Roll No. _____ [Total No. of Pages : 2]

5E1341

5E1341

B.Tech. V- Semester (Main) Examination, Nov.- 2019
ESC Civil Engg.
5CE3-01 Construction Technology and Equipments

Time : 2 Hours

Maximum Marks : 80
Min. Passing Marks : 28

Instructions to Candidates:

Attempt **all five** questions from **Part A**, **four** questions out of **six** questions from **Part B** and **two** questions out of **three** from **Part C**.

(Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly). Units of quantities used/calculated must be stated clearly.

PART - A

(Answer should be given up to **25** words only)

All questions are **compulsory**   (5×2=10)

1. Write down the objectives of construction technology.

2. Explain the term Depreciation and depletion.

3. Write down the objectives of Material Management.

4. Explain the term Break Even Analysis.

5. Name the different types of Earth Moving equipments.

PART - B

(Analytical/Problem solving questions)

Attempt any **four** questions   (4×10=40)

1. Explain any three methods of Depreciation.

2. Describe various safety measures for storage and handling of building materials.

3. Explain various causes of accidents.

4. Explain with neat sketches of pile driving equipment.

5. Describe the need of construction planning and constructional resources.

6. Explain principle of engineering economy with minimum cost point analysis..

PART - C

(Descriptive/Analytical/Problem Solving/Design Question)

Attempt any **two** questions   (2×15=30)

1. Explain with neat sketch power shovels.

2. Explain the need of construction team and stages in construction.

3. Explain with neat sketches of different methods of tunnelling.

Roll No. _____ [Total No. of Pages : 4]

5E1342

5E1342

0152607

B.Tech. V- Semester (Main) Examination, Nov. - 2019
PCC/PEC Civil Engineering
5CE4-02 Structural Analysis - I

Time : 2 Hours
Maximum Marks : 80
Min. Passing Marks : 28

Instructions to Candidates:

Attempt **all five** questions from **Part A**, **four** questions out of **six** questions from **Part B** and **two** questions out of **three** from **Part C**. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly). Units of quantities used/calculated must be stated clearly.

PART - A

(Answer should be given up to 25 words only)

All questions are compulsory   (5×2=10)

1. Define the term indeterminacy.

2. Write down the type of support provided in structure with their number of reaction components.

3. Differentiate between static and kinematic indeterminacy.

4. Define the term stiffness for springs.
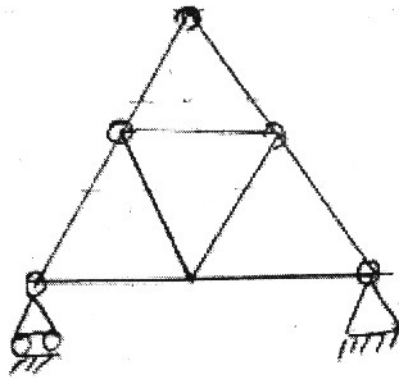
5. Elaborate Maxwell's Reciprocal theorem.

PART - B

(Analytical/Problem solving questions)

Attempt any four questions   (4×10=40)
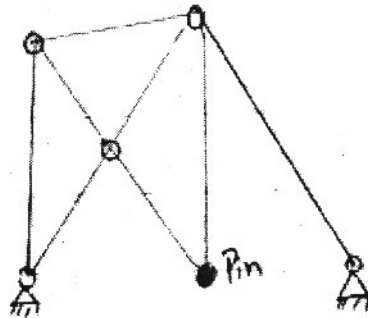
1. Determine the static indeterminacy of the followings :
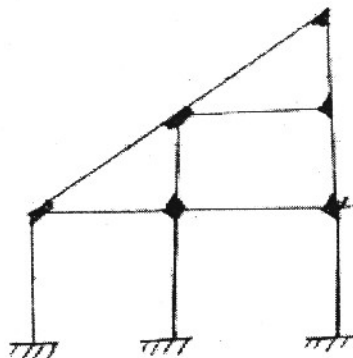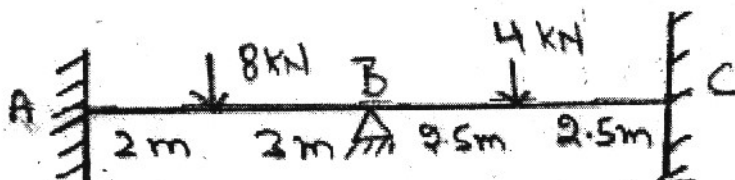
a)

y 6)

b)

c)

Pin
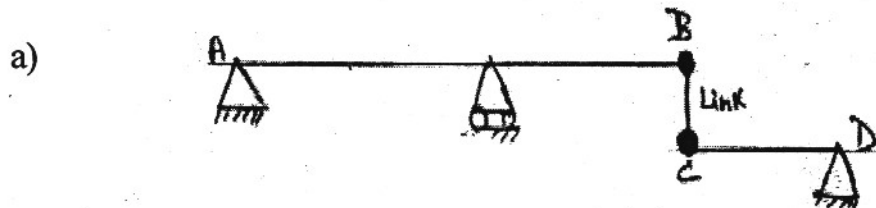
d)

(Rigid Frame)

2. State the D'Almbert's principle. Explain its application with example.

3. Using slope deflection method, compute the end moments and plot the bonding moment diagram. (EI = Constant)

4. Define the terms :

   i)   Critical damping

   ii) Logarithmic decrement

5. Derive an equation which gives the relationship between natural frequency and the static deflection of the system.

6. What do you understand by degree of Freedom. How many degrees of freedom can be taken in each case in the figure given below for simplicity :-
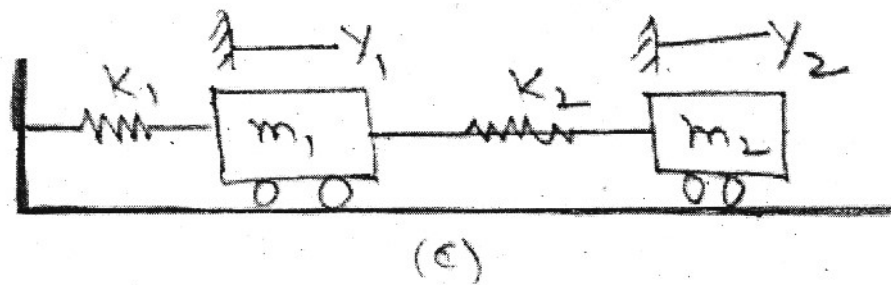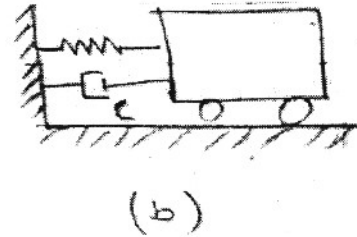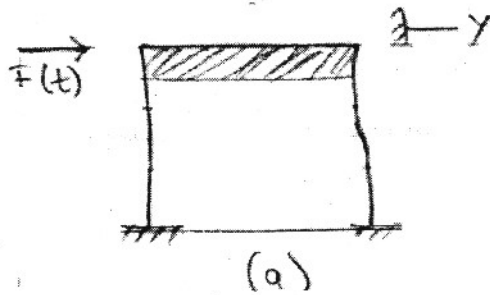
(a)

(b)

(c)

PART - C
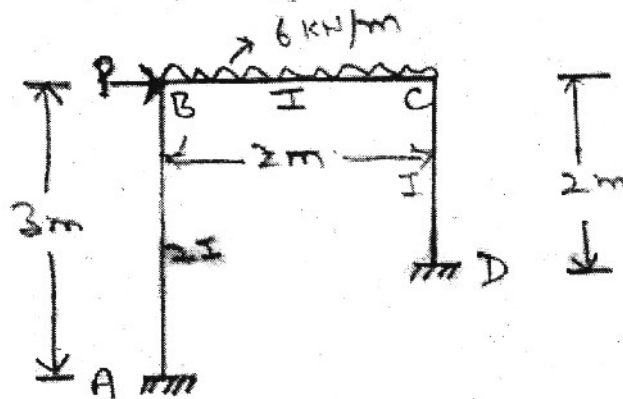
(Descriptive/Analytical/Problem Solving/Design Question)

Attempt any **two** questions   (2×15=30)

1. Calculate the Bending moment and draw Bending moment diagram with deflected shape of frame as shown in fig. (Using moment distribution method)

2. Using slope - deflection method calculate Bending moment and draw Bending moment diagram and deflected shape of the frame.
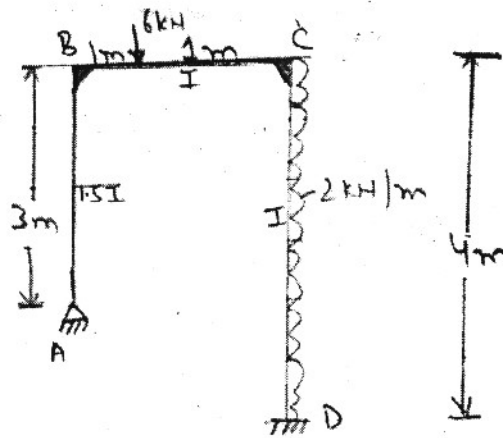
3. a) Derive an equation which gives the relationship between natural frequency and static deflection of the system. **(8)**

   b) For the system shown in fig. Find M. Such that system has natural frequency of 10 Hz.
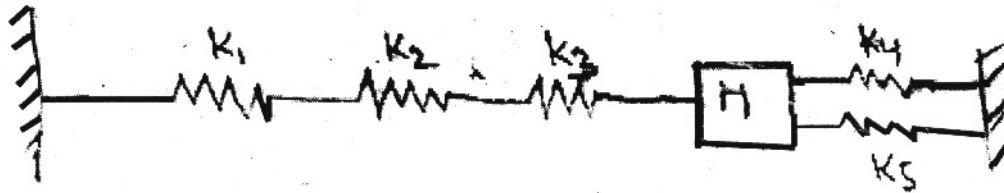
$k_1 = 2200$ N/m, $k_2 = 1800$ N/m, $k_3 = 3200$ N/m, $k_4 = k_5 = 550$ N/m **(7)**

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5E1343

B.Tech. V - Semester (Main) Examination, Nov. - 2019
PCC/PEC Civil Engineering
5CE4-03 Design of Concrete Structures

Time : 3 Hours

Maximum Marks : 120
Min. Passing Marks : 42

Instructions to Candidates:

Attempt all ten questions from Part A, selecting five questions out of Seven from Part B and Four questions out of Five from Part C. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly). Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination.(mentioned in form no.205)

1. *IS 456:2000*

PART - A
(Answer should be given up to **25** words only)
All questions are **compulsory**   (10×2=20)

1. Write any two difference between limit state and working state methods.
2. What do you understand by torsion of the beam?
3. What do you understand by singly reinforced beam?
4. Write the concept of bond stress.
5. What is anchorage length and development length?
6. Explain difference between design load and working load.
7. Write any two difference between short column and long column.
8. Define one way and two way slab.
9. Define factor of safety.
10. Write any two difference between combined and isolated footing.

PART - B
(Analytical/Problem solving questions)
Attempt any **five** questions   (5×8=40)

1. A rectangular singly R.C beam with cross - section 320 mm×550 mm is simply supported over the clear span of 4.50 m with support of 250 mm each. Calculate ultimate moment of resistance of the beam using limit state method.
   Use M20 Fe 415 steel grade.

2. Determine the moment of resistance of a R.C.C beam 350 mm× 350 mm (effective) and is reinforced with 3 bars of 20 mm diameter. The permissible stresses in concrete and steel are 7N/mm² and 230 N/mm². Take m = 13.33.

3. A R.C.C beam 300 mm × 600 mm in section is reinforced with 5-25 mm diameter bars. It is subjected to a design shear force of 200 kN. Comment on its shear design use M20 concrete and Fe 415 steel.

4. A short column 400 mm × 400 mm is reinforced with 4-25 mm diameter bars. Find the ultimate load carrying capacity of the column. Use M20 concrete and Fe 415 steel. Assume e<0.05 D.

5. A reinforced concrete beam is 300 mm × 700 mm is subjected to a bending moment of 150 kN-m. Determine the area of reinforcement if M20 concrete and Fe 415 steel is used. Take effective cover as 40 mm. (Follow limit state method).

6. An R.C.C beam 250 mm × 500 mm has a clear span of 5.5 m. The beam has 2 - 20 mm diameter bars going into the support. Factored shear force is 140 kN. Check for development length if Fe 415 and M20 grade of concrete is used.

7. Find the factored moment of resistance of an R.C.C beam 300 mm × 450 mm. The beam is reinforced with 4-25 mm diameter bars in the tension zone. 2-20 mm diameter bars are placed at a distance of 50 mm from top in the compression zone. Use M 20 concrete and Fe 415 steel.

PART - C
(Descriptive/Analytical/Problem Solving/Design Question)

Attempt any **Four** questions   (4×15=60)

1. Design a square footing of uniform thickness for an axially loaded column of 450mm×450 mm size. The safe bearing capacity of soil is 190 kN/m². Load on column is 850 kN. Use M20 concrete and Fe 415 steel.

2. A rectangular concrete Beam 300 mm wide and 500 mm deep is subjected to the following at a section (i) Factored bending moment of 80 kN-m (ii) Factored shear force of 70 kN and (iii) Factored torsional moment of 40 kN-m Design the section for torsion. Use M 20 grade of concrete and Fe 415 grade of steel.

3. Design a simply supported roof slab for a room 7.5m×3.5 m clear in size. The slab is carrying an imposed load of 5kN/m2. Use M20 and Fe415 steel. Take unit weight of R.C.C 25 kN/m³.

4. Design a circular column of diameter 400 mm subjected to a load of 1200 kN. The column is having spiral ties. The column is 3 m long and is effectively held in position at both ends but not restrained against rotation. Use M25 concrete and Fe 415 steel.

5. A rectangular reinforced concrete beam is simply supported on two masonry walls 230 mm thick and 6 m a part (centre - to - centre). The beam is carrying an imposed load of 15 kN/m. Design the beam with all necessary checks by limit state methods. Use M 25 concrete and Fe 415 steel.

Roll No. _____ [Total No. of Pages : 4]

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5E1344

5E1344

B.Tech. V- Semester (Main) Examination, Nov. 2019
PCC/PEC Civil Engineering
5CE4-04 Geotechnical Engineering

Time : 3 Hours

Maximum Marks : 120
Min. Passing Marks : 42

Instructions to Candidates:

Attempt **all ten** questions from **Part A**, **five** questions out of **Seven** from **Part B** and **Four** questions out of **Five** from **Part C**.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205).

1.   Graph paper (centimeters)

PART - A

(Answer should be given up to **25** words only)

All questions are **compulsory**   (10×2=20)

1.   Define the term 'Soil Mechanics'.

2.   State whether the following terms are true or false

    i.   The water content of soil can be more than 100%.

    ii.   The porosity of soil can be more than 100%.

3.   What are the consistency limits of a fine - grained soil?

4.   What is quick sand?

5.   What are Geostatic stresses?

6.   What is an Isobar Diagram?

7.   What are normally and over consolidated clays?

8.   What are three different types of tri-axial test depending upon different drainage conditions?

9. What do you understand about disturbed and undisturbed soil samples?

10. What is significance of SPT - N value in Geotechnical Engineering?

PART - B

(Analytical/Problem solving questions)

Attempt any **five** questions   (5×8=40)

1. A sample of saturated soil has a water content of 25% and a bulk unit weight of 20 kN/m³. Determine the dry unit weight, void ratio and specific gravity of solids.

2. A falling - head permeability test was performed on a soil sample. One minute was required for the initial head of 100 cm to fall to 50 cm in the stand pipe of X - sectional area 1.50 cm². If the sample was 4 cm in diameter and 30 cm long, calculate the coefficient of permeability of the soil sample.

3. A soil profile consists of a surface layer of clay 4m thick ($\gamma = 19.5 kN/m^3$) and a sand layer 2 m thick ($\gamma = 18.5 kN/m^3$) overlying an impermeable rock. The W.T. is at the ground surface. If the water level in a stand pipe driven into the sand layer rises 2 m above the ground surface. Draw the plot showing the variation of σ, u and σ^-. Take $\gamma_w = 10 kN/m^3$.

4. Atterberg limit tests were carried out on soil sample, results are :

   i.   Percentage passing 4.75 mm sieve = 60%

   ii. Percentage passing 75 microns sieve = 45%

   iii. Liquid Limit = 40%

   iv. Plasticity index = 10%

   Classify soil according to ISC system.

5. The stresses on a failure plane in a drained test on a cohesionless soil are as : Normal stress (σ) = 100 kN/m² and shear stress (τ) = 40 kN/m². Determine (i) the angle of shearing resistance and the angle which the failure plane makes with the major principal plane. (ii) The major and minor principal stresses.

6. The following results were obtained from a standard compaction test on a sample of soil. The volume of mould used was 1000 ml. Make necessary calculations to plot the compactive curve and from the plot obtain the M.D.D. and the O.M.C.

Water Content (%)	12	14	16	18	20	22
Mass of moist soil (kg)	1.68	1.85	1.91	1.87	1.87	1.85

5E1344   (2)

7. A long strip footing of width 2 m carries a load of 400 kN. Calculate the maximum stress at a depth of 5 m below the centre line of footing. Compare the results with 2:1 load distribution method.

PART - C

(Descriptive/Analytical/Problem Solving/Design Questions)

Attempt any **Four** questions   (4×15=60)

1. Derive Terzaghi's basic differential equation of 1-D consolidation. Also define degree of consolidation with the help of a sketch of Isocrones. A clay layer 4 m thick is subjected to a pressure of 100 kN/m². If the layer has a double drainage and undergoes 50% consolidation in one year,

   i) determine the coefficient of consolidation. Take $T_v = 0.196$. If the coefficient of permeability is 0.020 m/yr,

   ii) determine the settlement in one year and

   iii) rate of flow of water per unit area in one year.

2. What are different types of slope failure? Discuss them briefly. What is a stability number? What is its utility in the analysis of stability of slopes? A vertical cut is to be made in clayey soil ($c = 30kN / m^2 and \phi = 0, \gamma = 18kN / m^3$). Find the maximum depth of cut for which the cut may be temporarily supported. For $\phi = 0$ and i = 90°, the value of stability number is 0.261.

3. What are the different types of lateral earth pressure? Explain each type with the help of schematic diagrams showing the variation of earth pressure with the wall movement.

   A retaining wall is 7 m high, with its back face smooth and vertical. It retains sand with its surface horizontal. Using Rankine's theory, determine active earth pressure at the base when the backfill is

   i) dry,

   ii) saturated and

   iii) submerged, with W.T. at the surface. Take $\gamma = 18kN / m^3$ and $\phi = 30°$, $\gamma_{sat} = 20kN / m^3$.

4. What are the assumptions made in the derivation of Terzaghi's bearing capacity theory? Sketch failure plane of Terzaghi's analysis with the description of all its zones. Differentiate between the general shear failure and the local shear failure. How the bearing capacity in local shear is determined?

A strip footing 2 m wide is laid at a depth of 1.5 m below the ground surface. Determine the ultimate bearing capacity using Terzaghi's theory for general shear failure, if

i) W.T. is at the base of the footing and

ii) W.T. rises to the ground surface. Take $\gamma \, or \, \gamma_{sat} = 20kN/m^3$, $\phi' = 30°$, $c' = 15kN/m^2$ and $\gamma_w = 10kN/m^3$.

(for $\phi = 30°$, $N_c = 37.2$, $N_q = 22.5$ and $N_\gamma = 19.7$)

5. Describe plate load test for determining ultimate bearing capacity and settlement of clayey and sandy soils.

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Roll No. _____ [Total No. of Pages : 2

5E1345

5E1345

B.Tech. V- Semester (Main) Examination, Nov. - 2019
PCC/PEC Civil Engineering
5CE4-05 Water Resource Engineering

Time : 2 Hours

Maximum Marks : 80
Min. Passing Marks : 28

Instructions to Candidates:

*Attempt **all five** questions from **Part A**, **four** questions out of **six** questions from **Part B** and **two** questions out of **three** from **Part C**.*

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

PART - A

(Answer should be given up to **25** words only)

All questions are **compulsory**   (5×2=10)

1. Define irrigation. What is the necessity of irrigation?

2. Give relations for :
   a. Water application efficiency
   b. Water storage efficiency
   c. Water distribution efficiency

3. Draw a neat labelled diagram indicating all major forces on a gravity dam.

4. The following data is available at the proposed site of a canal crossing :

Item	Drain	Canal
B.L.(m)	252.2	248.0
FSL/HFL (m)	253.2	253.0
Discharge (cumecs)	2	400

   The most appropriate and economical C-D work at the above sites can be?

5. Name different forms of precipitation.

Part - B

(Analytical/Problem solving questions)

Attempt any **four** questions   (4×10=40)

1. A water course has a culturable command area of 1200 hectores. The intensity of irrigation for crop A is 40% and for B is 35%, both the crops being Rabi crops. Crop A has a Kor period of 20 days and Crop B has Kor period of 15 days. Calculate

the discharge of the water course if the Kor depth for crop A is 10 cm and for B it is 16 cm.

2. Write the expression for Exit Gradient. Using Khosla's theory, estimate the value of exit gradient for a weir with a horizontal floor on a permeable foundation having width $b = 10$ m and depth of D/S sheet pile = 1.5 m, given the difference between U/S and D/S water level is 4 m.

3. With the help of neat diagram, discuss stability of downstream slope during steady seepage for a earthen dam.

4. Show with the help of sketches, various types of wells.

5. What are the methods of computing run - off from a catchment area? Give various formulae stating clearly the area for which each is applicable.

6. What is the difference between hyetograph and hydrograph.
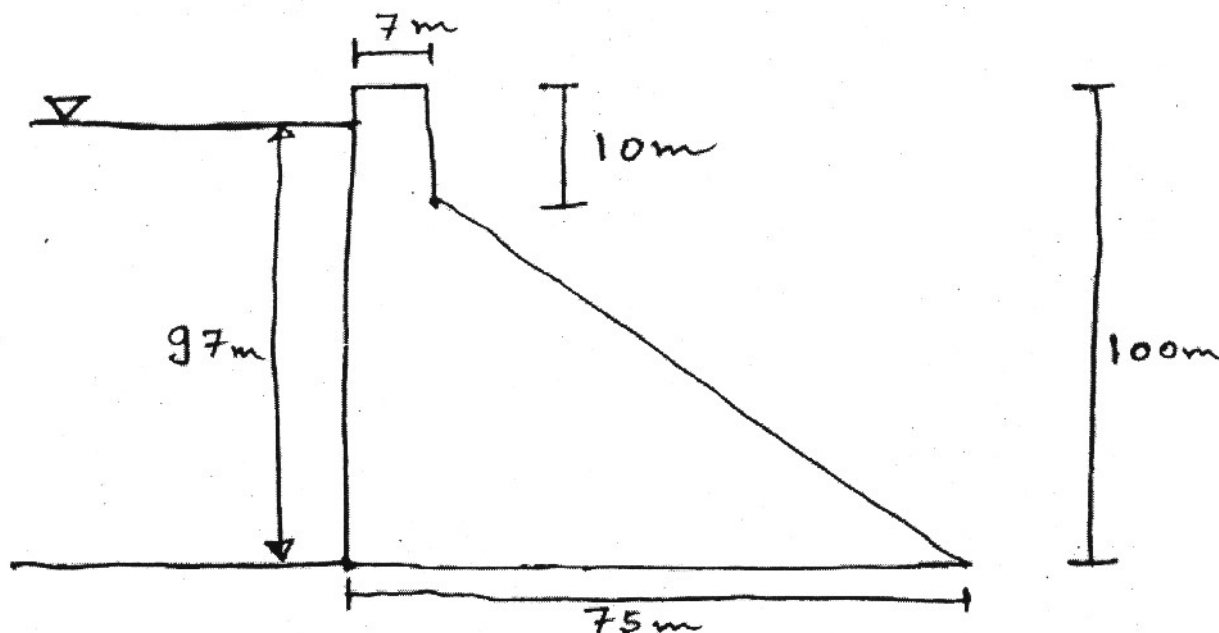
PART - C

(Descriptive/Analytical/Problem Solving/Design Questions)

Attempt any **two** questions   **(2×15=30)**

1. The slope of channel in aluminum is $S = 1/5000$; Lacey's silt factor = 0.9 and channel side slope = ½:1 Find the channel section and maximum discharge which can be allowed to flow in it.

2.

The above fig. gives profile of a gravity dam with reservoir levels as shown. If the coefficient of friction is 0.75, is the dam safe against sliding? Take weight density of concrete as 2.4 tonnes/m³.

3. What is a unit hydrograph? List the assumptions involved in the unit hydrograph theory.

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Roll No. _____ [Total No. of Pages : 2]

5E1346

B.Tech. V - Semester (Main) Examination, Nov. - 2019
PCC/PEC Civil Engineering
5CE511 Air & Noise Pollution and Control

Time : 2 Hours

Maximum Marks : 80
Min. Passing Marks : 28

Instructions to Candidates:

*Attempt **all five** questions from **Part A**, **four** questions out of **six** questions from **Part B** and **two** questions out of **three** from **Part C**.*

(Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly). Units of quantities used/calculated must be stated clearly.

PART - A

(Answer should be given up to **25** words only)

All questions are **compulsory**   (5×2=10)

1. Explain the phenomenon of Self - cleansing of atmosphere,

2. What is meant by Smog? State the harmful effects of smog.

3. Differentiate between Coning and Fanning.

4. What is meant by Acoustic reflex?

5. Differentiate Air - borne noise and Structure - borne noise.

PART - B

(Analytical/Problem solving questions)

Attempt any **four** questions   (4×10=40)

1. What are the harmful effects of sulphur dioxide, carbon monoxide and particulate matter on human beings?

2. Explain the natural and un-natural sources of air pollution.

3. What do you understand by Aerosols? Briefly describe various types of aerosols along with their characteristics.

4. Discuss the consequences of Ozone layer and Green house effect.

5. Differentiate between continuous noise, intermittent noise and impulse noise and their effects.

6. Define Noise and explain as to how and why it should be regarded as an environmental pollutant.

PART - C

(Descriptive/Analytical/Problem Solving/Design Questions)

Attempt any **two** questions   (2×15=30)

1. a) What is plume rise? Explain with neat sketches, how different atmospheric conditions give rise to different kinds of plumes. **(8)**

   b) With a neat sketch explain the principle, construction and working of cyclone separator. **(7)**

2. a) Explain in detail about the method of sampling suspended particulates by a High Volume air sampler. **(8)**

   b) What are the pollutants emitted by different vehicles with different type of fuels? Discuss their negative impacts and suggest the control measures. **(7)**

3. a) Write explanatory notes on the following :

   i) Noise rating systems.

   ii) Sources of noise and their noise levels   **(2×4=8)**

   b) What are the measures which may be taken to have an effective control on noise pollution? **(7)**

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5E1347

5E1347

B.Tech. V -sem. (Main) Examination, Nov. - 2019
PCC/PEC Civil Engg.
5CE5-12 Disaster Management

Time : 2 Hours

Maximum Marks : 80
Min. Passing Marks : 28

Instructions to Candidates:

Attempt all five questions from Part A, four questions out of six questions from Part B and two questions out of three from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

PART - A

(Answer should be given up to **25** words only)

All questions are **compulsory**   (5×2=10)

Q1. What is disaster?

Q2. Differentiate Man-made and Natural disaster.

Q3. Differentiate Geological and Biological disasters.

Q4. What do you understand by Pre and post disaster?

Q5. Define the term risk mapping.

PART - B

(Analytical/Problem solving questions)

Attempt any **four** questions   (4×10=40)

Q1. Explain the following terms.

   a)   Vulnerability

   b)   Hazard

Q2. What are the types of disasters?

Q3. Describe thunder storms, hail stroms and cold heat waves.

Q4. What are the Man - made disasters?

Q5. Describe the Technological disasters.

Q6. Write the common safety tips for various disasters.

PART - C

(Descriptive/Analytical/Problem Solving/Design Questions)

Attempt any **two** questions   **(2×15=30)**

Q1. What are the causes of disaster also write their impact and preventive measures?

Q2. Discuss the disaster management cycle and its components.

Q3. Discuss the role of Government and Non-Government agencies in disaster management.

Roll No. _____ [Total No. of Pages : 2]

5E1349

5E1349

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B.Tech. V - Semester (Main) Examination, Nov. - 2019
PCC/PEC Civil Engg.
5CE5-14 Repair and Rehabilitation of Structures

Time : 2 Hours

Maximum Marks : 80
Min. Passing Marks : 28

Instructions to Candidates:

Attempt **all five** questions from **Part A**, **four** questions out of **six** questions from **Part B** and **two** questions out of **three** from **Part C**.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Part - A

(Answer should be given up to **25** words only)

All questions are **compulsory**   (5×2=10)

1. What is the role of alkalies in concrete?

2. Define "Guniting" and "Bonding Aspect".

3. Write about self curing compound.

4. Explain the diffusion process.

5. Write the effect of chloride on concrete.

Part - B

(Analytical/Problem solving questions)

Attempt any **four** questions   (4×10=40)

1. Give the detail study about the alkali reactions. Also write the Mechanism of AAR.

2. Write the factor affecting and respective preventive measures of corrosion. Brief the corrosion Mechanism.

3. Explain different types of cracks.

4. What do you mean by ultra sonic pulse velocity? What are the equipments used in this test. Write its principle and its procedure of testing.

5. How Penetration resistance and pull out test are different from core cutting test.

6. What is the application of shotcreting? How it is done?

Part - C

(Descriptive/Analytical/Problem Solving/Design Question)

Attempt any **two** questions   (2×15=30)

1. Write notes on :   (3×5=15)
   i)   Grouting
   ii)   Under water repair
   iii) Externally bonded plates.

2. Write notes on :   (3×5=15)
   i)   Maping of data
   ii)   Rebound hammer test.
   iii) A Case study of rehabilitation of dam.

3. a) Discuss properties and selection criteria of epoxy, polyester and resins. **(7)**

   b) Explain the material, advantages, and applications of FRP and ferro - cement.
                                                   (8)

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Roll No. _____

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5E5061

[Total No. of Pages : 4]

5E5061

B.Tech. V - Semester (Back) Examination November - 2019
Civil Engineering
5CE1A Theory of Structures - I

Time : 3 Hours

Maximum Marks : 80
Min. Passing Marks : 26

Instructions to Candidates:

*Attempt any **five** questions, selecting one question from **each unit**. All questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

Unit - I

1. a) Write and prove Maxwell's reciprocal theorem and Betti's theorem. (8)

   b) Using Betti's theorem, determine the elongation of a bar 10 mm in diameter and 1 m long, when it is subjected to a force of 10kN at diametrically opposite points at mid - points of its length. Take $E = 2 \times 10^5$ MPa and $\mu = 0.3$. (8)

OR

1. a) Explain slope deflection method in detail. (4)

   b) A beam ABC, 10 m long, fixed at ends A and B is continuous over joint B and is loaded as shown in fig 1. Using the slope deflection, compute the end moments and plot the bending moment diagram. Also sketch the deflected shape of the beam. The beam has constant EI for both the span. (12)

Fig. 1
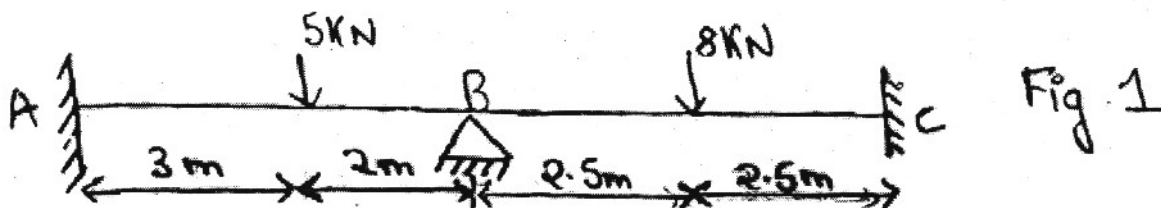
Unit - II

2. Solve by Moment distribution method for beam ABCD which is carried on hinged supports and is continuous over three equal spans each of 3m. All the supports are initially at same level as shown in Fig 2. Plot the bending moment diagram and sketch the deflected shape of beam if the support A settles of 10 mm, B settles by 30 mm and C settles by 20 mm. Take $I = 2.4 \times 10^6$ mm^4, $E = 2 \times 10^5$ N/mm^2. (16)

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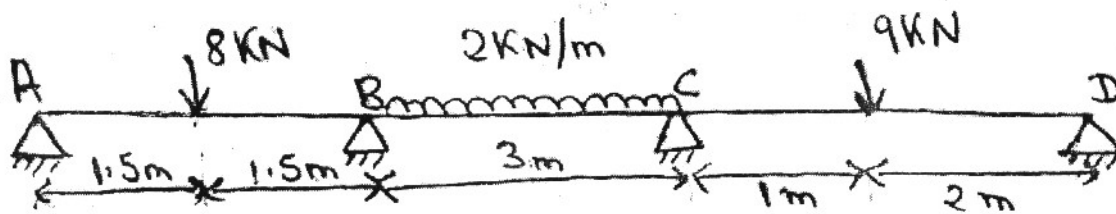
(1)

[Contd....

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Fig-2

OR

2. Analyse the inclined portal frame as shown in Fig 3. Draw bending moment diagram and deflected shape of the frame. Solve by using Moment distribution method.
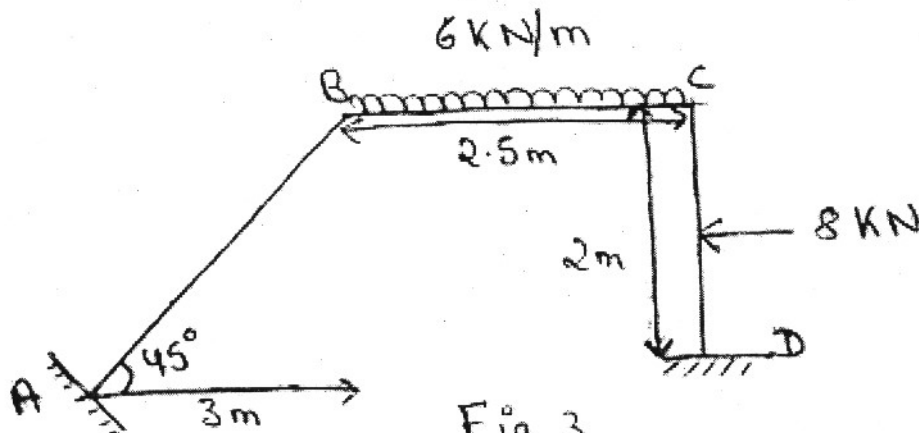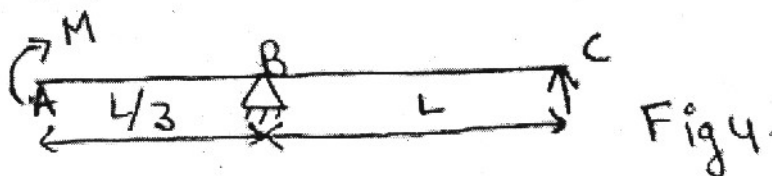
(16)

Fig 3

Unit - III

3. a) Using Castigliano's first theorem, determine the deflection and rotation of the overhanging end A of the beam loaded as shown in Fig 4. **(10)**

Fig 4.

b) Write castigliano's theorems. And prove first castigliano's theorem. **(6)**

OR

3. Solve using Unit load method. A pin jointed frame shown in Fig 5 is carrying a load of 60 kN at C. Find the vertical as well as horizontal deflection of C. Take area of member AB as 1000 mm² and those of members AC and BC as 1500 mm² ; E = 200 GPa. **(16)**
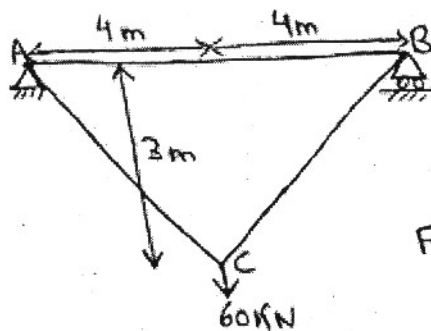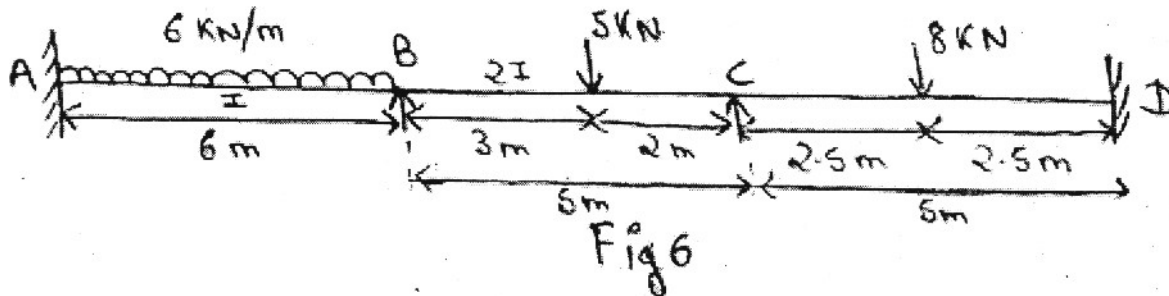

Fig 5

4. a) Explain Kani's method in detail. (4)

b) A continuous beam ABCD consists of three spans and is loaded as shown in Fig 6. Determine the bending moments at the supports, using Kani's method. Also plot the bending moment diagram. (12)

Fig 6

OR

4. Solve using column analogy method. A portal frame ABCD is fixed at A and D and has rigid joints at B and D and is loaded as shown in fig 7. Plot the bending moment diagram for the frame. (16)

Fig 7
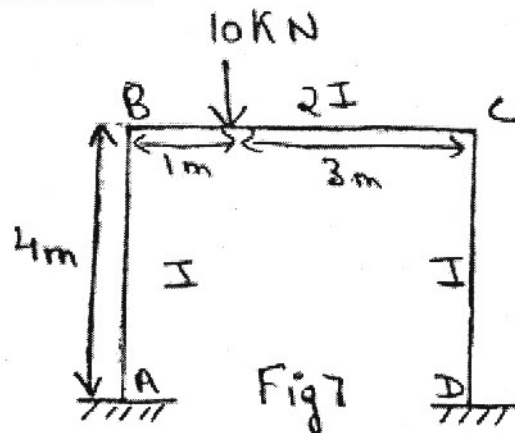
Unit - V

5. a) Explain the following methods :

   i) Portal method

   ii) Cantilever method

   iii) Factor method

   iv) Tension coefficient method (4×2=8)

b) Write the assumptions made in the cantilever method of lateral load analysis on a building frame. (8)

OR

5. Using Portal method, solve the building frame subjected to horizontal forces as shown in fig 8. (16)

Fig 8
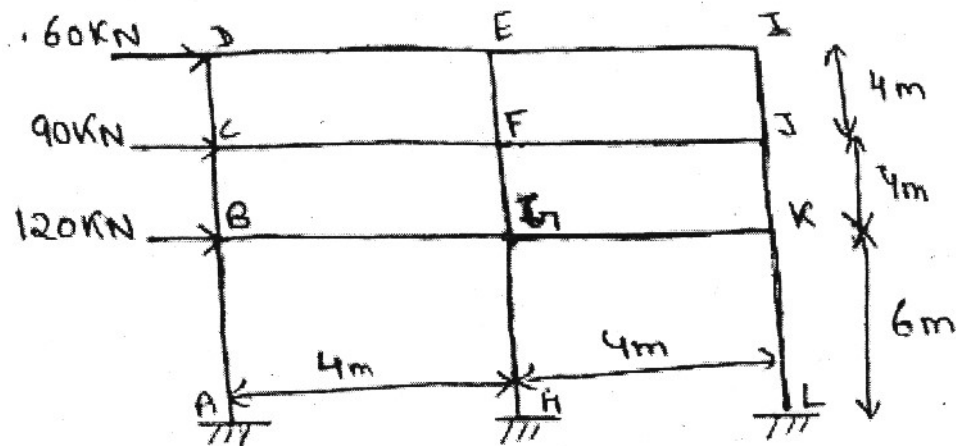
Roll No. _____   [Total No. of Pages : 2]

5E5062

B.Tech V- Semester (Back) Examination, Nov. - 2019
Civil Engg.
5CE2A Environmental Engg. - I

Time : 3 Hours   Maximum Marks : 80
Min. Passing Marks : 26

Instructions to Candidates:

*Attempt any **five** questions, selecting **one** question from **each** unit. All questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly). Units of quantities used / calculated must be stated clearly.*

UNIT - I

1. What is meant by "design periods" and "population forecasts"? Why is the population forecast necessary in the design of public water supply schemes? Discuss the different methods employed for the purpose and compare them based on their merits and demerits.   [16]

(OR)

1. Discuss as to how the requirements of water vary from season to season, day to day and hour to hour, and in what way does it affect the design capacities of various components of a water supply scheme.   [16]

UNIT- II

2. What are the common sources of water for a water supply scheme? State the factors that govern the final selection. Explain how would you determine the yield from any three of such sources.   [16]

(OR)

2. a) What is meant by porosity and permeability and how do they affect the ground water storage?   [8]

    b) What are the important characteristics of water? Also mention the quality standards for major water parameters as per Indian standards.   [8]

UNIT- II

3. a) Why are the pressure pipes most commonly used for conveying water from distant surface sources to the towns of supply? Discuss briefly the common stresses produced in pipe lines used for conveying water.   [8]

   b) What are the different materials, which are commonly used for water supply pipes? Discuss their comparative merits and demerits.   [8]

(OR)

3. a) Calculate the hydraulic gradient in a 2m diameter smooth concrete pipe carrying a discharge of 3 cumees at 10°c temperature by using modified Hazen-William's formula.   [10]

   b) Prove that the area and overflow rate rather than the detention period govern the design of a setting tank.   [6]

UNIT-IV

4. a) Describe the four different processes through which the filters purify the water.   [8]

   b) Discuss the importance of residual chlorine in public water supplies along with the tests of finding out residual chlorine.   [8]

(OR)

4.   What is meant by water softening ? Mention any three methods of softening water and describe " Zeolite process" in detail.   [16]

UNIT-V

5.   Illustrate with sketches the different types of layouts of pipe systems in distributing water and compare their merits and demerits.   [16]

(OR)

5. a) Discuss the various types of water piping systems that may be employed in building for fulfilling the water demands of its residents, giving merits and demerits of each system.   [12]

   b) Explain the Hardy-Cross method.   [4]

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5E5063

5E5063

B.Tech .V- Semester (Back) Examination, Nov. - 2019
Civil Engg.
5CE3A Geotechnical Engg.-I

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Time : 3 Hours

Maximum Marks : 80
Min. Passing Marks : 26

Instructions to Candidates:

Attempt any **five questions**, selecting **one question** from **each unit**. All Questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly). Units of quantities used / calculated must be stated clearly.

UNIT - I

Q.1 a) Define the terms void ratio, specific gravity of particles, degree of saturation and dry density? [8]

b) Develop a relationship between the void ratio, water content, specific gravity of particles and the degree of saturation. [8]

(OR)

a) What is the use of classification of soils ? Discuss Indian standard classification system. [8]

b) Classify the soils A and B, with the properties as shown below, according to USC system. [8]

Soil	We(%)	Ip%	% passing 4.75 mm sieve	% passing 75 μ sieve
A	44	29	100	59
B	55	15	100	85

UNIT -II

Q.2 a) What are the different types of soil structures. Describe with neat sketches. [8]

b) What is Darcy's law? What are its limitations. [8]

(OR)

a) Describe pumping out methods for the determination coefficient of permeability in the field ? What are their advantages and disadvantages? [8]

b) Determine the average coefficient of permeability in the horizontal and vertical directions for a deposit consisting of three layers of thickness 5m, 1m and 2.5m and having the coefficients of permeability of 3×10^{-2} mm/Sec., 3×10^{-5} mm/ sec and 4×10^{-2} mm/sec respectively Assuming the layers are isotropic ?

[8]

UNIT - III

Q.3 a) Define total stress, neutral stress and effective stress. [8]

b) What is the effect of surcharge and the capillary action of the effective stress?

[8]

(OR)

a) What is quick sand? How would you calculate the hydraulic gradient required to create quick sand conditions in a sample of sand? [8]

b) A sand deposit is 10m thick and overlies a bed of soft clay. The ground water table is 3m below the ground surface. If the sand above the ground water table has a degree of saturation of 45%, plot the diagram showing the variation of the total stress, pore water pressure and the effective stress. The void ratio of sand is 0.70 Take G=2.65. [8]

UNIT -IV

Q.4 a) What is Mohr's circle ? Discuss its important characteristics? Derive a relationship between the principal stresses at failure using Mohr-Coulomb failure criterion. [8]

b) Describe the triaxial test? What are the advantages of triaxial shear test over the direct shear test? [8]

(OR)

a) The following results were obtained from a series of consolidated undrained tests on a soil, in which the pore water pressure was not determined. Determine the Cohesion intercept and the angle of shearing resistance. [8]

Test	confining pressure	Deviator stress at failure
1	100 KN/M²	600 KN/m²
2	200 KN/m²	750 KN/m²
3	300 KN/m²	870 KN/m²

b) Discuss the modified failure envelope? What are its advantages and disadvantages over the standard failure envelope? [8]

5E5063   (2)

UNIT -V

Q.5 a) What is a compaction curve ? Discuss the factors affecting compaction? [8]

b) What is the effect of compaction on the engineering properties of the soil?[8]

(OR)

The maximum dry density of a sample by the light compaction test is 1.78 gm/ml at an optimum water content of 15%. Find the air voids and the degree of saturation G=2.67. What would be the corresponding value of dry density on the zero air void line at optimum water content? [16]

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B.Tech. V - Semester (Back) Examination, November - 2019
Civil Engg.
5CE4A Surveying - II

Time : 3 Hours

Maximum Marks : 80
Min. Passing Marks : 26

Instructions to Candidates:

*Attempt any **Five** questions, selecting **one question** from **each unit**. All Questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

UNIT - I

1. a) What is the necessity of providing curvature and refraction corrections. Explain to get the magnitude of these corrections and how to get corrected angles of elevation and dipression. (12)

   b) Find the corrected angle of elevation applying correction for

   i) Curvature

   ii) Refraction if angle observed is $3°17'21''$. (4)

(OR)

2. a) Following observations were made to find elevation difference between two stations A and B -

   Angle of depression from A to B - $2°18'16''$

   Height of signal at B - 4.23 m

   Height of Instrument Axis at A - 1.24 m

   Coefficient of Refraction - 0.07

   R $Sin1''$ - 30.88 m

   R.L of A = 242.6 m

   Distance between two stations - 3200 m

   Find the R.L of station B. (12)

   b) Explain how reciprocal observation in useful in determing level difference between two stations. (4)

UNIT - II

3. a) Explain how will you determine necessary dates to set out a simple circular by using the method "offset from Extended chord". (12)

b) If the radius of curve is 250 m and deflection angle is 40° compute

   i) Curve length

   ii) Mid ordinate

   iii) Tangent distance

   iv) Length of long chord (4)

(OR)

4. Radius of a simple circular curve is 240 m and deflection angle is 40°. Determine the necessary data to setout simple circular by Rankine's tangential angle method. Assume normal chord length (Py interval) as 20 m. The chainage of point of intersection PI in 2070 m. (16)

UNIT - III

5. Explain different criteria for selection of site for measurement of "Base Line" in a triangulation survey. (16)

(OR)

6. A 30 m segment of base line has measured by steel tape at 7 kg pull, 31°c temperature and difference in level of two supports is 0.3 m. Find the corrected length of segment by applying correction for

   i) Pull

   ii) Slope

   iii) Temperature and

   iv) Sag if standard Pull

is 10 kg, standard temperature is 20°c, co-efficient of Elasticity $E = 2.1\times10^4 kg/mm^2$ and coefficient of expansion is $\alpha = 0.00001/°C$, Unit wt of steel 8300 kg/m³, tape is 10 mm wide and 0.5 mm thick. (16)

Unit - IV

7. a) Explain following with suitable examples -

   i) Weight of a quantity

   ii) Independent quantity

   iii) True Error

   iv) Conditional equation (4×2=8)

5E5064 (2)

b) Following angles were measured closing the horizon with weights indicated against then

Find corrected angles -

$\angle P = 95°14'20''$ wt - 1

$\angle Q = 130°40'25''$ wt - 2

$\angle R = 134°5'00''$ wt - 3   **(8)**

(OR)

8. a) Write and explain the condition equations to be satisfied for figure adjustment of Triangle with central station.   **(8)**

   b) Find the most probable value of the angles A, B and C of a triangle ABC from the following observation

   $A = 65°15'30''$ wt = 3

   $B = 51°11'25''$ wt = 2

   $C = 63°32'34''$ wt = 4   **(8)**

Unit - V

9. a) Explain Napier's Rule with respect to star at Elongation condition.   **(8)**

   b) Explain with neat sketch the points of Equinoxes and point of solstices.   **(8)**

(OR)

10. Explain following with neat sketch

    i) Observer Meridian

    ii) Vertical Circle

    iii) Azimuth

    iv) Declination

    v) Altitude

    vi) Celestial Horizon

    vii) Visible horizon

    viii) Longitude   **(8×2=16)**

Roll No. _____   [Total No. of Pages : 3]

5E5065

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B.Tech. V- Semester (Back) Examination, Nov. - 2019
Civil Engg.
5CE5A Building Design

Time : 3 Hours

Maximum Marks : 80
Min. Passing Marks : 26

Instructions to Candidates:

Attempt any **five questions**, *selecting* **one question** *from* **each unit**. *All Questions carry* **equal** *marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly). Units of quantities used/calculated must be stated clearly.*

UNIT - I

1. a) What do you understand by symmetry and unsymmetry in building forms? **(4)**

   b) Describe the shear wall. What are the function of shear wall. **(6)**

   c) What do you understand by over turning resistance in a building? What is the factor of safety against over turning? **(6)**

(OR)

1. a) Explain the contributory area principle of load flow from slab to supporting structural member. **(8)**

   b) Calculate equivalent uniformly distributed load for bending moment and shear force for a beam if load transferred on such beam from a slab is triangular in nature. **(8)**

UNIT - II

2. Calculate wind load on walls and roof of a pitched roof building located in a farm. Consider height (h) = 3.5 m, width (w) = 10m, length (L) = 20 m, roof angle

   (α) = 5°, overhang = 0.5 m, opening in walls = 10%, terrain category 2 and front ground slope $\theta < 3^o$ and building is at Delhi. **(16)**

(OR)

2. Calculate wind load on rectangular clad building with monoslope roof. Consider height (h) = 4.0m, width (w) = 8.0 m, length (L) = 18 m and overhang = 0.5 m, ground is flat, life of building 25 years, terrain category = 2. roof angle $(\alpha) = 20°$ permeability of building is 10% and building is constructed at Pune. **(16)**
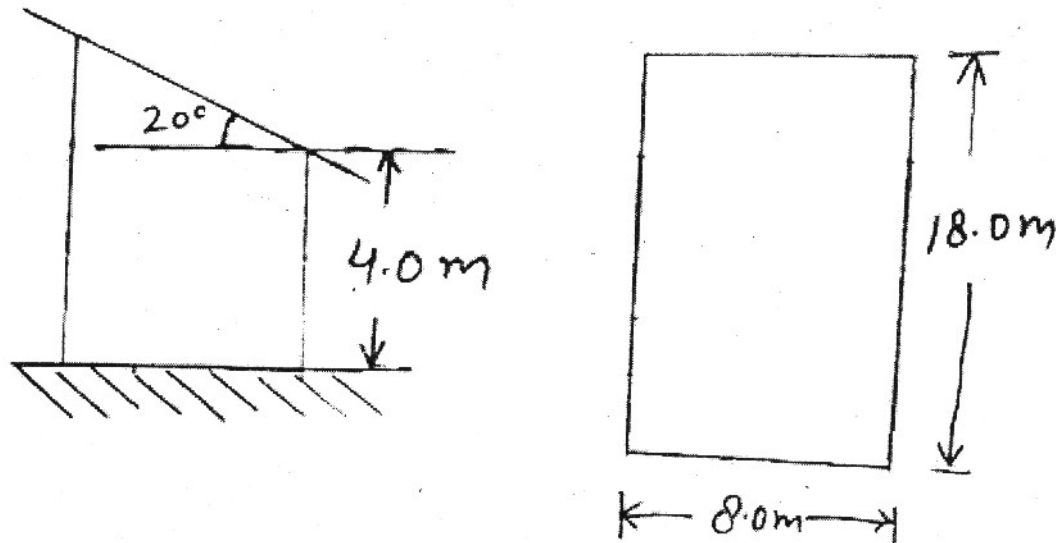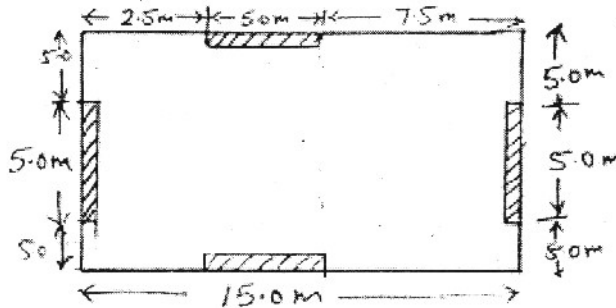

UNIT - III

3. Calculate Earthquake forces on a four storey R.C.C. special moment resisting frame building having 3 bays of X direction and 4 bays in Y direction. Storey height of building may be assumed as 4.0 m, beams of size 300 × 450 mm, columns of size 400×300mm, floor thickness 100 mm, walls of 230 mm thickness and live load on floor may be taken as 3.0 kN/m², R.C.C. frame is infilled with brick masonary and building is located in Delhi for telephone exchange. **(16)**

(OR)

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5E5068

B.Tech V - Semester (Back) Examination, Nov. - 2019
Civil Engg.
5CE6.3A Solid Waste Management

Time : 3 Hours

Maximum Marks : 80
Min. Passing Marks : 26

Instructions to Candidates:

*Attempt any **five** questions, selecting **one** question from **each unit**. All questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used / calculated must be stated clearly.*

UNIT - I

1. a) Write a short note on classification of solid waste. [8]

   b) What are the various characteristics of solid waste. Explain. [8]

(OR)

   a) Describe the Goals of solid waste Management. [8]

   b) Write some suggestions from your side to improve the solid waste management in your locality. [8]

UNIT- II

2. a) Write the characteristics of public bins/Containers. [8]

   b) How will you decide the location of container in your locality [8]

(OR)

   a) Describe the onsite processing methods & its associated problems. [8]

   b) Write a short note on onsite storage of waste. [8]

UNIT - III

3. a) What are the various types of collection system. Describe. [8]

   b) What points will you keep in mind while selecting the route map for collection of waste. [8]

(OR)

a) How will you evaluate the equipment & Labour requirement for collection of waste. [8]

b) How you will decide the utility of transfer station & also comment upon the comparison between night & day collection of waste. [8]

UNIT - IV

4. a) How will you select a suitable site for developing a land fill. [8]

   b) Draw a neat sketch of land fill & explain its components. [8]

(OR)

a) Explain the various methods of composting. [8]

b) Write short notes on Bioremediation & incineration [8]

UNIT - V

5. Write short notes on any two [2×8]

   i) Recovery & Reuse of Solid waste

   ii) Energy Recovery from solid waste.

   iii) Types of process for decomposition of solid waste.

   iv) Material Recovery options from solid waste.

(OR)

a) What are the various methods of industrial waste treatment. [8]

b) Write a short note on disposal of industrial waste. [8]

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