzeroat the fixed end to15Kn/mat mid span.Thespanof the beam is 5m. Determine the bending moments.	Understand	ACE004.13
3	A beam of uniformcrosssection and 5m length, isbuilt in ateachend.Itcarriesaudlof10Kn/mextendingfrom 3m from one endanda concentrated loadof20Kn,1mfrom the otherend.SketchtheB.Mdiagram giving principalnumerical values.	Understand	ACE004.13
4	A beam fixed atbothends is prismatic. Itcarriesaloadof varying intensity zeroat the end to w/unit lengthat the center.Determine the fixed moments.	Remember	ACE004.14
5	AcantileveroflengthI0mcarriesUDL of 1 KN/mlength over the length. The free end ofthe cantilever issupportedonaprop.Theprop sinks by 5mm.IfE=2X105N/mm2 andI=108 mm4,then calculate thepropreaction.	Understand	ACE004.14

5	Acantilever ABC oflength is fixed at the end A and is simply supported at an intermediate Support B. The cantilever carries a uniformly distributed load w/unit length over the whole span. Determine the positionof the supportB so that reactions atA and Bare equal.	Remember	ACE004.14
6	A beam AB of length L, simply supported at the ends and propped at mid span, carries a udl of w per unit length. Calculate the propreaction and plot the bending moment diagram.	Understand	ACE004.15
7	A cantilever of uniform cross section carries a udl w/unit length. What upward force must beappliedat the end to reduce the deflection there to zero?	Remember	ACE004.15
8	A 4 m long fixed beam AB is hinged at the pointH,3M from the end A, thus forming two concentrated cantilever AH and BH.Aloadof86KNactsata distance of 2m fromtheleft endA. Find the reactionat thehinge and the fixing moments atAandB.TakesIAH=2IBH.	Understand	ACE004.15
9	Acantileveroflength 2 m carriesaUDLof1Kn/mrun over the whole span length. The cantilever ispropped rigidly atthe free end.If the value ofIfE=2X105N/mm2andI=108 mm 4, Determine thereactionat the rigid prop and deflectionatthe center.	Remember	ACE004.16
10	A fixed beam AB, 3 m long, carriesapointloadof20 KNatits center. the moment ofinertiaofthe beam is5x107 mm4 and value ofE for the beam materials is 2x105 N/mm2. Determine Fixed end moments atAandB, and Deflectionunder the load.	Understand	ACE004.16

UNIT-V

INTERMEDIATE BEAMS: CONTINUOUS BEAMS

Part - A (Short Answer Questions)

1	Define clapeyron's theorem for continuous beam.	Understand	ACE004.17
2	Explain the term continuous beams.	Remember	ACE004.17
3	What is the expression for bending moment for continuous beam under udl.	Remember	ACE004.17
4	What are the applications of three moments?	Understand	ACE004.18
5	Write about effects of sinking of supports.	Remember	ACE004.18
6	Write the equation for continuous beam with supports at different levels.	Understand	ACE004.19
7	Write short notes on continuous beam with overhang.	Remember	ACE004.19
8	Write the equation for continuous beam with same moments of inertia for different spans.	Understand	ACE004.20
9	Write the equation for continuous beam with different moments of inertia for different spans.	Remember	ACE004.21
10	What are the advantages of continuous beam?	Remember	ACE004.22

Part - B (Long Answer Questions)			
1	Explain in detail clapeyron's theorem of three moments for continuous beam.	Understand	ACE004.17
2	A beam ABC of length of 16 m consists of spans AB and BC each 8 m long and is simply supported at A, B and C. The beam carries a UDL of 40 KN/m on the whole length. Find the reaction at the supports and the support moments.	Remember	ACE004.17
3	A beam ABC of length of 16 m consists of spans AB and BC each 10 m long and is simply supported at A, B and C. The beam carries a UDL of 60 KN/m on the whole length. Find the reaction at the supports and the support moments.	Understand	ACE004.17
4	A continuous beam ABC covers two consecutive spans AB and BC of lengths 4 m and 6 m, carrying uniformly distributed loads of 60 kN/m and 100 kN/m respectively. If the ends A and C are simply supported find the support moments at A, B and C. Draw also Shear Force and Bending moment diagram.	Remember	ACE004.18
5	A continuous beam ABC covers two consecutive spans AB and BC of lengths 8m and 10m, carrying uniformly distributed loads of 80 kN/m and 120 kN/m respectively. If the ends A and C are simply supported find the support moments at A, B and C. Draw also Shear Force and Bending moment diagram.	Remember	ACE004.18
6	A continuous beam ABC of length 3L consists of spans AB and BC of lengths 2L and L respectively. The beam carries UDL of W per unit run on the whole beam. Determine the bending moments and reactions. Draw also S.F. and B. M. diagrams	Understand	ACE004.19
7	A continuous beam consists of three successive span of 8 m, 10 m, 6 m, and carries loads of 6 kN/m,4 kN/m, and 8 kN/m respectively on the span. Determine the reactions at supports and bending moments.	Understand	ACE004.20
8	A continuous beam ABC of length 5L consists of spans AB and BC of lengths 3L and 2L respectively. The beam carries UDL of W per unit run on the whole beam. Determine the bending moments and reactions. Draw also S.F. and B. M. diagrams	Remember	ACE004.21
9	A continuous beam consists of three successive span of 6 m, 8 m, 4 m, and carries loads of 6 kN/m, 4kN/m, and 8 kN/m respectively on the span. Determine the reactions at supports and bending moments.	Understand	ACE004.22
10	A continuous beam consists of three successive span of 6 m, 8 m, 4 m, and carries loads of 3 kN/m, 2 kN/m, and 5kN/m respectively on the span. Determine the reactions at supports and bending moments	Understand	ACE004.23

Part – C (Problem Solving and Critical Thinking)			
1	A beam ABC of length of 10 m consists of spans AB and BC each 8 m long and is simply supported at A, B and C. The beam carries a UDL of 24 KN/m on the whole length. Find the reaction at the supports and the support moments.	Understand	ACE004.17
2	A beam ABC of length of 8 m consists of spans AB and BC each 4 m long and is simply supported at A, B and C. The beam carries a UDL of 20 KN/m on the whole length. Find the reaction at the supports and the support moments.	Understand	ACE004.17
3	A continuous beam ABC covers two consecutive spans AB and BC of lengths 4 m and 6 m, carrying uniformly distributed loads of 60 kN/m and 90 kN/m respectively. If the ends A and C are simply supported find the support moments at A, B and C. Draw also Shear Force and Bending moment diagram.	Understand	ACE004.18
4	A continuous beam ABC covers two consecutive spans AB and BC of lengths 8 m and 10 m, carrying uniformly distributed loads of 60 kN/m and 120 kN/m respectively. If the ends A and C are simply supported find the support moments at A, B and C. Draw also Shear Force and Bending moment diagram.	Remember	ACE004.18
5	A continuous beam ABC of length L consists of spans AB and BC of lengths L/4 and 3L/4 respectively. The beam carries UDL of W per unit run on the whole beam. Determine the bending moments and reactions. Draw also S.F. and B. M. diagrams	Understand	ACE004.18
6	A continuous beam consists of three successive span of 8 m, 10 m, 6 m, and carries loads of 6 kN/m,6 kN/m, and 86kN/m respectively on the span. Determine the reactions at supports and bending moments.	Understand	ACE004.19
7	A continuous beam ABC of length 5L consists of spans AB and BC of lengths L and 4L respectively. The beam carries UDL of W per unit run on the whole beam. Determine the bending moments and reactions. Draw also S.F. and B. M. diagrams	Remember	ACE004.20
8	A continuous beam consists of three successive span of 6 m, 8 m, 4 m, and carries loads of 4 kN/m,4 kN/m, 4 kN/m respectively on the span. Determine the reactions at supports and bending moments.	Understand	ACE004.21
9	A continuous beam consists of three successive span of 3 m, 8 m, 4 m, and carries loads of 3 kN/m,2 kN/m, 5 kN/m respectively on the span. Determine the reactions at supports and bending moments.	Understand	ACE004.22
10	A beam ABC of length of 1 m consists of spans AB and BC each 0.5 m long and is simply supported at A, B and C. The beam carries a UDL of 4 KN/m on the whole length. Find the reaction at the supports and the support moments.	Remember	ACE004.23

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