Enroll No	

K.E.Society's
Rajarambapu Institute of Technology, Rajaramnagar
(An Autonomous Institute, affiliated to SUK)
End Semester Examination (Summer 2018)
F.Y.M.Tech. Civil Structure Sem- II

Q.P.Code
EB 1088

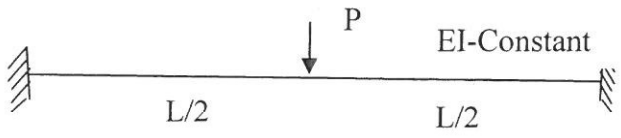
Course Code: CES2011 **Course Name**: Finite Elements Analysis

Day & Date: .Thursday, 26/4/2018
Time : 10.30 am to 12.30 pm Max Marks: 50

Instructions: 1) All questions are compulsory
2) Figures to the right indicate maximum marks
3) Assume suitable data if not given
4) Use of non-programmable calculator is allowed

Q.1 Solve any TWO

(a) Analyze the beam shown in figure by using finite element method. 9 CO_2



(b) i) Describe the confirming and non confirming elements for selection of F.E. displacement model. 6 CO_3

ii) Explain the importance of node numbering in FEM. 3

(c) How relationship between natural and cartesian coordinate system is established? Explain with suitable example. 9 CO_4

Q.2 Solve the following

(a) Explain the term- axisymmetric problems and state its applications. 4 CO_5

OR

(a) What is isoparametric element? Explain various types of isoparametric elements. 4 CO_5

(b) Develop element stiffness matrix [K] for triangular ring axisymmetric element 12 CO_5

Q.3 Solve any TWO

(a) i) Write the assumptions made in analysis of thin shells. 2 CO_6

ii) List the difficulties developed in the analysis of curved shell elements. 3

iii) Explain in brief flat shell elements. 3

(b) Formulate the matrix [B] for rectangular plate bending element with 12 dof. 8 CO_6

(c) i) Classify the plates by classical theory and state the criteria for selection of displacement function for plate elements. 4 CO_6

ii) Write the basic relations in thin plate theory. 4

Enroll No	

Q.P.Code EB 1129

K.E.Society'

Rajarambapu Institute of Technology, Rajaramnagar

(An Autonomous Institute, affiliated to SUK)

End Semester Examination (Summer 2018)

F.Y.M.Tech. Civil StructureSem- II

Course Code: CES 2021

Course Name: Advanced Design of Concrete Structures

Day & Date: Sat. 28/04/2018

Time: 10.30 am - 12.30 pm Max Marks: 50

Instructions: 1) All questions are compulsory

2) Figures to the right indicate maximum marks

3) Use of IS- 456, IS- 3370 are allowed

4) Assume suitable data if not given

5) Use of non-programmable calculator is allowed

Q 1 a	A R.C.C. slab 5 m x 7 m is reinforced with10 mm dia bars at 160 mm c/c along short direction and 8 mm dia bars spacing at 180 mm c/c along long direction. The total depth of slab is 120 mm .and yield lines are inclined at $45^0$to either directions. Find ultimate moments along yield line. Material properties are M 20 and Fe 415.	08	CO 2
	OR		
a	Explain detailed design process with moment formulae, Is codes used for ultimate bending capacity of R.C.C. structure subjected to fire	08	CO 3
b	Design a grid floor of size 15 x 25 m to be covered by a hall roof. Use roof finish load as 2 kN/m^2 and live load as 2.5 kN/m^2. Adopt M 20 and Fe 415.Draw sketch.	10	CO 4
Q 2	Design a top dome, ring beams and vertical wall of elevated circular water tank of 6 lakhs liters capacity.Use M 20 and Fe 415. Neglect continuity effect. Draw sketch.	16	CO 5
Q 3	Solve any two		
a	Design a side wall and bottom hopper of bunker to store 450kN of coal. Unit weight of coal is 8.4 kN/m^3, Angle of repose 33^0. Use M 20 and Fe 415. Check for stresses. Draw sketch.	08	CO 6
b	Design the slab of raft foundation consists of 08 columns in two	08	CO 6

Rajaramnagar Exam Cell

rows. Four side columns are 350 x 350 mm and intermediate columns are 450 x 450 mm. Each side column is carrying 750 kN load, while each intermediate column is carrying 950 kN load. Take bearing capacity of soil as 120 kN/m^2, M 20 and Fe 415.

c A R.C.C. column 450 x 450 mm carrying a load of 800 kN. It is supported on 04 piles forming square. Each pile is 350 x 350 mm and 1.4 m c/c distance in each direction. Design a suitable pile cap. Use M 20 and Fe 415. Draw sketch. 08 CO 6

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Rajarambapu Institute of Technology, Rajaramnagar

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EB 1175

End Semester Examination- 2018

First Year M. Tech (Civil) Structural Engineering, Semester II

Course: Theory of Elasticity and Plasticity, Course Code: CE52031

Date & Day: Thursday, 03-05-2018 Maximum Marks: 50

Time: 10.30am to 12.30pm

Instructions:

1. *All questions are compulsory.*
2. *Use of non-programmable calculator is allowed.*
3. *Assume any additional data if required and mention it clearly.*
4. *Figures to the right indicate full marks.*
5. *Draw neat sketches wherever necessary.*

1 a	The strain components at a point in a continuum are $\varepsilon_x = 3\times10^{-3}$, $\varepsilon_y = 1\times10^{-3}$, $\varepsilon_z = 2\times10^{-3}$, $\gamma_{xy} = 5\times10^{-3}$, $\gamma_{yz} = 0$, $\gamma_{zx} = 8\times10^{-3}$. Determine strain invariants, principal strains and maximum shear strains.	**08**	**CO2**
b	A hollow rectangular section of outer dimensions 100mm×56mm with uniform thickness 6mm is designed for maximum shear stress of 35.7N/mm^2, neglecting stress concentrations. Estimate the twisting moment that can be taken up by the section and the angle of twist if the length of the member is 3m. If the member is redesigned with same outer dimensions, keeping thickness of long walls 9mm and thickness of short walls 6mm, find the allowable twisting moment and angle of twist. Take G=1.575×10^{5}N/mm^2.	**10**	**CO3**
2 a	Draw stress-strain diagrams and corresponding mechanical models for following materials: i) Perfectly linear elastic material, ii) Rigid-perfectly plastic material, iii) Rigid with strain hardening material and iv) Elastic-perfectly plastic material.	**04**	**CO1**
b	The principal stresses at a point are given as follows: $\sigma_2 = 50$ MPa, $\sigma_3 = 80$ MPa. If the yield stress for the material is 100 MPa, what is the minimum value of σ_1 for yielding to occur as per Tresca criterion and von Mises criterion?	**08**	**CO2**
	OR		
b	The state of stress at a point is give by $\sigma_x = 50$MPa, $\sigma_y = 100$MPa, $\tau_{xy} = -25$MPa. If the yield stress is 100 MPa in simple tension, determine whether there is yielding according to Tresca and von-Mises conditions or not.	**08**	**CO2**
c	A metal yields when the maximum shear stress, τ_{max}, reaches the value of 125 MPa. A material element of this metal is subjected to biaxial state of stress: $\sigma_1 = \sigma_i$, $\sigma_2 = \alpha\,\sigma_i$, $\sigma_3 = 0$ where α is a constant. For what values of (σ_i, α) will yielding occur?	**04**	**CO2**

3	a	A cantilever beam 100mm wide and 120mm deep is 4m long and is subjected to an end load of 6kN. If the stress-strain curve for the beam material is given by $\sigma=7000\epsilon^{0.25}$, determine the maximum stress induced in the beam and its radius of curvature.	02	CO2
	b	A rectangular beam 80mm wide and 100mm deep is simply supported at the ends and is 3m long. It carries a central concentrated load W. Determine the magnitude of W if beam is to yield just at the outermost fibres by taking yield stress of beam material to be equal to 250N/mm^2. Also determine the value of W if the outer shell of the beam is to yield plastically upto a depth of 20mm.	04	CO2
	c	A thick walled cylinder made of steel has an inside diameter of 100mm and has an outside diameter of 200mm. The cylinder is subjected to an internal pressure of 65MPa.		CO2
	i	Find the stress distribution across the cylinder.	06	
	ii	Calculate the increase in inside and outside radii of the cylinder. Take E=2×10^{5}N/mm^2 and ν=0.25.	02	
	iii	Determine the pressure at which the cylinder will start yielding just at the inner radius when yield strength for cylinder material is 250MPa. Assume Tresca's yield criterion.	02	

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End Semester Examination (Summer 2018)
F.Y.M.Tech. Civil Structure Sem- II

Q.P.Code
EB1251

Course Code: CES2081 **Course Name**: PE IV: Pre-stress Concrete Structures

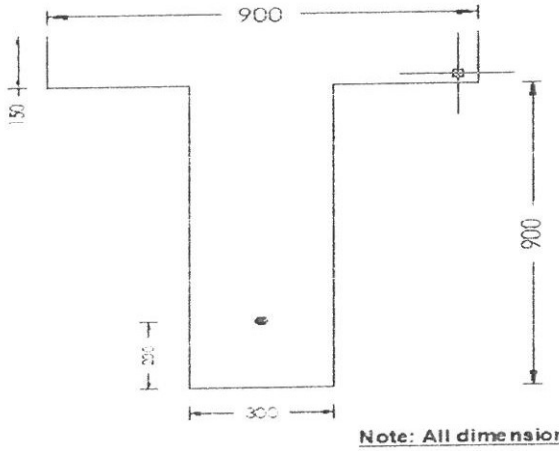
Day & Date: Tue, 08/05/2018
Time : 10.30 am – 12.30 pm Max Marks: 50

Instructions: 1) All questions are compulsory
2) Figures to the right indicate maximum marks
3) Assume suitable data if required and mention it
4) Use of non-programmable calculator is allowed

Q.1		A post tensioned continuous beam consists of two spans each of 20 meters long. The external loading other than the dead load of the beam is 20 kN/m. Design the beam. Select I shape section of the beam.	16	CO2
		OR		
Q.1	(a)	A concrete beam AB of span 12m is post tensioned by a cable which is concentric at supports A and B and has an eccentricity 200mm in the mid third span with a linear variation towards the supports. If the cable is tensioned at the jacking end A, what should be jacking stress in the wires if the stress at B is to be 1000 N/mm^2? Assume the coefficient of friction between the cable duct and concrete as 0.55 and the friction coefficient for the wave effect as 0.0015/m.	8	CO3
	(b)	Enlist losses of pre-tensioning and post-tensioning elements of prestressed concrete. Explain any one of each in detail.	8	CO3
Q.2				
	(a)	Design a free edge water tank of diameter 36 meter to store water to a depth of 5 meter. Assume ultimate stress in steel = 1500 N/mm^2. Stress in steel at transfer = 70% of the ultimate stress. Safe stress in concrete in compression at transfer = 0.5 f_{ck}. Compressive stress in concrete at service condition = 0.1 f_{ck}. Final stress in steel = 0.8 X Stress in steel at transfer. Modular ratio = 5.5. f_{ck} = 45 N/mm^2.	9	CO5

(b) Design a prestressed concrete non cylindrical pipe of internal diameter of 500mm to carry water with a pressure of 1 N/mm^2. The concrete used has 14 N/mm^2 as permissible compressive stress at transfer. Steel wire of 3mm diameter is available and it can be stressed to a level of 1000 N/mm^2. The prestressing losses may be assumed to be 20% and a loss coefficient of 0.8 may be assumed. Barring other loads and their combinations, for water pressure load, the pipe concrete should have a residual compressive stress 0.7 N/mm^2 at service load conditions. Evaluate also the test pressure that the pipe can with stand if concrete can be stressed to a level of 0.7N/mm^2 in tension. For prestressing steel E modulus may be assumed to be 250 kN/m^2 and that of concrete is 35 kN/m^2. 9 CO5

Q.3 Following fig. shows the cross section of a composite beam which consist of a 300mmX900mm precast stem and cast in situ flange 900mmX150mm. The stem is a post tensioned unit with an initial prestressing force of 2500 kN. The effective prestress available after making deduction for losses, is 2200 kN. The dead load moment at mid span due to the weight of the precast section is 250kNm. The dead load moment due to the weight of the flange is 125 kNm. After the hardening of the flange concrete, the composite section has to carry a live load which produce a bending moment of 700kNm. Determine the stress distribution in concrete at the various stages of the loading. 16 CO4



Note: All dimensions are in mm

Fig. 1

K. E. Society's

Rajarambapu Institute of Technology, Rajaramnagar

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End Semester Examination April/May 2018

F. Y. M. Tech. Civil- Structures Sem. II

Q. P. Code
EB 1217

Earthquake Resistant Design of Structures CES 2121

Day & Date : Sat., 05/05/2018

Time : 10.30 am - 12.30 pm Max Marks – 50

Instructions: 1) All questions are compulsory.

2) Use of non programmable calculator is permitted.

3) I. S. 1893 part I and II, SP 16 are permitted.

4) Figures to right indicate full marks.

Q. 1 Solve any two

a) If a building is to be constructed on the slope of a hilly area, explain precautions will have to be exercised during planning of the building to avoid twisting? L2 C5 **09**

b) Identify the various earthquake resistant features that can be introduced in a masonry building to make it earthquake resistant. L3 C5 **09**

c) Explain how to increase the following for a building in an earthquake –prone area:

Period of vibration, Energy dissipation capacity and Ductility. L5 C4 **09**

Q. 2 Elevated cylindrical RCC tank with 100 m^3 capacity has inside diameter of 6m, height of 3.80 m and wall thickness is 250mm, roof of tank consists of RCC slab of 100mm thick and supported on 6 columns of 3000mm diameter and bracing system. The height of base of tank above ground level (**staging height)** is 12m. The base of tank is RCC slab of thickness 300mm. Tank is filled with liquid of specific gravity 1.00. Tank has a supported on hard soil in zone V. Density of RCC is 25.0 kN/m^3. Explain with example detail procedure for Analyse of tank for seismic loads. **L5 C2 16**

Q. 3 Solve any four (04 marks each)

a) Explain application and suitability of base isolation in the structures. L2 C4

b) Explain properties of construction materials for earthquake resistance. L2 C5

c) Explain different retrofitting methods/ techniques used for strengthen RCC structures. Explain with example one technique for retrofitting of RCC column.

L2 C4

d) Explain storey drift. L2 C2

e) Explain various special precautions should be exercised during planning and construction of openings in a masonry wall? L2 C4

----------GOOD LUCK----------