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Total No. of Pages :3

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B.E. (Civil Engineering) (Semester - VII) (Old)

Examination, November - 2017

EARTHQUAKE ENGINEERING

Sub. Code: 47903

Day and Date :Wednesday, 15 - 11- 2017

Total Marks : 100

Time :2.30 p.m. to 5.30 p.m.

- Instructions :
- 1) Attempt any three questions from each section.
  - 2) Figures to the right indicate full marks.
  - 3) Assume suitable data whenever necessary.
  - 4) Use of non-programmable calculator and I.S. 1893: 2002 (Part I) are allowed.

SECTION-I

- Q1) a) What are causes of earthquake? Explain in brief plate tectonic theory. [8]  
b) Classify and describe with suitable sketches, different types of seismic waves generated by an earthquake. [8]
- Q2) a) Define Logarithmic decrement, how it is measured and derive the equation of Logarithmic decrement. [7]  
b) The building frame shown in the Fig.1 is given a 100 mm lateral displacement and released from the rest to vibrate freely. Find the logarithmic decrement and displacement of the system after 12 cycles and comments on the result. Consider 10% damping. Take  $EI_{\text{column}} = 1.1 \times 10^{12} \text{ Nmm}$ . [9]

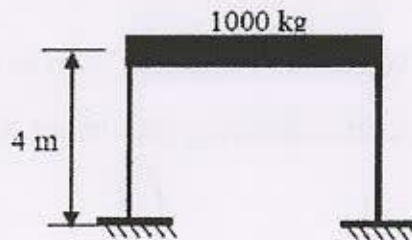


Fig. 1



P.T.O.

- Q3) a)** Explain in details Force Transmission Ratio. [05]
- b) A SDOF system consists of 5 m high column of 600 mm diameter which supports the heavy mass of 10500 kg at its top. The system is subjected to a harmonic force of  $1800 \sin 50t$  N. Consider 20% damping and  $E = 2 \times 10^5$ . Calculate the maximum dynamic amplitude and also state whether the system will have resonance or not? [11]
- Q4)** Calculate the base shear for a five storey hospital building having special moment resisting frame (SMRF) located in Pune on medium soil with following data using seismic coefficient method. [18]
- a) No. of bay in x and y-direction = 4
  - b) Width of each bay = 5m
  - c) Thickness of slab = 150 mm
  - d) Storey height = 3.2 m
  - e) Size of beam and column = 300 mm  $\times$  450 mm
  - f) Amount of damping = 5% of critical damping
  - g) Live load = 4kN/m<sup>2</sup>
- Assume any additional data if required and neglect the weight of the infill wall panels.

### SECTION-II

- Q5) a)** Explain earthquake design philosophy for building. [8]
- b) Explain soft storey? Explain how soft storey problems can be eliminated in the existing buildings. [8]
- Q6) a)** Explain how "ductility of building" can be effectively designed. [8]
- b) What are the ductile detailing provisions for column? Explain with neat sketches. [8]

- Q7) a) What points should be kept in mind while designing earthquake resistant brick masonry structure? [8]
- b) Discuss in detail the advantage of horizontal bands and vertical reinforcement in the masonry buildings. [8]

Q8) Write a short note (Any three): [18]

- a) Stud Wall Construction.
- b) Strong column and weak beam.
- c) Effect of soft storey of RC structure.
- d) Jacketing of column.

EEE



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**B.E. (Civil) (Semester-VII) (Revised)**  
**Examination, November - 2017**  
**SOLID WASTE MANAGEMENT (Elective-I)**  
**Sub. Code : 67569**

Day and Date : Thursday, 23-11-2017

Total Marks : 100

Time : 2.30 p.m. to 5.30 p.m.

- Instructions :**
- 1) All questions are compulsory.
  - 2) Figures to the right indicate full marks.
  - 3) Make assumptions wherever necessary.
  - 4) Use of non-programmable calculator is allowed.

**SECTION-I**

**Q1) Answer any two of the following:** **[2×8=16]**

- a) What is Solid Waste and Solid Waste Management? Write the objectives of SWM.
- b) State the composition of MSW. Describe the compositions.
- c) Write note on Biomedical Waste Management.

**Q2) Answer any two of the following:** **[2×9=18]**

- a) Explain with the help of flow diagram, the functional elements of Municipal Solid Waste Management.
- b) Explain the methods of solid waste collection with a neat sketch.
- c) Explain in detail with help of figure the different types of Transfer Station.

**Q3) Answer any two of the following:** **[2×8=16]**

- a) List out the different equipment used for processing solid waste and explain any one with neat sketch.
- b) What is MRF? Explain the processes for MSW at these facilities with flow diagram.
- c) Explain with the figure the different types of air classifiers methods.

**P.T.O.**



SECTION-II

Q4) Answer any two of the following:

[2×9=18]

- a) What is Sanitary landfilling? Write the site selection criteria for sanitary landfilling.
- b) Draw the cross section of sanitary landfill and explain the essential components.
- c) Identify the adverse effects of a landfill leachate and its appropriate control measures.

Q5) Answer any two of the following:

[2×8=16]

- a) What is composting? Explain composting process of bio degradable MSW.
- b) Explain mechanical composting plant with flow diagram.
- c) Explain the different factors affecting composting.

Q6) Answer any two of the following:

[2×8=16]

- a) Explain the working of an incinerator with a neat sketch.
- b) Write the air pollution problem associated with incineration system and its control techniques.
- c) Describe pyrolysis and its products.





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Total No. of Pages : 2

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**B.E. (Civil) (Semester-VII) Examination, November - 2017**  
**GROUND IMPROVEMENT TECHNIQUES (Elective-I)**  
**Sub. Code : 67571**

Day and Date : Thursday, 23-11-2017

Total Marks : 100

Time : 2.30 p.m. to 5.30 p.m.

- Instructions :
- 1) Que. No. 1 from section-I and Que. No. 5 from section-II are compulsory.
  - 2) Solve any two other questions from each of the section.
  - 3) Figures to the right indicates full marks.

**SECTION-I**

**Q1) Answer the following:** **[4×5=20]**

- a) Explain the various types of vertical drains used in ground improvement.
- b) What is mean by dynamic consolidation.
- c) Explain use of stone column as ground improvement method.
- d) Enlist various ground improvement technique according to their suitability.

**Q2) a) How do vertical drains improve the functioning of pre-loading? Explain with neat sketch.** **[8]**

**b) Explain various components of ground Anchor.** **[7]**

**Q3) a) Explain design procedure of stone column.** **[8]**

**b) Explain construction sequence of soil nailing.** **[7]**

**Q4) Write a short note on** **[3×5]**

- a) Classification of ground improvement technique
- b) Soil nailing
- c) Rock Anchor in granular soil

**P.T.O.**



**SECTION-II****Q5) Answer the following:****[4×5=20]**

- a) Enlist various factor affecting the soil stabilization.
- b) Explain the earth reinforcement mechanism.
- c) Write down the various application of earth reinforcement.
- d) Enlist different types of geosynthetics.

**Q6) a) Compare and enlist the various method of soil stabilization. [8]****b) Explain the various application of geosynthetics with respect to**

- i) reinforcement                      ii) separator
- iii) filter                                iv) drainage                      [7]

**Q7) a) Explain the stress-strain relationship of reinforced soil. [8]****b) Explain the various types of grout used in ground improvement. [7]****Q8) Write a short note on:****[5×3]**

- a) Function of geosynthetics
- b) Fly-ash soil stabilization
- c) Selection of geosynthetics





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**B.E. (Civil) (Part - IV) (Semester - VIII)**  
**Examination, November - 2017**  
**DESIGN OF CONCRETE STRUCTURES - II**  
**Sub. Code : 67748**

Day and Date : Wednesday, 1 - 11 - 2017

Total Marks : 100

Time : 10.00 a.m. to 1.00 p.m.

- Instructions :
- 1) Attempt any three questions from each section.
  - 2) Figures to the right indicate full marks.
  - 3) Assume suitable data wherever necessary and mention it clearly.
  - 4) Use of non programmable calculator is allowed.
  - 5) Use of relevant IS Codes are allowed.

**SECTION - I**

**Q1)** Design rectangular beam for limit state of collapse in torsion for following data. [16]

Size of beam =  $400 \times 700\text{mm}$ , over all

Factored Shear force = 95 KN

Factored Bending moment = 180 KN.m

Factored Torsion Moment = 55 KN.m

Effective cover = 50mm

Use M20 and Fe 415

**Q2)** A RCC beam ABCD spanning over four supports carries a live load of 12KN/m and dead load from walls 300mm, 2.8 high. If M20 grade concrete and Fe 415 grade steel is to be used. Design the continuous beam using IS-456 - 2000 provision. Span AB = BC = CD = 6m Take unit weight brick wall 19KN/m<sup>3</sup>. Draw a sketch showing reinforcement details. [16]

**Q3)** Design a square water tank resting on ground having dimensions  $4\text{m} \times 4\text{m}$  and height of water is 3m. Assume free board of 0.2m. Use M20 and Fe 415 grades. [16]

P.T.O.





- Q4) a) Write a note on balanced, under reinforced and over reinforced section as per WSM. [9]  
 b) Explain the concept of moment of redistribution. [9]

### SECTION - II

- Q5) a) Explain in details three concepts of pre-stress concrete section in analysis. [8]  
 b) Explain systems of pre-stressing with figures. [8]

- Q6) A pre-stressed concrete beam of rectangular section  $300\text{mm} \times 600\text{mm}$  has a span of 10m. The effective pre-stressing force is 980KN at constant eccentricity of 120mm. The dead load of beam is 4.5KN/m and the beam has to carry a live load of 7.5KN/m [16]

Determine the extreme stresses,

- a) At the end section  
 b) At the midsection without action of live load  
 c) At mid section with action of live load.

- Q7) A post tensioned pre-stressed concrete beam of 16m span is subjected to an initial pre-stress of 1458KN. The profile of the cable is parabolic with the maximum eccentricity of 520mm at the center of span. [16]

$$A = 2.42 \times 10^5 \text{mm}^2, I = 5.30 \times 10^{10} \text{mm}^4, A_s = 1386 \text{mm}^2,$$

$$E_s = 2.1 \times 10^5 \text{N/mm}^2, E_c = 3.82 \times 10^4 \text{N/mm}^2$$

$$\mu = 0.25, k = 0.0015/\text{m}, \text{anchorage slip} = 2.5\text{mm}, \text{creep coefficient} = 1.5, \alpha = 0.13$$

Determine the following losses in pre-stress,

- a) Elastic shortening.  
 b) Shrinkage in concrete.  
 c) Creep in concrete.  
 d) Slip in anchorage.  
 e) Frictional loss.

**Q8)** Design a pre-tensioned concrete rectangular section for the following details

Effective span of beam = 12m.

Live load of intensity = 30 kN/m.

Concrete grade = M 35

Ultimate stresses tendon = 1450 N/mm<sup>2</sup>

Loss of pre-stress = 20%

Assume Safe stress is 0.6 times Ultimate stress in tendon.

Permissible stress in concrete at transfer stage is  $0.5 \sigma_{ck}$

Permissible stress in concrete at working stage is  $0.4 \sigma_{ck}$

Permissible tensile stress in concrete at transfer and working stage is 1.2 N/mm<sup>2</sup>

**[18]**





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**B.E. (Civil Engineering) (Semester - VIII)**  
**Examination, November - 2017**  
**STRUCTURAL DESIGN OF FOUNDATION AND**  
**RETAINING STRUCTURES (Elective - II)**  
**Sub. Code: 67753**

Day and Date :Monday, 06 - 11- 2017

Total Marks : 100

Time :10.00 a.m. to 1.00 p.m.

- Instructions :**
- 1) Solve any two questions from each section.
  - 2) Figures to the right indicate full marks.
  - 3) Use of IS 456- 2000 is allowed.
  - 4) Assume suitable data if necessary and mention it clearly.
  - 5) Use of non-programmable calculator is allowed.

**SECTION-I**

- Q1)** Two columns A and B 5 m apart between centres carry loads 840 kN and 1200 kN. Design a 2 m wide combined rectangular footing for the columns. The footing shall consist of a central longitudinal beam with cantilevering slabs on either side. Each column is 400 mm  $\times$  400mm. The safe bearing capacity of soil is 150 kN/m<sup>2</sup>. Use M 20 grade concrete and Fe 415 steel. **[25]**
- Q2)** A column carrying a load of 2500 kN has to be supported on 4 piles each of size 300 mm  $\times$  300 mm. The piles are spaced at 1.00 m centres as shown in figure.1. The column size is 600 mm  $\times$  600 mm. Design the pile cap. Use M 20 grade concrete and Fe 415 steel. **[25]**

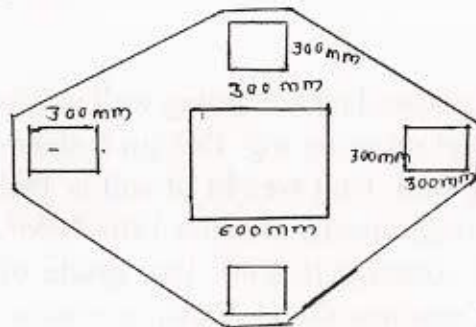


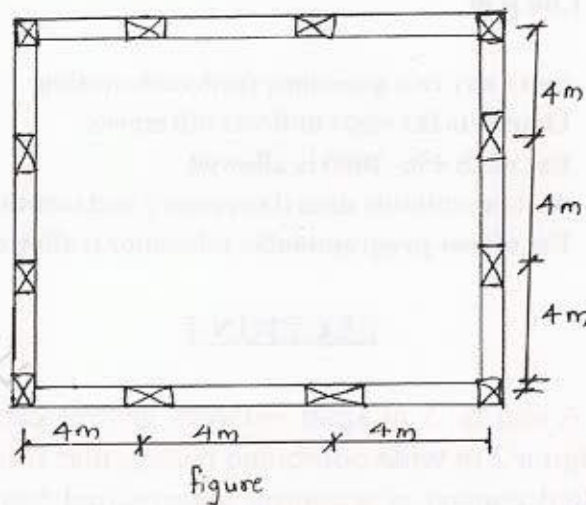
Fig. 1



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**Q3)** Design a suitable continuous raft foundation connecting the columns of a building  $12\text{ m} \times 12\text{ m}$  shown in figure to suit the following data. [25]

- Spacing of column =  $4\text{ m C/C}$
- Service load transmitted =  $500\text{ kN}$  on each column.
- Size of column =  $300\text{ mm} \times 300\text{ mm}$ .
- Safe bearing capacity =  $150\text{ kN/m}^2$ .
- M 20 concrete and Fe 415 steel.



### SECTION-II

**Q4) a)** Draw neat sketch of well foundation and explain function of each component part in detail. [12]

b) Enlist different types of well foundation explain each in detail with neat sketch. [13]

**Q5)** A stem of cantilever retaining wall is  $3.8\text{ m}$  tall, The cantilever retaining wall retains soil up to its top. Design a stem, toe and heel slab of a cantilever retaining wall. Unit weight of soil is  $19\text{ kN/m}^3$ . The angle of repose is  $30^\circ$ . Safe bearing capacity of soil is  $180\text{ kN/m}^2$ . The coefficient of friction between soil and concrete is  $0.60$ . Use grade of concrete  $M_{20}$  and grade of steel Fe 415. Draw neat sketch showing reinforcement details of cantilever retaining wall. [25]



- Q6) a) Explain breakwater and its application? Draw a neat sketch and explain vertical wall break water. [12]
- b) Design armor of rubble mound breakwater if depth of water is 17.0m. Wind velocity is 165Km/Hour. Fetch of wave is 260KM. Allowable bearing pressure on rock is 800KN/M<sup>2</sup>. [13]

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- b) Differentiate between free hold property and lease hold property. [5]  
c) Write the significance of sinking fund and derive its expression. [5]

Q8) Write short note on (any three): [18]

- a) Building lease and occupational lease.  
b) Valuer and his duties.  
c) Different types of values.  
d) Arbitration.

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**B.E. (Civil) (Semester - VII) (New Course)**  
**Examination, November - 2017**  
**QUANTITY SURVEYING & VALUATION**  
**Sub. Code: 67560**

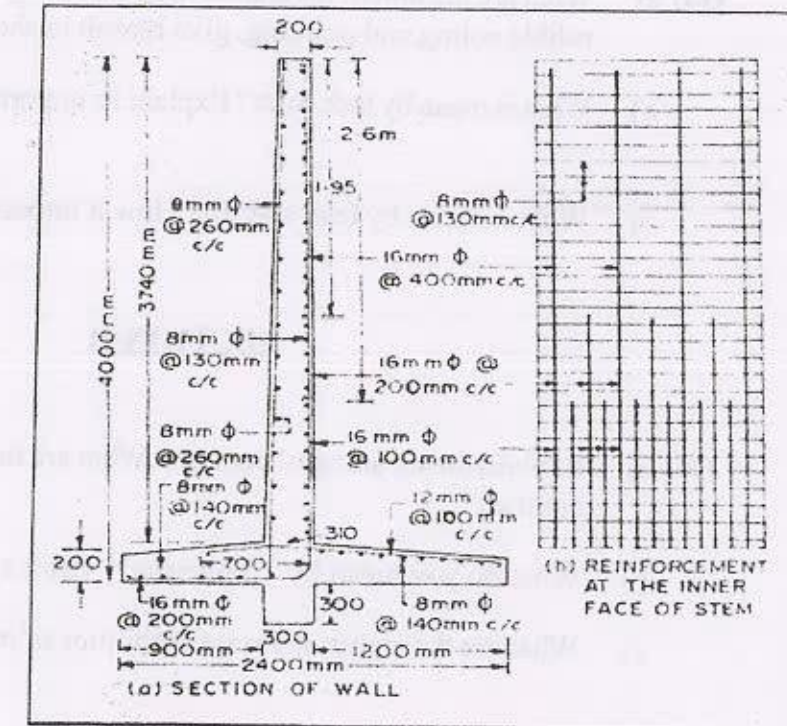
Day and Date : Wednesday, 15 - 11- 2017  
Time : 2.30 p.m. to 6.30 p.m.

Total Marks : 100

- Instructions : 1) Q.No. 1 is compulsory.  
2) Attempt any two questions from remaining questions of section I.  
3) Attempt any three questions from section II.  
4) Assume any other additional data if required and state it clearly.

**SECTION-I**

Q1) Work out the quantities of below retaining wall 50m in length as stated. [20]



P.T.O.





- a) Calculate concrete quantity in standard format.
- b) Prepare a BBS of given figure in standard format.

Q2) a) Write different types of estimate and state various items to be included in it. [5]

- b) What is DSR? Prepare analysis of rate for a RCC isolated box footing of area 2.5Sq.M, and 3.1Sq.M each for a concrete depth 350mm. [10]

Q3) a) Which are the various extra charges taken in to account for preparing detailed estimate and why? Explain in detail. [8]

- b) Write unit of measurement of any three civil engineering items. Write mode of measurement for excavation and concrete. [7]

Q4) a) What are the unit of measurement for skirting, door handle, steel sections, rubble soling and pointing, give reason in short. [5]

- b) What is mean by task work? Explain its importance with suitable example. [5]

- c) What is mean by lead and lift? How it impacts the cost? [5]

### SECTION-II

Q5) a) Explain the meaning of contract. What are the reasons of for rejection of contract? [7]

- b) What do you mean by "Tendering"? Draft a sample tender notice. [5]

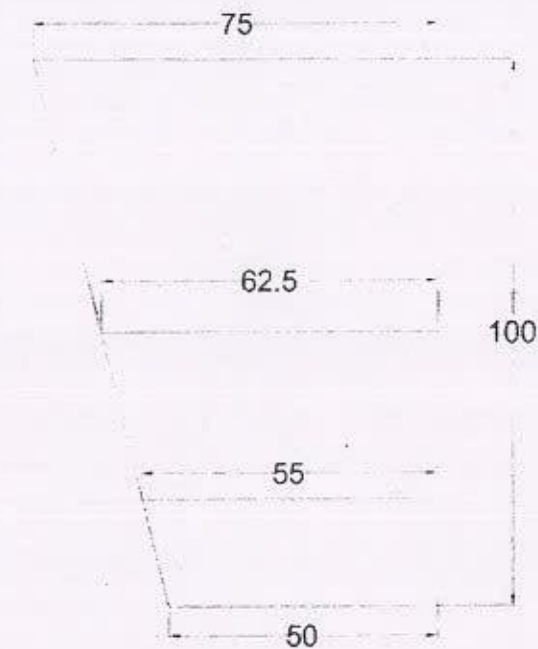
- c) What are the rights and responsibilities of parties of contract. [5]

Q6) a) Explain valuation by development method. [6]

- b) A plot shown in figure is to be valued according to the following details: [10]

- i) Front width is 50m
- ii) Rear width is 75m
- iii) Initial depth is 20m
- iv) Market rate of land in the same locality is Rs. 375psm.

Use belting method of valuation.



Q7) a) A plate compactor was purchased at Rs. 80,000/-. Assume salvage value to be 10% after 8 years, Calculate depreciation for every year by following methods: [6]

- i) Straight line method
- ii) Constant percentage method.



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**B.E. (Civil) (Semester-VII) (Revised) Examination, November - 2017**  
**PROJECT MANAGEMENT AND CONSTRUCTION EQUIPMENT**  
**Sub. Code : 67561**

Day and Date : Tuesday, 21 - 11 - 2017

Total Marks : 100

Time : 2.30 p.m. to 5.30 p.m.

- Instructions : 1) Attempt any THREE questions from each Section.  
 2) Figures to the right indicate full marks.

**SECTION-I**

- Q1) a) Explain the role of various agencies involved in a construction project. [8]  
 b) A project consists of following activities with their duration in days. [9]

Activity	1-2	1-3	1-4	2-5	3-6	4-5	4-6	4-7	5-7	6-7
Duration (days)	6	3	4	0	4	12	10	8	5	6

Draw the network. Find out critical path and project duration.

Following conditions exists at the end of 10<sup>th</sup> day,

- Activities 1-2, 1-3, 1-4 have been completed as per schedule.
- Activities 4-5, 4-6, 3-6 are in progress and will require 6, 6 and 1 more days for its completion, respectively.
- Other activities have not been started and their duration holds good except activity 5-7 which will require only 3 days instead of 5 days as planned originally.

Update the network.



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- 2) a) Explain the concept of Normal and Beta Distribution in P.E.R.T. [8]
- b) With the information given in the table draw the network for a construction project. Determine the critical path and its standard deviation. Find Probability of completion of project in 40 days. (For  $Z = 1.7$ , Pr. = 95.54%; For  $Z = 1.8$ , Pr. = 96.41%) [9]

Activity	Optimistic time	Most likely time	Pessimistic time
1-2	2	5	8
2-3	8	11	20
3-4	0	0	0
2-4	4	7	16
2-5	4	9	20
4-6	7	10	13
5-6	3	7	17
3-7	3	5	13
6-7	2	3	10
7-8	2	4	6

- 3) a) Explain various safety equipment used on construction sites. [8]
- b) What are the common risks on construction projects? How will you identify these risks? [9]

- 4) Write notes on any FOUR. [16]
- Objectives of Project Management.
  - Milestone Chart.
  - Resource Allocation.
  - Safety Policy.
  - Safety Training.

## SF-30

### SECTION-II

- 5) a) Explain the construction and operation of Bulldozer with neat sketch. [8]
- b) Explain working of Scraper with neat sketch. [8]
- 6) a) Explain the construction and working of 'Clamshell'. [8]
- b) Enlist various types of compacting equipment. Explain any ONE with sketch. [9]
- 7) a) Explain the 'safety measures' in blasting operations. [8]
- b) Explain in detail 'Well Point System' of dewatering with neat sketches. [9]
- 8) Write notes on any FOUR. [16]
- Mechanical v/s Manual Construction.
  - Use of Tractors in construction.
  - Tippers.
  - Detonators.
  - Necessity of drainage in excavations.

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Seat  
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B.E. (Civil Engineering) (Semester - VII)

Examination, November - 2017

EARTHQUAKE ENGINEERING (New)

Sub. Code : 67559

Day and Date : Monday, 13-11-2017

Total Marks : 100

Time : 2.30 p.m. to 5.30 p.m.

- Instructions :
- 1) Figures to the right indicate full marks.
  - 2) Assume any suitable data whenever necessary.
  - 3) Use of non-programmable calculator and I.S. 1893: 2002 (Part I) are allowed.

SECTION - I

- Q1) a) What is mean by plate boundaries? Explain in details. [8]  
 b) Classify and describe with suitable sketches, different types of waves generated by an earthquake? [8]
- Q2) a) Derive the equation of motion and its solution for free damped vibration system. [8]  
 b) Find the natural frequency and natural period for the building frame shown in the fig. 1. During test the frame is given 40 mm initial lateral displacement and released from the rest to vibrate freely. Find the displacement after 4 seconds and number of cycles when amplitude reduced to 1/20 of maximum. Consider 10% damping. Take  $EI_{\text{Column}} = 1.5 \times 10^{12} \text{ N.mm}^2$ ,  $EI_{\text{Beam}} = \infty$ . [10]

OR

- b) A SDOF system consists of 5 m high column of 450 mm diameter which supports the heavy mass of 20 tonne at its top. The system is subjected to a harmonic force of  $200 \sin 40t$  kN. Consider 20% damping &  $E = 2.1 \times 10^5 \text{ N/mm}^2$ . Calculate the maximum dynamic amplitude. Also, state whether system will have resonance or not? [10]

P.T.O.





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Q3) Calculate base shear in the critical direction only for BSNL office in Pune with following data by seismic coefficient method. [16]

- a) No. of storey = 4
- b) No. of bay in x direction = 3
- c) No. of bay in y direction = 1
- d) storey height = 3 m
- e) Width of each bay = 5 m
- f) Total DL on roof =  $12 \text{ kN/m}^2$
- g) Total DL on floor =  $10 \text{ kN/m}^2$
- h) LL =  $4 \text{ kN/m}^2$ ,
- i) Thickness of slab = 120 mm

All columns having their longer side in X direction. Neglect weight of infill walls. Assume suitable data if required. Write all your assumptions & clauses of IS 1893 (2002). Building is provided with additional viscous dampers which will increase damping by 10%.

### SECTION - II

Q4) a) Explain ductile detailing of beam as per IS 13920: 1993. Also give limitation of this code. [10]

b) Explain four virtue of good earthquake resistant design. [8]

OR

b) Explain soft storey & discuss its performance of soft storey building in past earthquakes. How will you avoid soft storey? [8]

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Q5) a) Define the shear wall and its classification? Describe the structural behavior of shear wall? [8]

b) Draw the detailed sketch of [8]

- i) Different ways of beam jacketing as IS code and.
- ii) Different ways of columns as per IS code.

Q6) a) Explain in details concept of Friction Pendulum Bearings? [8]

b) Explain Tuned Liquid Dampers with its working principal? [8]

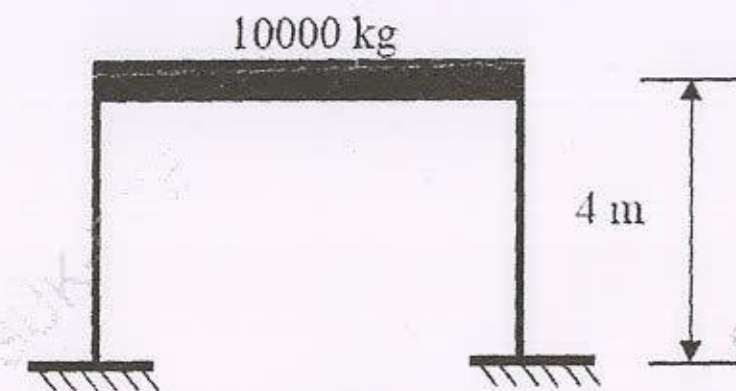


Fig 1.

