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R18

Course Code: A30123



CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

B.Tech VI Semester Supplementary Examinations December-2022

Course Name: DESIGN & DRAWING OF STEEL STRUCTURES
(Civil Engineering)

Date: 05.12.2022 FN

Time: 3 hours

Max.Marks: 70

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

Each question carries TWO marks.

10x2=20M

- | | |
|---|-----|
| 1. List the types of connections in steel structures. | 2 M |
| 2. Write the equation for calculating the effective throat thickness of weld. | 2 M |
| 3. Classify the modes of failure in tension members. | 2 M |
| 4. State the purpose of column base. | 2 M |
| 5. Define shape factor. | 2 M |
| 6. What is meant by yield moment? | 2 M |
| 7. Classify simple beam connections. | 2 M |
| 8. Define unstiffened seated connections. | 2 M |
| 9. What are the different types of stiffeners provided in plate girder? | 2 M |
| 10. Write short notes on web splice. | 2 M |

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). A tie member 75mm x 8mm connected to a 10mm thick gusset plate is to transmit a load of 90kN. Design the fillet weld and calculate the necessary overlap. Assume site welding and sketch the connection details. 10M

OR

11. B). Find the safe load and efficiency of a double cover butt joint. The main plates are 12mm thick connected by 18mm diameter bolts at a pitch of 100mm. Design the cover plate also. What is the percentage reduction in the efficiency of the joint if the plates are lap jointed? 10M

12. A). A tension member consists of two angles 80mm x 10mm x 6mm bolted to opposite sides of 12mm thick gusset plate using single row of 5 nos. of 20mm diameter bolts at a distance of 35mm from toe of the angle. Take pitch as 50mm and end distance as 40mm. The length of the member is 4m. Use Fe410 grade steel. Determine the maximum load that the member can carry. What will be the load carrying capacity if the angles are connected on the same side of the gusset? 10M

OR

12. B). Design a built-up column 6m long to carry a load of 400kN. The column is restrained in position but not in direction at both the ends. Provide single angle lacing system with bolted connections. 10M

(P.T.O.)

13. A). A built up I-section has the following dimensions: Flanges 250mm x 6mm, web 300mm x 3mm. Calculate the plastic section modulus and plastic moment capacity of the section. Also find the shape factor. 10M

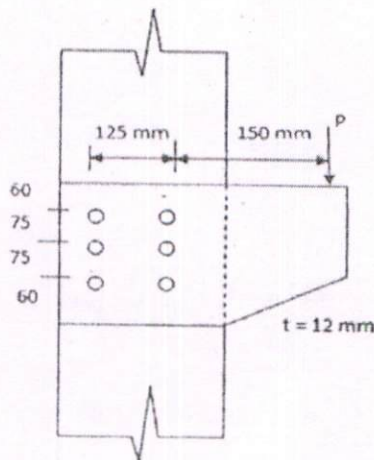
OR

13. B). Design a laterally supported beam of effective span 6 m for the following data. 10M
- Grade of steel: Fe 410
 - Maximum bending moment: $M = 150\text{KNm}$
 - Maximum shear force : $V = 210\text{KN}$.

14. A). An ISMB 400 transfers an end reaction of 160kN to the flange of an ISHB 300 @577N/m. Estimate the loads and design an unstiffened welded seat connection. Assume any other data required. Sketch the connection details. 10M

OR

14. B). A bracket connection is shown in fig. With 24mm diameter bolts of grade 4.6 and plate of grade Fe410 steel. Determine the safe load that could be transferred through the connection. 10M



15. A). A welded plate girder of span 25m is laterally restrained throughout its length. It has to carry a load of 80kN/m over the whole span besides its weight. Design the girder without intermediate stiffness. 10M

OR

15. B). A plate girder of span 15m is made-up of web plates of 1600mm x 8mm flange angles 150mm x 115mm x 10mm and two flange plates 480mm x 10mm it carries a uniformly distributed load of 100kN/m including its own weight. Identify the suitable design and sketch the web splices at 5m from one end. 10M

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Course Code: A30124



CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

B.Tech VI Semester Supplementary Examinations December-2022

Course Name: **FOUNDATION ENGINEERING**

(Civil Engineering)

Date: 07.12.2022 FN

Time: 3 hours

Max.Marks: 70

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

Each question carries TWO marks.

10x2=20M

- | | |
|--|-----|
| 1. List various methods of drilling in hard stratum. | 2 M |
| 2. Name few geophysical investigation techniques. | 2 M |
| 3. Write brief notes on Taylor's stability number. | 2 M |
| 4. What is stability number utility in the analysis of stability of slopes? | 2 M |
| 5. Write the assumptions of Coulombs Theory. | 2 M |
| 6. Culmann's graphical method is used for what? | 2 M |
| 7. What is difference between ultimate bearing capacity and Safe bearing capacity? | 2 M |
| 8. What are the various types of settlements in foundations? | 2 M |
| 9. List piles based on their type of application. | 2 M |
| 10. How well foundations are classified? | 2 M |

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). A SPT was performed at a depth of 20m in a dense sand deposit with a unit weight of 17.5kN/m². If the observed N-value is 38, what is the N- value corrected for overburden? 10M

OR

11. B). Under what circumstances are geophysical methods used in exploration? Write a note on wash borings with neat sketch. 10M

12. A). An excavation is made with a vertical face in a clay soil which has $C_u = 50 \text{ kN/m}^2$, unit weight of soil is 18 kN/m^3 . Determine maximum depth so that excavation is stable. Stability number in this case is 0.261. 10M

OR

12. B). It is proposed to construct a highway embankment using a $c-\phi$ soil having $c = 25 \text{ kPa}$, $\phi = 20^\circ$, $\sigma = 17 \text{ kN/m}^3$. Determine the critical height up to which the embankment can be built with an inclination of 30° with a factor of safety of 1.50. Given the Taylor's stability number for these conditions as 0.0737. 10M

13. A). A gravity retaining wall retains 12 m of a backfill, $\gamma = 17.7 \text{ kN/m}^3$, $\phi = 25^\circ$ with a uniform horizontal surface. Assume the wall interface to be vertical, determine the magnitude and point of application of the total active pressure. If the water table is a height of 6m, how far do the magnitude and the point of application of active pressure change? 10M

OR

13. B). Derive the expression for coefficient of Active earth pressure coefficients of cohesive backfill. 10M

(P.T.O.)

14. A). A strip footing, 1.5 m wide, rests on the surface of a dry cohesionless soil having $\phi = 20^\circ$ and $\gamma = 19 \text{ kN/m}^3$. If the water table rises temporarily to the surface due to flooding, calculate the percentage reduction in the ultimate bearing capacity of the soil. Assume $N_\gamma = 5.0$. 10M

OR

14. B). What is the ultimate bearing capacity of a square footing resting on the surface of a saturated clay of unconfined compressive strength of 100 kN/m^2 . 10M

15. A). Explain the in- situ penetration tests for Estimating the load carrying capacity of a single driven pile. 10M

OR

15. B). Explain well foundation with neat sketch. 10M

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R18

Course Code: A30125



CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

B.Tech VI Semester Supplementary Examinations December-2022

Course Name: ESTIMATION & COSTING

(Civil Engineering)

Date: 09.12.2022 FN

Time: 3 hours

Max.Marks: 70

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

Each question carries TWO marks.

10x2=20M

1. Write Units of measurements. 2 M
2. What is abstract estimate? 2 M
3. Write about Lead and Lift. 2 M
4. What is lift in earth work calculations? 2 M
5. How do you calculate Rate Analysis? 2 M
6. What is the purpose of rate analysis? 2 M
7. Write tabular column to calculate Bar Bending Schedule. 2 M
8. Difference between lump sum contract and item wise contract. 2 M
9. How to do valuation of a building? 2 M
10. What is Tender Document? 2 M

PART-B

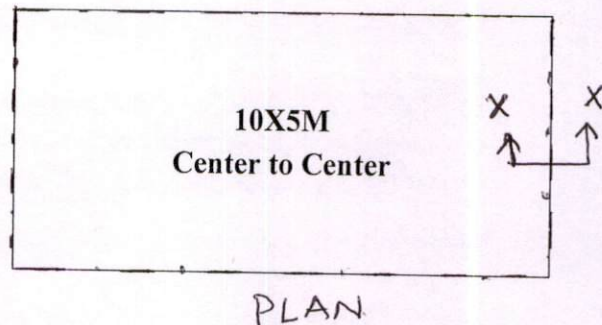
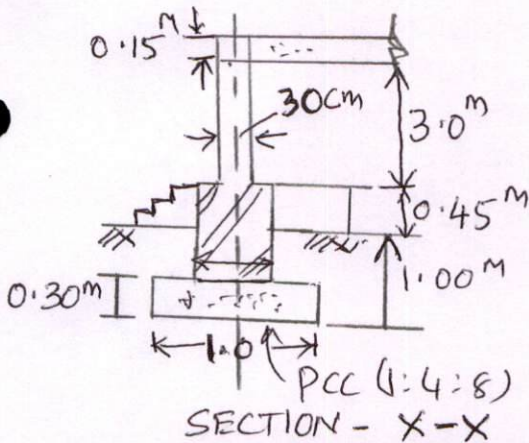
Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). Explain in Detail about the Types of Estimation. 10M

OR

11. B). Prepare the detailed estimate for the load bearing wall of single room building shown in centre line fig. Use Standard specification data and market rate for abstract estimate. 10M



12. A). Explain the details about the canal sections with neat sketches 10M

(P.T.O.)

OR

12. B). Prepare the detailed estimate for the earth work for a portion of a road from the following data. The formation level at starting point is 120m. formation width of road is 10m and side slopes of banking are 2:1. The road is downward gradient f 1 in 50 up to 120 m and then the gradient changes 1 in 100 downward. 10M

| | | | | | | | | | | | |
|------------------|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Distance In m | 0 | 30 | 60 | 90 | 120 | 150 | 180 | 210 | 240 | 270 | 300 |
| RL of Ground | 114.5 | 114.75 | 115.25 | 115.20 | 116.10 | 116.85 | 118.20 | 118.25 | 118.10 | 117.80 | 117.25 |

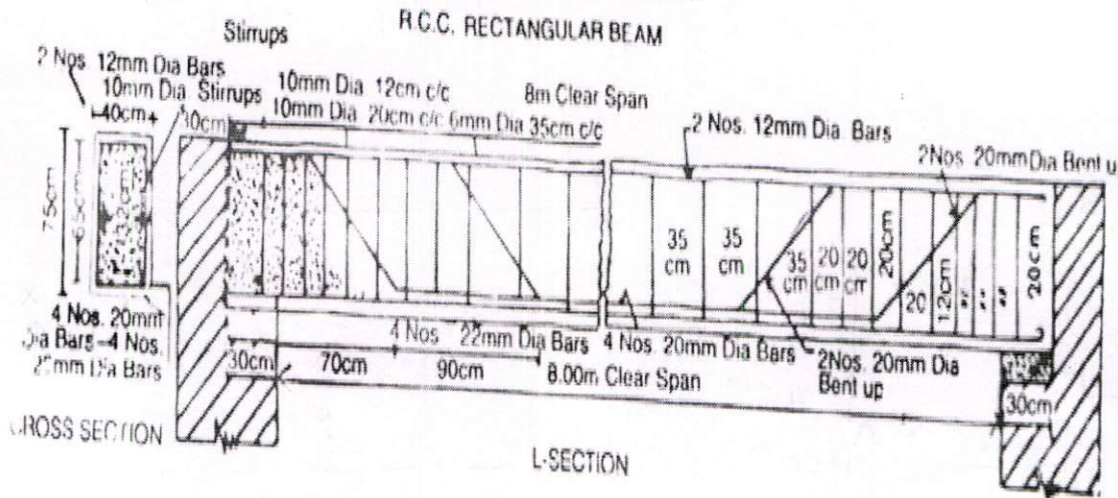
13. A). Explain in detail about the Rate Analysis of i) PCC (1:4:8). 5M
ii) Brick Masonry in C.M (1:5) 5M

OR

13. B). Explain about working out various item of work in building including overhead and contingencies charges in detail. 10M

14. A). Prepare the detailed estimation of a RCC beam from the given drawings. 10M

Prepare a detailed estimate of a R.C.C. beam of 8 metre clear span and 75 cm x 40 cm in section from the given drawings (Fig. 5-5). Steel in detail and R. C. C. work shall be calculated separately. Also prepare a schedule of bars.



OR

14. B). Classify and explain about types of contracts. 10M

15. A). What is Depreciation and explain in detail about building valuation? 10M

OR

15. B). Explain in detail about the standard specification for building construction. 10M

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R18

Course Code: A30126



CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

B.Tech VI Semester Supplementary Examinations December-2022

Course Name: WATER RESOURCES ENGINEERING

(Civil Engineering)

Date: 12.12.2022 FN

Time: 3 hours

Max.Marks: 70

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

Each question carries TWO marks.

10x2=20M

1. What are infiltration indices? 2 M
2. List the different types of rain gauges. 2 M
3. What do you mean by base flow? 2 M
4. What is meant by effective rainfall? 2 M
5. Define transmissibility. 2 M
6. What do mean by radial flow? Give an example. 2 M
7. What is consumptive use? 2 M
8. List the principal crops in India. 2 M
9. What is stream gauging used for? 2 M
10. Define canal lining. 2 M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). i) Explain various methods of determining average rainfall over a basin and also discuss the suitability of each method. 5M
ii) What do you understand by precipitation? Explain various types of precipitation. 5M
- OR**
11. B). i) What is meant by infiltration? Explain factors effecting infiltration. 5M
ii) What is run-off? What are the factors that affect the run-off from a catchment area? 5M
12. A). Define unit hydrograph? Illustrate how you can obtain the unit hydrograph from a flood hydrograph resulting from a storm of certain duration. 10M
- OR**
12. B). Given below are the ordinates of a 4-hour unit hydrograph of a basin in m³/s at one hour intervals. 4, 25, 44, 60, 70, 61, 52, 45, 38, 32, 27, 22, 18, 14, 11, 8, 6, 4, 2 and 1. Derive 2-hour unit hydrograph. 10M
13. A). i) What is Darcy's law? Derive the equation for Darcy's law. 5M
ii) A 30 cm well completely penetrates an unconfined aquifer of depth 40 m. After a long period of pumping at a steady state of 1580 lpm, the drawdown in two observation wells 25 m and 75 m from the pumping well were found to be 3.5 m and 2.0 m respectively. Determine the transmissibility of the aquifer. What is the drawdown at the pumping well. 5M
- OR**
13. B). With a neat sketch explain different types of aquifers. 10M

(P.T.O.)

14. A). i) What is meant by Duty and Delta of canal water? Derive the relationship between them for a given base period. 5M
ii) Describe the step by step procedure for preparation of land for irrigation. 5M

OR

14. B). i) Describe various methods adopted as anti -waterlogging measures. 5M
ii) Define irrigation efficiency. List out different types of irrigation efficiencies. Explain any two of them. 5M

15. A). i) Illustrate Kennedy's silt theory. What are the drawbacks in this theory. 5M
ii) Derive an expression for balancing depth of cutting and filling. 5M

OR

15. B). i) The slope of a channel in alluvial soil is $1/4500$. Find the channel section and the maximum discharge which can be allowed to flow in it. Take Lacey's silt factor $f=1$. The channel is of trapezoidal section, having side slopes $1/2:1$ 7M
ii) What are the different types of canal linings? Explain any two types of linings along with their merits and demerits. 3M

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Course Code: A30143



CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

B.Tech VI Semester Supplementary Examinations December-2022

Course Name: **PRESTRESSED CONCRETE**

(Civil Engineering)

Date: 14.12.2022 FN

Time: 3 hours

Max.Marks: 70

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

Each question carries TWO marks.

10x2=20M

- | | |
|---|-----|
| 1. What is Tendon Splices in Pre-stressed concrete? | 2 M |
| 2. Why high strength concrete and high tensile steel are used in Pre-stressed Concrete? | 2 M |
| 3. What is meant by wobble effect? | 2 M |
| 4. List the types of Losses in PSC. | 2 M |
| 5. What are the Assumptions made to estimate the flexural strength of PSC? | 2 M |
| 6. What is pressure line? | 2 M |
| 7. Explain Bursting Tension. | 2 M |
| 8. How the design of end block are considered in Magnel's method? | 2 M |
| 9. How will you achieve the shear keys in composite construction of PSC? | 2 M |
| 10. What are the factors that influence the deflection of prestressed concrete members? | 2 M |

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- | | |
|--|-----|
| 11.A). Brief about types of Pre-stressing system by scientist's Method. | 10M |
| OR | |
| 11. B). An unsymmetrical I section is used to support an imposed load of 2 kN/m over a span of 8 m. The sectional details of top flange is 300 mm wide and 60 mm deep bottom flange, 100 mm wide and 60 mm thick. The thickness of the web is 80mm and overall depth of the beam is 400 mm. At the centre of the span the effective prestressing force 100 kN is located at 50 mm from the soffit of the beam. Estimate the stress at the centre of the span for Prestress +Self Wt + Live Load conditions. (Assume the required data). | 10M |
| 12. A). Brief about Losses of Prestress with types. | 10M |
| OR | |
| 12. B). A post-tensioned cable of a beam 10 m long is initially tensioned to a stress of 1000 N/mm ² at one end. If the tendons are curved so that the slope is 1 in 15 at each end with an area of 600 mm ² , calculate the loss of prestress due to friction, given the following data: Coefficient of friction between duct and cable = 0.55 Friction of coefficient for wave effect = 0.0015/m. calculate the final force in the cable and the percentage loss of prestress due to friction and slip. | 10M |

(P.T.O..)

13. A). A rectangular concrete beam 250 mm X 300 mm is prestressed by a force of 540 kN at a constant eccentricity of 60 mm. The beam supports a concentrated load of 68 kN at the center of a span of 3 m. Determine the location of the pressure line at the centre support sections of the beam. Neglect the self-weight of the beam. 10M

OR

13. B). A pre-tensioned, T section has a flange which is 300 mm X 200 mm thick. The rib is 150mm wide by 350 mm deep. The effective depth of cross section is 50 mm. $A_p=200 \text{ mm}^2$, $f_{ck} = 50 \text{ N/mm}^2$, $f_p=1600 \text{ N/mm}^2$. Estimate ultimate moment capacity. $X_u/d=0.09$, $f_{pu}=0.87f_p$. 10M

14. A). The end block of a post tensioned concrete beam 300 mm×300 mm is subjected to a concentric anchorage force of 800 kN by a freyssinet anchorage system of area 1100mm². Design, Discuss and detail the anchorage reinforcement for the end block? 10M

OR

14. B). The end block of a prestressed concrete beam of 100 mm wide and 200 mm deep is prestressed by a force of 150 KN is transmitted to concrete by a distribution plate 100 mm wide and 50 mm deep, concentrically located at the ends. Calculate the position and magnitude of the maximum tensile stress on the horizontal section at the centre of the Anchor plate. 10M

15. A). Explain how the composite construction achieved in PSC member and sketch the stress distribution in propped and unpropped construction. 10M

OR

15. B). A concrete beam with a rectangular section, 100 mm wide and 300 mm deep, is stressed by 3 cables, each carrying an effective force of 240 kN the span of the beam is 10 m, the first cable is parabolic with an eccentricity of 50 mm below the centroidal axis at the centre of span and 50 mm above the centroidal axis at the supports. the second cable is parabolic with zero eccentricity at the supports and an eccentricity of 50 mm at the centre of span, the third cable is straight with a uniform eccentricity of 50 mm below the centroidal axis, If the beam supports a uniformly distributed live load of 5 kN/m and $E_c = 38 \text{ kN/mm}^2$, estimate the instantaneous deflection at the prestress + self weight of beam + live load stages. 10M

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Course Code: A30145



CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

B.Tech VI Semester Supplementary Examinations December-2022

Course Name: ELEMENTS OF EARTHQUAKE ENGINEERING

(Civil Engineering)

Date: 14.12.2022 FN

Time: 3 hours

Max.Marks: 70

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

Each question carries TWO marks.

10x2=20M

- | | |
|--|-----|
| 1. Define an earthquake. List the different seismic waves. | 2 M |
| 2. With the help of a neat sketch show the various elements of a vibratory system. | 2 M |
| 3. What is the difference regular and irregular buildings? | 2 M |
| 4. Differentiate confined and unconfined concrete. | 2 M |
| 5. List any two principles of earthquake resistant design of buildings. | 2 M |
| 6. What are the different methods for evaluation of seismic forces as per IS 1893? | 2 M |
| 7. List any two reasons for poor performance of masonry buildings during earthquake. | 2 M |
| 8. What are the load combinations for which the masonry structures are assessed for their adequacy under earthquake loads? | 2 M |
| 9. List the common earthquake failures in non-structures. | 2 M |
| 10. Differentiate structural and non-structural elements. | 2 M |

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). Formulate the equation of motion for a damped single degree of freedom system subjected to free vibration. 10M

OR

11. B). A platform of weight $W = 4000 \text{ N}$ is being supported by four equal columns which are clamped to the foundation as well as to the platform. Experimentally it has been determined that a static force of $F = 1000 \text{ N}$ applied horizontally to the platform produces a displacement of 0.10 mm . It is estimated that damping in the structure is of the order of 5% of the critical damping. Determine for this structure the following (i) undamped natural frequency, (ii) absolute damping coefficient, (iii) logarithmic decrement, and (iv) the number of cycles and the time required for the amplitude of motion to be reduced from an initial value of 0.1 in to 0.01 mm . 10M

12. A). With the help of a neat sketch, explain the concept of continuous load path in buildings. 10M

OR

12. B). With the help of neat sketches, explain about buildings regular and irregular in plan and the importance with reference to performance of building during earthquake. 10M

(P.T.O..)

13. A). What are the different IS code based methods for evaluating the lateral forces and seismic design? Explain the procedure of any one method in detail. 10M

OR

13. B). The plan and elevation of a three-storey RCC school building is shown in Fig. 1 below. The building is located in seismic zone V. The type of soil encountered is medium stiff and it is proposed to design the building with a special moment-resisting frame. The intensity of DL is 10 kN/m^2 and the floors are to cater to an IL of 3 kN/m^2 . Determine the design seismic loads on the structure by equivalent lateral force method. 10M

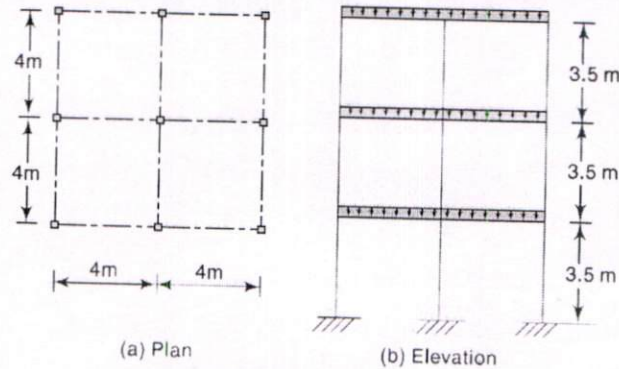


Fig. 1: Building configuration

14. A). How do the unreinforced masonry walls behave under seismic forces? Explain their behaviour with the help of neat sketches. 10M

OR

14. B). How do you improve the seismic behaviour of masonry buildings? Explain. 10M

15. A). How to prevent the non-structural damage in buildings? How to isolate the non-structures? 10M

OR

15. B). Design the reinforcement for a column of size $450 \text{ mm} \times 450 \text{ mm}$, subjected to the following forces. The column has an unsupported length of 3.0 m and is braced against side sway in both directions. Use M-25 grade concrete and Fe-415 steel. 10M

| | Dead load | Live load | Seismic load |
|-----------------|-----------|-----------|--------------|
| Axial load (kN) | 1000 | 800 | 550 |
| Moment (kNm) | 50 | 40 | 100 |
