Sr. No. 101031 Roll No

M.TECH. (CE) – 3rd SEMESTER EXAMINATIONS; JANUARY-2018
(SUB.: ADVANCED RCC DESIGN-II; PAPER CODE: 13120301)

TIME: 03:00 Hrs. **Max. Marks: 100**

Instructions:-

1. Write your Roll no. on the Question paper.
2. Candidate should ensure that they have been provided with the correct question paper. Complaints in this regards, If any, should be made within 15 minutes of the commencement of the exam. No complaint(s) will be entertained thereafter.
3. Attempt Five (05) Questions in all, Question No.-01 is Compulsory. Students are required to attempt Four (04) questions from Q.No.-2 to Q.No.8. Parts of a question should be attempted in sequence order. Marks are indicated against each question.
4. Draw Diagram wherever required.

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

a) Equilibrium Method for Yield Line.
b) Virtual Work Method for Yield Line.
c) Drive expressions for Simply Supported Square Slab for Yield Line.
Explain with suitable diagram.

Q.2. A square slab of side length 4m is simply supported at the ends and carries a survive live load of $3kN/m^3$. Design the slab for yield line. Use M20 concrete and Fe415 steel bar. **(20)**

Q.3. Design an interior panel of flat slab, 6mX6m, for a live load of $7kN/m^2$. Use M20 concrete Fe415 steel. Provide two-way reinforcement. ($k_c = 0.289$; $j_c = 0.904$; $Q = 0.914$). **(20)**

Q.4. **Explain the following:-** **(20)**

a) Drop panel of flat slab and Column head.
b) IS Code: 456 – 2000 Recommendations of Flat Slab.
c) Limitation of Flat slab.

Q.5. The balanced section of a singly reinforced beam is designed for the following permissible stresses:- **(20)**

$C = \sigma_{cb} = 5N/mm^2$, $t = \sigma_{st} = 140N/mm^2$, $m = 18$, $E_s = 2.1X10^5\ N/mm^2$

Determine the final stresses in concrete and steel. Taking into account shrinkage of concrete having a shrinkage coefficient of 0.0004

Q.6. **Explain the following:-** **(20)**

a) What is the difference between creep and shrinkage.
b) What factors influence the creep of concrete.
c) What are the different types of shrinkage.

Q.7. A pipe of 1500mm internal diameter is subjected to a normal water pressure of 12metre of head of water. Design the pipe if it is supported at ground level at its horizontal diameter use HYSD bars. **(20)**

Q.8 Design a pipe of 1500mm internal diameter is passes under a road, and depth of filling over its crown is 1.2m. The maximum live load expected on the road is equivalent to a constructed load of 40kN/m length of the pipe. The unit weight of soil around pipe is $18kN/m^3$ and its angle of suppose 30°. The pipe is supported upto its horizontal diameter. Use HYSD bars **(20)**

****

Sr. No. 101032 Roll No. _____

M.TECH. (CE) – 3rd SEMESTER EXAMINATIONS: JANUARY-2018
(SUB.: DESIGN OF BRIDGES; PAPER CODE: 13120302)

TIME: 03:00 Hrs. **Max. Marks: 100**

Instructions:-

1. Write your Roll no. on the Question paper.
2. Candidate should ensure that they have been provided with the correct question paper. Complaints in this regards, If any, should be made within 15 minutes of the commencement of the exam. No complaint(s) will be entertained thereafter.
3. Attempt Five (05) Questions in all. Parts of a question should be attempted in sequence order. Marks are indicated against each question.
4. Draw Diagram wherever required.

Q.1. a) Give an overview of bridge development from the early wooden bridges to the current prestressed and steel bridges. **(10)**

b) Consider a 12m span simply supported RC slab bridge for traffic in 2-lanes and 1m pedestrian way oneither side.The bridge is located in Kerala. The slab deck rests on wall piers of size 1m x 10m in plan and 8m height from the top of its mat foundation. Use IRC 6 to estimate the design horizontal and vertical seismic coefficient values for the design of bridge. **(10)**

Q.2. a) Explain with suitable sketches the component parts and structural actions of truss bridges, Arch bridges, Cable-stayed bridges and suspension bridges. **(10)**

b) What are the factors to be considered in the selection of a suitable bridge site? **(10)**

Q.3. Design a box culvert having inside dimensions 4m × 4m for the following data. Dead load = 12 kN/m^2, Live load = 46 kN/m^2, Density of soil=18 kN/m^3,Use M20 concrete & Fe 415 steel. **(20)**

Q.4. Design the longitudinal girder of a T-beam and slab bridge for the following data. Effective span 18m,Carriage way width 7.5m, Kerb 600 mm on either side. Provide three longitudinal beams and five cross beams. Loading IRC class AA tracked vehicle. Adopt M25 Fe415 bars. Also provide the reinforcement details. **(20)**

Q.5. A reinforced concrete simply supported slab is required for the deck of a road bridge having the following data:- **(20)**

a) clear span = 5.5 m.
b) width of carriage way = 7.5 m.
c) foot path on either side = 1m. wide.
d) Materials = M20 grade concrete and Fe 415 steel.
e) Type of loading IRC class AA. Design the deck slab. Show the reinforcement details

Q.6. a) Explain the different types of bridge maintenance. **(10)**

b) Discuss some important criteria regarding aesthetical design of bridges. **(10)**

Q.7. Design the intermediate beam of a prestressed concrete bridge of clear span 25m. Assume the roadway width as 7.5 m., loading IRC class 70R tracked vehicle. **(20)**

Q.8. a) Describe with sketches typical methods of construction of steel bridges. **(10)**

b) Explain with case study how the bridge testing is carried out to find out the load carrying capacity. **(10)**

****

Sr. No. 101033 Roll No

M.TECH. (CE) – 3rd SEMESTER EXAMINATIONS; JANUARY-2018
(SUB.: ANALYSIS OF HIGH RISE BUILDING; PAPER CODE: 13120303)

TIME: 03:00 Hrs. **Max. Marks: 100**

Instructions:-

1. Write your Roll no. on the Question paper.
2. Candidate should ensure that they have been provided with the correct question paper. Complaints in this regards, If any, should be made within 15 minutes of the commencement of the exam. No complaint(s) will be entertained thereafter.
3. Attempt Five (05) Questions in all, Question No.-01 is Compulsory. Students are required to attempt Four (04) questions from Q.No.-2 to Q.No.8. Parts of a question should be attempted in sequence order. Marks are indicated against each question.
4. Draw Diagram wherever required.

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

a) Columns Brackets.
b) Rafter Bracing.
c) Gable Columns.
d) Gable Rafter.

Explain with suitable diagram.

Q.2. For a hall 10m wide and 20m long, portal frames are to be provided at 4 centre to centre, dividing the hall into five equal parts. The portals are fixed at the base, and its height uptocentre of horizontal member is 6.5m. Design the roof and portal frame, if it carries a live load of 1.5kN/m^2. Assume the safe bearing capacity of soil as 120 kN/m^2. Use M15 concrete and take its unit weight as 24000 N/ m^3. (σ_{st} = 140 N/mm^2; σ_{cbc}= 5 N /mm^2; m = 19 , j = 0.865; k = 0.405; Q = 0.875). **(20)**

Q.3. **The column of a portal frame are hinged at the base. Design the hinge for the following data:-** **(20)**

a) Axial load in the column = 200 kN.
b) Horizontal shear at the base = 60kN.
c) Size of the column = 500 x 300mm.

Q.4. a) Explain the portal method for analyzing a building frame subjected to horizontal forces. **(10)**
b) Explain the cantilever method for analyzing a building frame subjected to horizontal forces. **(10)**

Q.5. What do you understand by a substitute frame.How do you select it. Discuss in brief the method of analysis. **(20)**

Q.6. **Explain the following terms with suitable diagram:-** **(20)**

a) Vertical Slip Form Construction.
b) Horizontal Slip Form Construction.
c) Tapered Slip Form Construction.
d) 3-Jump Form

Q.7. a) What do you understand by Slip Form Construction? Application of Slip Form Construction. **(10)**
b) What are the Advantages and disadvantages of slip form construction? **(10)**

Q.8. **Explain the following terms with suitable diagram:-** **(20)**

a) Knee braced bent with columns hinged at the base.
b) Knee braced bent with columns Fixed at the base.
c) Knee braced bent with columns partially fixed at the base.

****

Sr. No. 101034 Roll No_____

M.TECH. (CE) – 3rd SEMESTER EXAMINATIONS; JANUARY-2018
(SUB.: EARTHQUAKE ENGINEERING; PAPER CODE: 13120308)

TIME: 03:00 Hrs. **Max. Marks: 100**

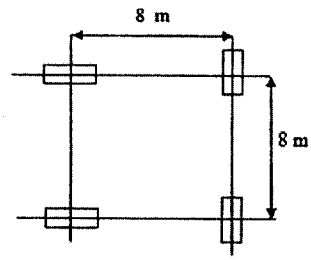
Instructions:-

1. Write your Roll no. on the Question paper.
2. Candidate should ensure that they have been provided with the correct question paper. Complaints in this regards, If any, should be made within 15 minutes of the commencement of the exam. No complaint(s) will be entertained thereafter.
3. Attempt Five (05) Questions in all, Question No.-01 is Compulsory. Students are required to attempt Four (04) questions from Q.No.-2 to Q.No.8. Parts of a question should be attempted in sequence order. Marks are indicated against each question.
4. Draw Diagram wherever required.

Q.1. a) Derive the motion equation for the forced undamped vibration. **(10)**
b) Derive the motion equation for the free damped vibration. **(10)**

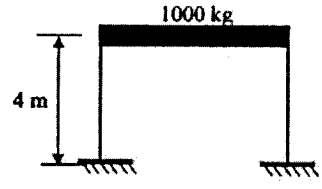
Q.2. a) List the four virtues of good earthquake resistance design and describe any one in detail. **(12)**
b) List and sketch the earthquake resistance feature of ordinary brick masonry structure. **(8)**

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)**



P.T.O.

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)

****