END SEMESTER THEORY EXAM; NOV./DEC.-2018

Programe:	M.Tech. (CE-Structural Engineering)	Year/Semester:	3rd Sem.
Course/Subject:	Application of Numerical Method in Structural Engineering	Duration:	03:00 hrs.
Subject Code:	13120334	Maximum Marks:	100
Roll No.:			

Instructions:-

1. Write your Roll No. on the Question paper.
2. Candidate should ensure that they have been provided correct question paper. Complaint(s) in this regard, if any, should be made within 15 minutes of the commencement of the exam. No complaint(s) will be entertained thereafter.
3. Attempt five questions in all. Question No. 1 is compulsory. Marks are indicated against each question.
5. Attempt at least one question from each unit.

Q1. Attempt all questions:- **(20)**

a) Define finite strip method.

b) What Gauss- Siedal method.

c) Discuss Gauss Jordon method.

d) Discuss about the stiffness matrix with example.

e) Short note on skyline technique.

Q.2 a) Solve by Gauss Elimination Method: **(20)**

$2x + 4y + z = 3$
$3x + 2y - 2z = -2$
$x - y + z = 6$

Q.3 Solve the equation $27x+ 6y- z = 85$, $x+y + 54z = 110$, $6x+ 15y+ 2z =72$ by gauss Jordan method. **(20)**

Q.4 Explain about the membrane analogy using finite difference method for slabs? **(20)**

Q.5 What is the finite difference method explains with suitable example? **(20)**

Q.6 Solve $\int_0^6 \frac{dx}{1+x^2}$ using Trapezodial rule and Simpson's rule. Also compare with exact solution. **(20)**

Q.7 Solve the boundary value problem **(20)**

$Y'' = (1+ X^2) Y, \quad -1<X<1$

$Y(-1) = Y(1) = 1$

Using second and forth order difference methods with h=0.2

Q.8 Are the element stiffness matrix and element flexibility matrix always non-singular? **(20)**

Q.9 Prove that the force response obtained by applying static equilibrium concepts in a statically determinate structure also satisfies compatibility of displacements? **(20)**

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Program:	**M. Tech (CE-Structural Engineering)**	**Year/Semester:**	**3rd Sem.**
Course/Subject:	**Earthquake Resistant Design**	**Duration:**	**03:00 Hrs.**
Subject Code:	**13120337**	**Maximum Marks:**	**100**
Roll No.:			

Instructions:-

1. Write your Roll No. on the Question paper.
2. Candidate should ensure that they have been provided correct question paper. Complaint(s) in this regard, if any, should be made within 15 minutes of the commencement of the exam. No complaint(s) will be entertained thereafter.
3. Attempt five questions in all, Q.1 is compulsory. Parts of a question should be attempted in sequential order. Marks are indicated against each question.
4. Illustrate your answer with diagram wherever required.

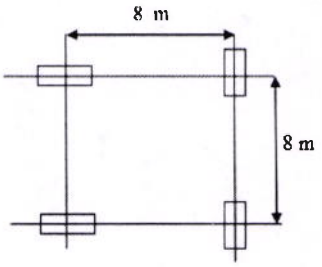
Q.1 a) Derive the motion equation for the forced undamped vibration. **(20)**

b) Derive the motion equation for the free damped vibration

Q.2 a) List the four virtues of good earthquake resistance design and describe any one in detail. **(12)**

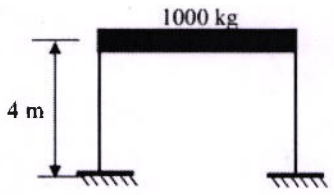
b) List and sketch the earthquake resistance feature of ordinary brick masonry structure. **(8)**

Q.3 For a floor slab shown in the fig., Locate centre of mass and stiffness. Find design eccentricity and torsional moment if 200 kN force acts long Y direction. All columnsare of 300 X 600 mm c/s with same height. Mass is uniformly distributed. **(20)**



Q.4 A SDOF vibrating system is having following parameters. m= 10 kg , k=80 N/m ,C=10 N s /m. Determine(i) Damping Factor (ii) Natural Frequency (iii) Damped frequency (iv)Logarithmic decrement (iv) No.of cycles after which the original amplitude reduces to 25 % . **(20)**

Q.5. The building frame shown in the Fig. is given a 120 mm lateral displacement and released from the rest to vibrate freely. Find the logrithmatic decrement and displacement of the system after 10 cycles and comments on the result. Consider 5% damping. Take EIcolumn =1.2 x 1012 Nmm, EIbeam = ∞. **(20)**



Q.6. a) Explain soft storey? Explain how soft storey problems can be eliminated in the existing buildings. **(12)**

(b) Explain how ductile design is helpful for better earthquake resistance. **(8)**

Q.7 a) What is a response spectra? How it is constructed and compare it with design spectra. **(4)**

b) Explain the Earthquake resistant Design Philosophy. **(4)**

c) Explain vertical and horizontal irregularities in multistoried buildings and their effect on Seismic behavior, of such buildings. **(12)**

Q.8 a) Write short note on structural control **(8)**

b) Describe various strengthening methods for RCC columns and beams through illustrative sketches. **(12)**

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Program:	**M. Tech. (CE-Structural Engineering)**	**Year/Semester:**	**3rd Sem.**
Course/Subject:	**Soil Structure Interaction**	**Duration:**	**03:00 Hrs.**
Course/Subject Code:	**13120339**	**Maximum Marks:**	**100**
Roll No.:			

Instructions:-

1. Write your Roll No. on the Question paper.
2. Candidate should ensure that they have been provided correct question paper. Complaint(s) in this regard, if any, should be made within 15 minutes of the commencement of the exam. No complaint(s) will be entertained thereafter.
3. Attempt five questions in all. Q.1 is compulsory. Attempt other four questions selecting one question from each unit. Parts of a question should be attempted in sequential order. Marks are indicated against each question.
4. Illustrate your answer with diagram wherever required.

Q.1 Write short notes on followings: **(20)**

a) Elastic continuum model
b) Heteni model
c) Visco elastic model
d) Pasternak model

UNIT - I

Q.2 a) Explain the raft parameters affecting conduct pressure. **(10)**

b) Explain the contact distribution below the flexible and rigid pavement. **(10)**

OR

Q. 3 Explain the modulus of subgrade in brief. Explain the allowances for the worst subgrade moisture. How we can apply corrections on small plate size . **(20)**

UNIT - II

Q. 4 a) Explain briefly the latest IRC guidelines for the design of flexible pavements by CBR method. **(10)**

b) A plate load test was conducted on a soaked subgrade during monsoon section using a plate diameter of 30 cm. the load values corresponding to the mean settlement dial readings are given below. Determine the modulus of subgrade reaction for the standard plate. **(10)**

Mean settlement Values (mm)	0.0	0.24	0.52	0.76	1.02	1.23	1.53	1.76
Load values (kg)	0.0	460	900	1180	1360	1480	1590	1640

OR

Q.5 Explain the applications of design of combined footing in detail. **(20)**

UNIT - III

Q. 6 What is pile foundation? Explain the type of piles. Also explain the elasto -plastic analysis of pile foundation. **(20)**

OR

Q.7 Differentiate linear and non-linear load analysis in pile foundation in detail. **(20)**

UNIT - IV

Q.8 Explain the Baker's method for rafts. **(20)**

OR

Q.9 Discuss the method of estimating the load carrying capacity of the group piles by static method in cohesive and non- cohesive soil. **(20)**

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