

CE V SEM

Techno India NJR Institute of Technology

Plot-SPLT, Bhamashah (RIICO) Industrial Area
Kaladwas, Udaipur-313003 (Rajasthan)

Total No. of Pages: 2

5E1740

Roll No. _____

5E1740

B. Tech. V - Sem. (Main) Exam., February - 2023
Civil Engineering

5CE3 – 01 Construction Technology & Equipments

Time: 3 Hours

Maximum Marks: 70

Instructions to Candidates:

Attempt all ten questions from Part A, five questions out of seven questions from Part B and three questions out of five from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may 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. NIL

2. NIL

PART – A

(Answer should be given up to 25 words only)

[10×2=20]

All questions are compulsory

- Q.1 What is the objective of construction technology and equipment?
- Q.2 What is the principle of engineering economy?
- Q.3 What do you mean by depreciation?
- Q.4 Define the term accident.
- Q.5 Define depletion.
- Q.6 What is the outcome of construction technology?
- Q.7 Name the different types of crane.

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Q.8 Enumerate different types of hauling equipment.

Q.9 What is the use of hoe?

Q.10 What is the objective of material management?

PART – B

(Analytical/Problem solving questions)

[5×4=20]

Attempt any five questions

Q.1 What do you mean by minimum cost point analysis?

Q.2 Discuss in detail different types of accident.

Q.3 What are the safety measures in demolition of building?

Q.4 What are the causes of an accident?

Q.5 Explain the different factor on which power shovel depends.

Q.6 What is the need of construction planning? Write a brief note on construction stages.

Q.7 Discuss in detail on job layout for building with neat sketches.

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions)

[3×10=30]

Attempt any three questions

Q.1 Explain in detail the break-even point analysis with diagram.

Q.2 Write a short essay on the fire resistant construction of structural elements in view of fire safety in building.

Q.3 How will you prepare the construction schedule? Explain in detail with neat sketches.

Q.4 List different earth moving equipment. What are the various parts of dragline and also, discuss the operation of a dragline with diagram?

Q.5 What are the different pile driving equipment? Also, discuss in detail the advantages and disadvantages of each hammers used in pill driving.

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Total No. of Pages: **4****5E1741****B. Tech. V - Sem. (Main) Exam., February - 2023****Civil Engineering****5CE4-02 Structural Analysis - I****Time: 3 Hours****Maximum Marks: 70***Instructions to Candidates:*

Attempt all ten questions from Part A, five questions out of seven questions from Part B and three questions out of five from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may 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. NIL2. NIL**PART – A****(Answer should be given up to 25 words only)****[10×2=20]****All questions are compulsory**

- Q.1 In a simply supported beam of span 7.5 m the deflection at a point A is 4 mm when 10 kN load is applied at point B. What will be the deflection at B if load of 25 kN is applied at A? Point A is 1.5 m from left support and point B is 4.5 m from left support.
- Q.2 Define static indeterminacy. Calculate internal and external static indeterminacy for the structure shown in Fig 1.

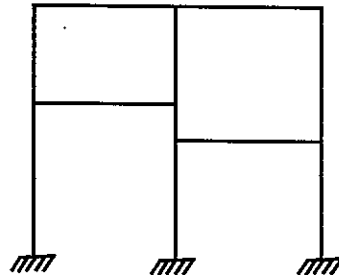


Fig.1

- Q.3 Define stiffness of a spring. Based on the stiffness of spring, define linear spring, soft spring and hard spring.
- Q.4 Draw neat diagrams to show a Cantilever beam, Propped cantilever beam, Fixed Beam and Continuous beam.
- Q.5 What do you understand by a Conjugate beam?
- Q.6 What is D'Alembert's Principle?
- Q.7 Define the terms –
- Carry over factor
 - Distribution factor used in moment distribution method
- Q.8 Can the Clapeyron's Theorem (Theorem of three moments) be applied to solve a fixed beam? If yes, what is the procedure?
- Q.9 Find out the ratio of column head moments to be taken in sway analysis of a portal frame by moment distribution method if one of the column is fixed at the base and other is hinged.
- Q.10 Define the terms –
- Amplitude
 - Damping
 - Time period
 - Harmonic motion

PART – B

(Analytical/Problem solving questions)

[5×4=20]

Attempt any five questions

- Q.1 What are the special devices available for release of forces in structure? Explain any three devices with the help of diagram. Also, write expressions to compute the static and kinematic indeterminacy if such special devices are used in Rigid Jointed Plane Structure. Assume members to be inextensible.
- Q.2 Identify the unknowns in terms of slope and deflection in the given problem shown in Fig.2. Write down the slope deflection equations for the portal frame ABCD shown in Fig.2. Also, write the conditions available, equilibrium equations and shear equation (if required) to find the unknowns. (Solution of equations is not required to find unknowns).

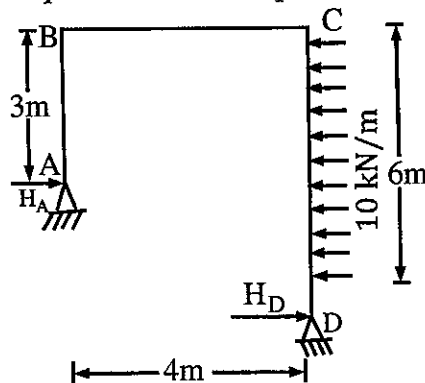


Fig. 2

- Q.3 Two springs of stiffness s_1 and s_2 are connected in series and parallel in two different systems. Derive the relation for resultant stiffness of the system when the springs are in -
- Series
 - Parallel
- Q.4 In a continuous beam XYZ, $XY = L$ and $YZ = L$. Supports X and Z are hinge supports and central support Y is roller support. The beam carries uniformly distributed load of intensity 'w' per unit length throughout. Draw shear force and bending moment diagrams for the continuous beam.
- Q.5 A fixed beam of span 6 m carries a point load of 20 kN at 2 m from the left hand support. Draw bending moment diagram for the beam using area moment method.
- Q.6 A cantilever of length L carries a concentrated load 'W' at $2L/3$ from the fixed end. If the free end is supported by a rigid prop, find out the reaction at the prop. Also draw the shear force and bending moment diagrams.
- Q.7 Using moment distribution method, calculate the moments at supports of the beam ABCD as shown in Fig. 3

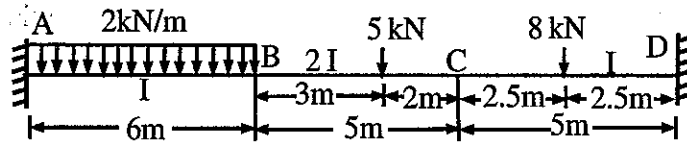


Fig. 3

PART - C

(Descriptive/Analytical/Problem Solving/Design Questions) [3×10=30]

Attempt any three questions

- Q.1 Solve the structure shown Fig. 4 using moment distribution method. Draw B.M.D. and deflected shape.

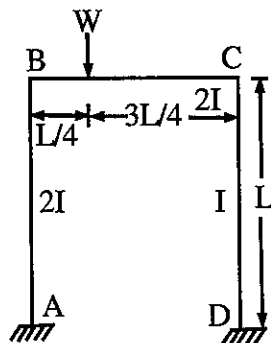


Fig. 4

Q.2 Using theorem of three moments, solve the continuous beam shown in Fig. 5. Plot the bending moment diagram.

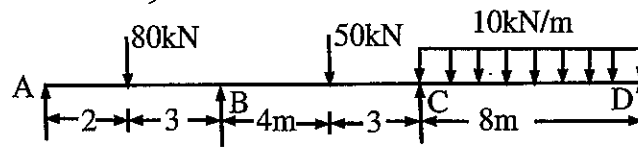


Fig. 5

Q.3 Using slope deflection method solve the structure shown in Fig. 6. Plot the bending moment diagram.

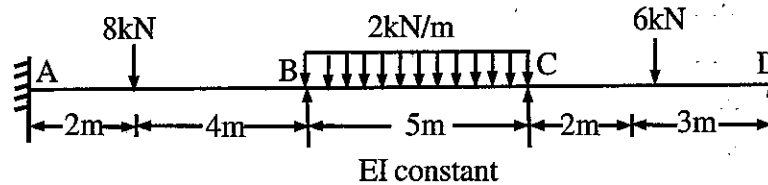


Fig. 6

Q.4 Derive the equation of motion for a damped single degree of freedom system having free vibration. Also define the terms –

- Critically damped system
- Over damped system
- Under damped system
- Logarithmic decrement

Q.5 In a cantilever beam AB, of span 'L' fixed at A and carrying a load 'P' at free end B, the value deflection 'y' at a section X, distant 'x' from support A is given by ,

$$y = \frac{Px^2(3L-x)}{6EI}$$

If the cantilever is now loaded with a concentrated load 'W' at X and propped at 'B' to the same level as A, show by using Reciprocal theorem that the reaction at support 'B' is

$$R_B = \frac{Wx^2(3L-x)}{2L^3}$$

Take E = Modulus of Elasticity and I = Moment of Inertia.

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B. Tech. V - Sem. (Main) Exam., February - 2023

Civil Engineering

5CE4 – 03 Design of Concrete Structures

Time: 3 Hours

Maximum Marks: 70

Instructions to Candidates:

Attempt all ten questions from Part A, five questions out of seven questions from Part B and three questions out of five from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may 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. NIL

2. NIL

PART – A

(Answer should be given up to 25 words only)

[10×2=20]

All questions are compulsory

Q.1 Name the various limit states in which a structure may unfit for use.

Q.2 Give the formula for calculating moment of resistance when a beam is under reinforced section.

Q.3 What is characteristics strength of concrete?

Q.4 What is doubly reinforced beam?

Q.5 What do you understand by a column?

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- Q.6 What are the values of factor of safety used for getting the permissible stresses in steel and concrete?
- Q.7 What is the difference between shallow foundation and deep foundation?
- Q.8 What is two way slab?
- Q.9 Define critical depth of neutral axis.
- Q.10 What is the slenderness ratio for a compression member? Define.

PART – B

(Analytical/Problem solving questions)

[5×4=20]

Attempt any five questions

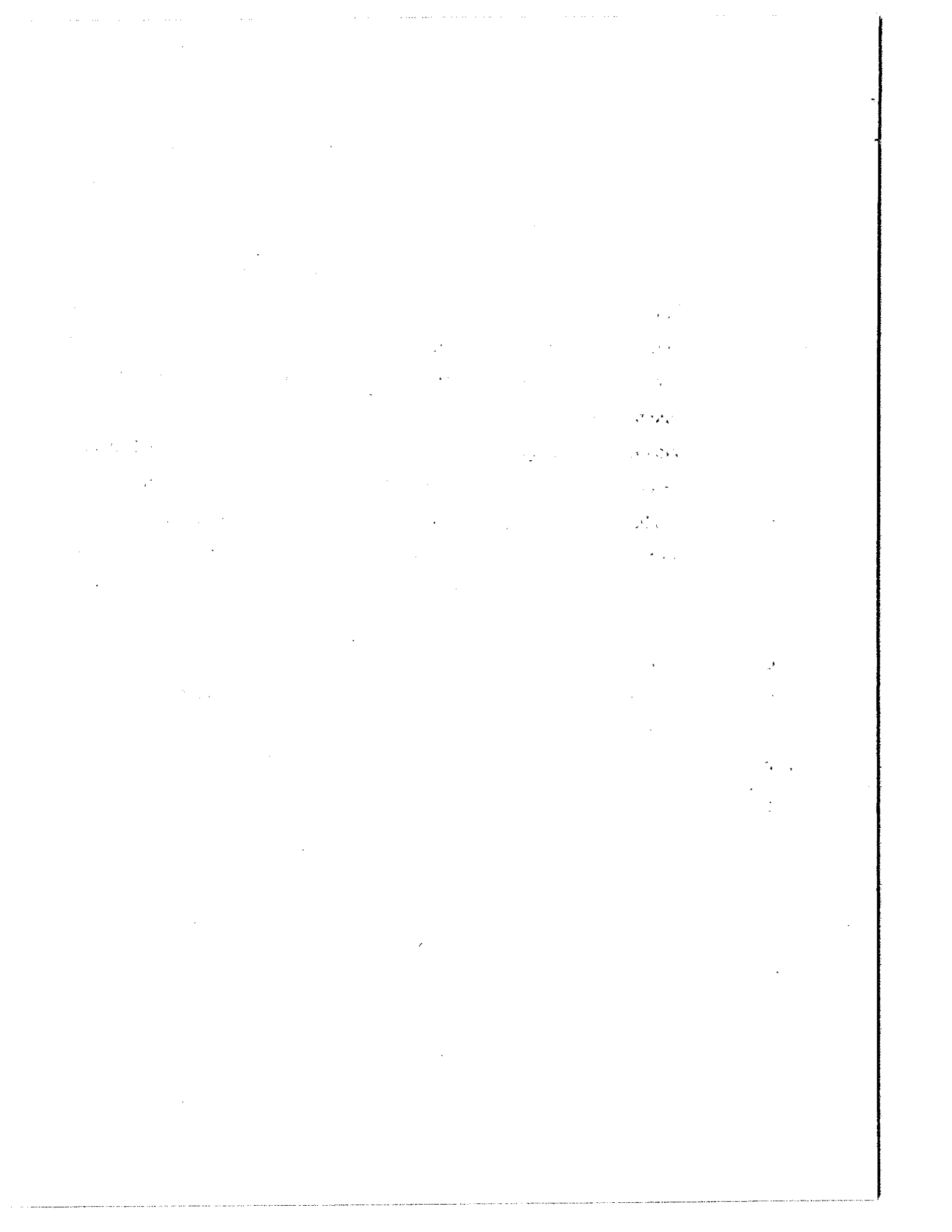
- Q.1 What are the assumptions made in limit state of collapse?
- Q.2 Explain balanced, under-reinforced and over-reinforced section.
- Q.3 What are the conditions for provision of doubly reinforced beam?
- Q.4 Draw a stress-strain curve for concrete and explain the different types of modulus of elasticity of concrete through it.
- Q.5 Differentiate between Working Stress Design Method and Limit State Design Method.
- Q.6 Explain with neat diagram –
- (i) Two legged vertical stirrups
 - (ii) Inclined shear stirrups
- Q.7 Which resistances are comprised in case of bond between steel & concrete?

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions) [3×10=30]

Attempt any three questions

- Q.1 Using Working Stress Method, a reinforced concrete beam 200mm × 400mm effective depth is used over an effective span of 5m. It is subjected to a uniformly distributed load of 5kN/m inclusive of its own weight. Find the necessary steel reinforcement at the center of the span. Take allowable stresses in steel and concrete as 130N/mm² and 4N/mm² respectively and $m = 16$.
- Q.2 Use Limit State Method to design a beam of M20 grade concrete, 300mm wide and 500mm deep is required to resist a super-imposed moment of 152kN-m at an intermediate support of a continuous beam. Using mild steel bars, calculate A_{st} at top, if 4 Nos. 16mm dia. bars are required to be continued at bottom from one span to the other. Assume, effective cover to compression steel as 45mm and that to the tension steel as 50mm.
- Q.3 A simply supported beam, 300mm wide and 600mm effective depth carries a uniformly distributed load of 74kN/m including its own weight over an effective span of 6m. The reinforcement consists of 5 bars of 25mm diameter. Out of these, two bars can be safely bent up at 1m distance from the support, design the shear reinforcement for the beam.
- Q.4 Design a RC floor slab for a room of internal dimensions 4m × 9.5m. Assume, slab to be simply supported on 230mm thick walls. Total load on slab is 10.75kN/m² (including self- weight). Use M20 concrete and Fe415 steel.
- Q.5 Write a short note on following –
- (i) Stress block parameter
 - (ii) Development length
-



5E1743

Roll No. _____

Total No. of Pages: 3

5E1743

B. Tech. V - Sem. (Main) Exam., February - 2023

Civil Engineering

5CE4 – 04 Geotechnical Engineering

Time: 3 Hours

Maximum Marks: 70

Instructions to Candidates:

Attempt all ten questions from Part A, five questions out of seven questions from Part B and three questions out of five from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may 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. NIL

2. NIL

PART – A

(Answer should be given up to 25 words only)

[10×2=20]

All questions are compulsory

- Q.1 Define void ratio and porosity.
- Q.2 What is an isobar?
- Q.3 Differentiate between uniform and differential settlement.
- Q.4 Discuss about disturbed and undisturbed soil samples.
- Q.5 What is quicksand condition?
- Q.6 Define stability number.
- Q.7 What is the significance of SPT-N value?
- Q.8 What are the different types of tri-axial test based on drainage conditions?
- Q.9 Define permeability of soil.
- Q.10 Differentiate between compaction and consolidation.

PART – B

(Analytical/Problem solving questions)

[5×4=20]

Attempt any five questions

- Q.1 Elaborate on classification of fine-grained soils using plasticity chart.
- Q.2 What will be the ratio of average permeability in the horizontal direction to that in the vertical direction for a soil deposit consisting of three layers if the thickness and permeability of the second layer is twice of the first layer and the thickness and permeability of the third layer is thrice of the second layer?
- Q.3 A concentrated load of 2000kN is applied at the ground surface. Determine the vertical stress at a point P, which is 6m directly below the load. Also, calculate the vertical stress at a point R, which is at a depth of 6m but at a horizontal distance of 5m from the axis of the load. Solve using Boussinesq's equation.
- Q.4 A direct shear test was carried out on a cohesive soil sample and the following results were obtained –

Normal stress (kN/m ²)	140	240
Shear stress at failure (kN/m ²)	100	110

What would be the deviatoric stress at failure if a tri-axial test is carried out on the same soil with a cell pressure of 150kN/m²?

- Q.5 Explain with a neat sketch : active, passive and earth pressure at rest.
- Q.6 Explain Terzaghi's Theory on bearing capacity of soil.
- Q.7 A smooth backed vertical wall is 6.3m high and retains a soil with bulk unit weight of 18kN/m³ and angle of internal friction 18 degrees. The top of the soil is level with the top of the wall and is horizontal. If the soil surface carries a uniformly distributed load of 45kN/m², determine the total active thrust on the wall per unit length and its point of application.

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions) [3×10=30]

Attempt any three questions

- Q.1 A clay stratum 8m thick is located at a depth of 6m from the ground surface. The natural moisture content of the clay is 56% and $G = 2.75$. The soil stratum between the ground surface and the clay consists of fine sand. The water table is located at a depth of 2m below the ground surface. The submerged unit weight of fine sand is 10.5kN/m^3 and its bulk unit weight above the water table is 18.68kN/m^3 . Plot the pressure distribution diagram. Also, calculate the effective stress at the centre of the clay layer.
- Q.2 Describe briefly on different types of slope failure. An infinite slope is to be constructed of clay soil with a slope angle of 30° . The ground water table is at the ground itself, with seepage parallel to the ground. The soil properties are cohesion = 15kN/m^3 , angle of internal friction = 22° and saturated unit weight of 20kN/m^3 . What is the factor of safety against movement along a plane parallel to the ground surface at a depth of 4m and 5.5m?
- Q.3 Distinguish between normally and over consolidated soils. In a consolidation test, the void ratio of the specimen which was initially 1.068 under an effective pressure of 214kN/m^2 changed to 0.994 when the pressure was increased to 429kN/m^2 . Calculate the coefficient of compressibility, compression index and coefficient of volume compressibility. Find the settlement of foundation resting on top of clay if the thickness of layer is 8m and the increase in pressure is 10kN/m^2 .
- Q.4 What is the basis of construction of Newmark's influence chart? How it is used?
- Q.5 Discuss plate load test with a neat sketch. Explain its limitations and uses.
-

1. The first part of the document discusses the importance of maintaining accurate records of all transactions. It emphasizes that proper record-keeping is essential for the integrity of the financial system and for the ability to detect and prevent fraud.

2. The second part of the document outlines the specific requirements for record-keeping, including the need to maintain original documents and to keep copies of all transactions. It also discusses the importance of regular audits and the need to ensure that all records are up-to-date and accurate.

3. The third part of the document discusses the consequences of failing to maintain accurate records, including the potential for financial loss and the risk of legal action. It also discusses the importance of training staff on proper record-keeping procedures and the need to ensure that all staff are aware of the importance of accurate record-keeping.

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5E1744

Roll No. _____

Total No. of Pages: 2

5E1744

B. Tech. V - Sem. (Main) Exam., February - 2023

Civil Engineering

5CE4 – 05 Water Resource Engineering

Time: 3 Hours

Maximum Marks: 70

Instructions to Candidates:

Attempt all ten questions from Part A, five questions out of seven questions from Part B and three questions out of five from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may 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. NIL

2. NIL

PART – A

(Answer should be given up to 25 words only)

[10×2=20]

All questions are compulsory

- Q.1 Define consumptive use of water.
- Q.2 Name the principal Indian crop seasons.
- Q.3 Define Duty and Delta of water.
- Q.4 What is hydrologic cycle?
- Q.5 Define hydrograph.
- Q.6 What are the types of canals?
- Q.7 Name the semi-theoretical approaches used for design of canals and channels.
- Q.8 What is the application of Bligh's method?
- Q.9 What is a gravity dam?
- Q.10 What are the forces acting on a gravity dam?

PART – B

(Analytical/Problem solving questions)

[5×4=20]

Attempt any five questions

- Q.1 What are the functions and advantages of irrigation?
- Q.2 Discuss the present status of irrigation in India, alongwith the challenges and their solutions.
- Q.3 Explain the steps followed during design of diversion head works.
- Q.4 What are the embankment dams? How would you select a site for construction of such dams?
- Q.5 Describe the principles of design of earth dams alongwith their stability requirements.
- Q.6 What is meant by cross-drainage structures? Explain their necessity with some suitable examples and neat sketches.
- Q.7 Define unit hydrograph and the method of its determination. Also, discuss its importance in hydrology.

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions)

[3×10=30]

Attempt any three questions

- Q.1 Explain the Lacey's theory and its assumptions.
 - Q.2 Describe the causes of failures of embankment dams and the remedial & preventive measures.
 - Q.3 What are the differences between Kennedy's Theory and Lacey's Theory? Critically evaluate.
 - Q.4 What are the types and functions of wells? Explain their role in irrigation, alongwith the advantages and disadvantages.
 - Q.5 Explain the methods used for measurement of rainfall. Also, discuss their suitability merits and demerits.
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5E1745

Roll No. _____

Total No. of Pages: **2****5E1745****B. Tech. V - Sem. (Main) Exam., February - 2023****Civil Engineering****5CE5 – 11 Air & Noise Pollution and Control (Elective-I)****Time: 3 Hours****Maximum Marks: 70***Instructions to Candidates:*

Attempt all ten questions from Part A, five questions out of seven questions from Part B and three questions out of five from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may 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. NIL2. NIL**PART – A****(Answer should be given up to 25 words only)****[10×2=20]****All questions are compulsory**

- Q.1 What are the sources of air pollution?
- Q.2 Explain Greenhouse effect.
- Q.3 What do you mean by indoor air pollution?
- Q.4 Explain the phenomenon of self-cleansing of atmosphere.
- Q.5 What is meant by “Smog”? State the harmful effects of smog.
- Q.6 What are the indices of air pollution?
- Q.7 What is meant by Acoustic reflex?
- Q.8 Differentiate between Air-borne noise and Structure-borne noise.
- Q.9 Differentiate between sound intensity and sound pressure levels.
- Q.10 What are the harmful effects of noise on human health?

PART – B

(Analytical/Problem solving questions)

[5×4=20]

Attempt any five questions

- Q.1 Describe the primary and secondary meteorological parameters that influence air pollution.
- Q.2 Describe the working and advantages of cyclone separator as an equipment for control of air pollution.
- Q.3 Explain the natural and un-natural sources of air pollution.
- Q.4 What do you understand by biological air pollution control strategies?
- Q.5 What is Noise Pollution? What are the harmful effects of noise pollution?
- Q.6 Define dBA. What are the various standards of noise?
- Q.7 Differentiate between continuous, intermittent and impulsive noise.

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions)

[3×10=30]

Attempt any three questions

- Q.1 What are the different methods for control of gaseous pollutants? Describe any one method in detail.
 - Q.2 What do you understand by the terms RSPM, SPM and PM10? Explain the working of Electrostatic Precipitator alongwith its working principle.
 - Q.3 Discuss the impact of atmospheric pressure and moisture on dispersion of air pollutants.
 - Q.4 What is annoyance by noise? Explain Sonic booms in detail.
 - Q.5 Distinguish between Temporary Threshold Shift (TTS), Permanent Threshold Shift (PTS) with respect to cause of hearing loss, duration of exposure and potential for recovery.
-

5E1748

Roll No. _____

Total No. of Pages: 3

5E1748

B. Tech. V - Sem. (Main) Exam., February - 2023

Civil Engineering

5CE5 – 14 Repair and Rehabilitation of Structures
(Elective-II)

Time: 3 Hours

Maximum Marks: 70

Instructions to Candidates:

Attempt all ten questions from Part A, five questions out of seven questions from Part B and three questions out of five from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may 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. NIL

2. NIL

PART – A

(Answer should be given up to 25 words only)

[10×2=20]

All questions are compulsory

- Q.1 Name any one of the commonly used corrosion inhibitor compound (chemical name) and its typical dosage.
- Q.2 What is the effect on 'permeability' when aggregates are mixed in cement paste? Enumerate the main factor responsible for change in permeability from that of the cement paste.
- Q.3 Name any two preventive measures to reduce risk of alkali-aggregate reaction and associated possible cracks in concrete.
- Q.4 Write in brief the function of 'Rebar locator'.
- Q.5 Write any two disadvantages of 'epoxy based coatings' on concrete surface.

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- Q.6 How composition/ metallurgy of 'corrosion resistant steel' is different from 'ordinary steel' used as reinforcement?
- Q.7 If concrete core strength of a 100×200 mm core sample is 20 N/mm², write its (approximate) equivalent cube strength.
- Q.8 If 'resistivity' value of 'A' concrete is 5.0 kΩcm and that of 'B' concrete is 15 kΩcm, which concrete, out of 'A' and 'B' is less prone to corrosion of reinforcement embedded in it?
- Q.9 Which chemical admixture will you recommend to be used for 'under water repair concrete'? State the reason too.
- Q.10 List the components/ ingredients of ferro-cement.

PART – B

(Analytical/Problem solving questions)

[5×4=20]

Attempt any five questions

- Q.1 Enumerate the conditions where 'self-curing compounds' are useful than other repair materials.
- Q.2 Write typical half-cell potential values that indicates –
- (i) Low risk vulnerability to corrosion
 - (ii) Medium risk vulnerability of corrosion
 - (iii) High risk vulnerability of corrosion
- Q.3 Enumerate any four things to be looked and noted during 'visual investigation' for preliminary assessment of a damaged structure.
- Q.4 Enumerate through figures types of cracks in Masonry structures.
- Q.5 Explain 'Sacrificial Anode' method.
- Q.6 Write measures recommended to prevent/minimize damage to concrete structures due to sulfate attack.
- Q.7 Write the conditions in which repair by polymer modified mortars is to be preferred than by other methods.

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions) [3×10=30]

Attempt any three questions

- Q.1 Write any case study related to rehabilitation of bridge piers in India or of any heritage structure rehabilitation carried out in the country.
- Q.2 Explain 'Grouting' process, its limitations and applicable conditions as a repair technique (with figures).
- Q.3 Explain utility of 'FRP' as a repair material its properties and conditions in which it is selected.
- Q.4 Explain the 'Carbonation' of concrete with factors affecting it. How does and how it affects risk of corrosion in embedded steel?
- Q.5 Describe various types of cracks in concrete through figure/s and their preventive measures.
-

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5E1341

Roll No. _____

Total No. of Pages: 2

5E1341

B. Tech. V - Sem. (Back) Exam., February - 2023
ESC Civil Engineering
5CE3 – 01 Construction Technology & 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 may 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. NIL

2. NIL

PART – A

(Answer should be given up to 25 words only)

[5×2=10]

All questions are compulsory

- Q.1 Describe the importance of construction management in national development.
- Q.2 Define minimum cost point analysis with the help of graph.
- Q.3 List items of works prone to severe accident.
- Q.4 Describe the various resources required for construction.
- Q.5 Give advantages of utilisation of construction equipments.

PART – B

(Analytical/Problem solving questions)

[4×10=40]

Attempt any four questions

- Q.1 Define engineering economy. Explain principle of engineering economy.
- Q.2 Give difference between depreciation and depletion with example.
- Q.3 Write about causes of accidents on construction jobs.
- Q.4 Explain codal provisions for fire safety as per National Building Code of India.
- Q.5 Write about objectives and function of material management.
- Q.6 Write about selection criteria for earthwork equipments. Give neat sketch of tower cranes showing its parts.

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions)

[2×15=30]

Attempt any two questions

- Q.1 What do you understand by safety lacuna in Indian scenario? State codal requirements and important safety measures for demolition of buildings.
- Q.2 Define job layout. What are the purpose and factors affecting job layout. Prepare a typical layout for a three storeyed building block.
- Q.3 Give name of different types of earth moving equipments. Write about clamshells and its application with the help of neat sketch.

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Roll No. _____

Total No. of Pages: 4

5E1342

B. Tech. V - Sem. (Back) Exam., February - 2023

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 may 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. NIL

2. NIL

PART – A

(Answer should be given up to 25 words only)

[5×2=10]

All questions are compulsory

Q.1 Define the utility of the Maxwell's reciprocal theorem.

Q.2 Differentiate between the static and kinematic degree of indeterminacy.

Q.3 Define Betti's theorem.

Q.4 Define the term stiffness for springs.

Q.5 Define Simple Harmonic Motion.

[5E1342]

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PART – B

(Analytical/Problem solving questions)

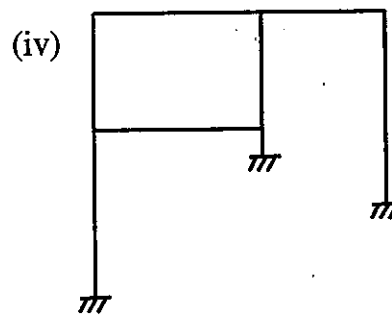
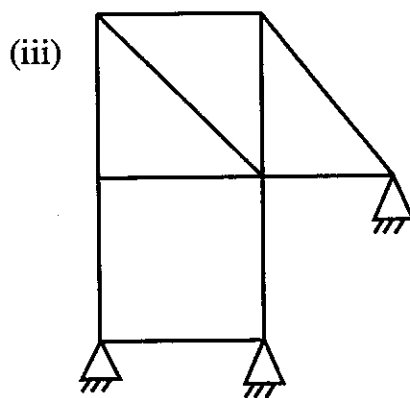
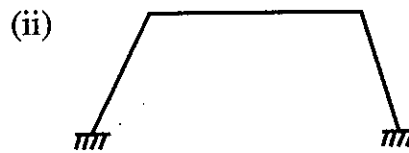
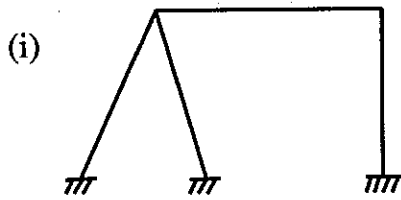
[4×10=40]

Attempt any four questions

Q.1 Define the following terms for a prismatic member in moment distribution method –

- (i) Stiffness of a member
- (ii) Distribution factor
- (iii) Carry over factor

Q.2 Determine static and kinematic indeterminacy of the plane frames. (fig (i) to (iv))



11
12
13
14
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16
17
18

Q.3 Explain Angular oscillation.

Q.4 Write short notes on –

- (a) D'Alembert's principle
- (b) Degree of freedom
- (c) Newton's law of motion
- (d) Three moment theorem

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

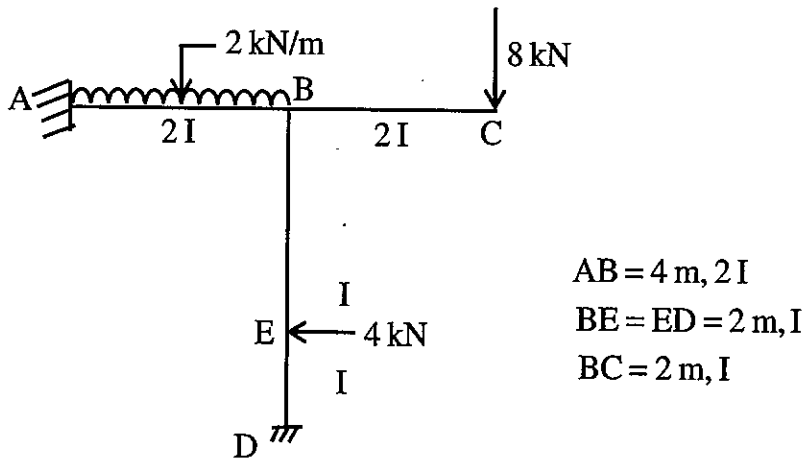
Q.6 Derive an expression for undamped force vibration of SDOF subjected to harmonic force.

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions) [2×15=30]

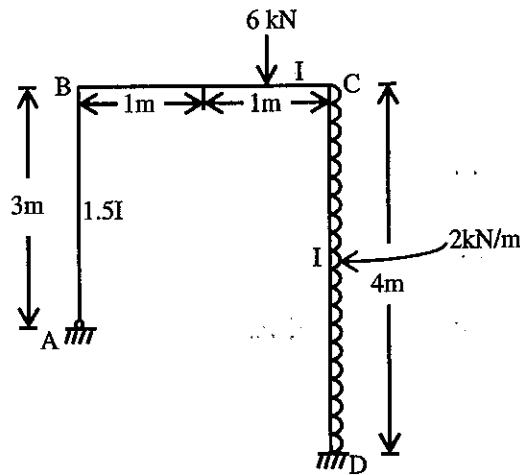
Attempt any two questions

Q.1 Analyze the rigid frame shown in (fig. 2) using slope deflection method. Draw the BMD.

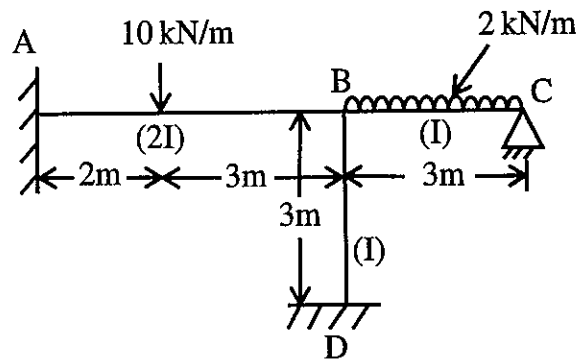


(Fig. 2)

Q.2 Analyze the frame shown in fig using moment distribution method. Draw BMD and deflected shape.



Q.3 A continuous beam ABC is supported on an elastic column BD and is loaded as shown in fig. Treating Joint B as rigid analyze the frame by slope deflection method and plot the bending moment diagram.



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Total No. of Pages: 3

5E1343

B. Tech. V - Sem. (Back) Exam., February - 2023

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, five questions out of seven questions from Part B and four questions out of five from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may 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

2. NIL

PART – A

(Answer should be given up to 25 words only)

[10×2=20]

All questions are compulsory

Q.1. Define characteristics strength.

Q.2. Define limit state of service ability.

Q.3. Define factor of safety and load factor.

Q.4. Differentiate between short and long column.

Q.5. Differentiate between one way and two way slab.

Q.6. Differentiate between singly reinforced and doubly reinforced beams.

Q.7. Define moment of resistance.

[5E1343]

Page 1 of 3

- Q.8 What is the difference between lap length and anchorage length?
Q.9 What is torsion in R.C.C.?
Q.10 Write down different types of footings.

PART – B

(Analytical/Problem solving questions)

[5×8=40]

Attempt any five questions

- Q.1 Explain balanced, under reinforced and over reinforced sections in the context of limit state design philosophy.
- Q.2 Design a balanced singly reinforced concrete beam section for an applied moment of 60 kN-m. The width of the beam is limited to 175 mm. Use M20 concrete and Fe 415 steel bars.
- Q.3 Determine the factored moment of resistance of a beam 230 mm × 460 mm (effective). The beam is reinforced with 2-16 mm diameter bars on compression side and 4-20 mm diameter bars on tension side. The compression bars are placed at a distance of 40 mm from top. Use M20 concrete and Fe 415 steel.
- Q.4 A singly reinforced beam has an effective depth of 400 mm and a breadth of 250 mm. It contains 4-16 mm bars. For M20 concrete and Fe 415 steel. Calculate the shear reinforcement for a factored shear force of 250 kN.
- Q.5 Write short notes on –
- (i) Types of shear reinforcement
 - (ii) Concept of band stress
 - (iii) Anchoring bars
 - (iv) Bent up bars
- Q.6 Design a circular column to carry an axial load of 1000 kN. Use M20 concrete and Fe 415 steel.
- Q.7 Determine the reinforcement required for a rectangular beam section with the following data :
- Width of section : 300 mm, Depth : 500 mm, Factored BM : 80 kN-m,
Factored torsional : 40 kN-m, Factored shear force : 70 kN.
Use M20 grade concrete and Fe 415 grade steel.

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions) [4×15=60]

Attempt any four questions

- Q.1 Using limit state design method, determine and provide the tension reinforcement for resisting a working moment of 125 kN-m. The beam section is having width = 300 mm and effective depth = 675 mm. Use M20 concrete and Fe 415. Give the neat sketch showing all details.
- Q.2 Explain following –
- (i) PU-MU interaction curve
 - (ii) Isolated footing and combined footing
 - (iii) Punching shear
- Q.3 A slab is simply supported over a clear opening in plan $6\text{m} \times 4.5\text{m}$. The corners of the slab are free to lift up. There is 50 mm thick plain concrete floor finish on the top of slab. Live load = 4 kN/m^2 , concrete grade M-15, steel grade Fe 415. Design the slab. Also give neat sketch of slab showing all details of reinforcement in support of your answer.
- Q.4 Design a suitable footing to support a square column $400 \text{ mm} \times 400 \text{ mm}$ carrying an axial service load of 1200 kN. The safe bearing capacity of the soil at the site = 200 kN/m^2 . Adopt M20 and Fe 415. Give the neat sectional sketch and plan showing reinforcement details.
- Q.5 Design a short axially loaded square column $500 \text{ mm} \times 500 \text{ mm}$ for a service load of 2000 kN. Use M20 concrete and Fe 415 grade steel.
-

5E1344

Roll No. _____

Total No. of Pages: **3**

5E1344

B. Tech. V - Sem. (Back) Exam., February - 2023

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 questions from Part B and four questions out of five from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may 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. NIL

2. NIL

PART – A

[10×2=20]

(Answer should be given up to 25 words only)

All questions are compulsory

- Q.1 Define relative index.
- Q.2 Explain Darcy's Law of Permeability.
- Q.3 What are the assumptions of Westergaard's theory?
- Q.4 Differentiate between Standard Proctor test and Modified Proctor test.
- Q.5 What are the application of sheet piles?
- Q.6 Define –
(a) Net safe bearing capacity
(b) Gross safe bearing capacity.

- Q.7 What are the assumptions of Terzaghi's bearing capacity theory?
- Q.8 What do you understand by the term 'Piping' in soil?
- Q.9 Define degree of saturation in soil.
- Q.10 Define percentage air voids in soil.

PART – B

[5×8=40]

(Analytical/Problem solving questions)

Attempt any five questions

- Q.1 Explain Liquid limit, Plastic limit and Shrinkage limit with suitable curve.
- Q.2 Derive the relation between porosity and void ratio.
- Q.3 Explain the method to determine water content by Pycnometer.
- Q.4 A soil sample with specific gravity of soil solids as 2.70 has a mass specific gravity of 1.84 assuming the soil to be perfectly dry, determine the void ratio.
- Q.5 Determine the shear strength in terms of effective stress on a plane within a saturated soil mass at a point where the total normal stress is 200 kN/m^2 and the pore water pressure is 80 kN/m^2 . The effective stress shear strength parameters for the soil are: $c' = 16 \text{ kN/m}^2$ and $\phi = 30^\circ$.
- Q.6 Explain Skempton's analysis of determination of bearing capacity in saturated soil.
- Q.7 Explain the stability analysis of earth dam. Write three critical conditions for stability analysis.

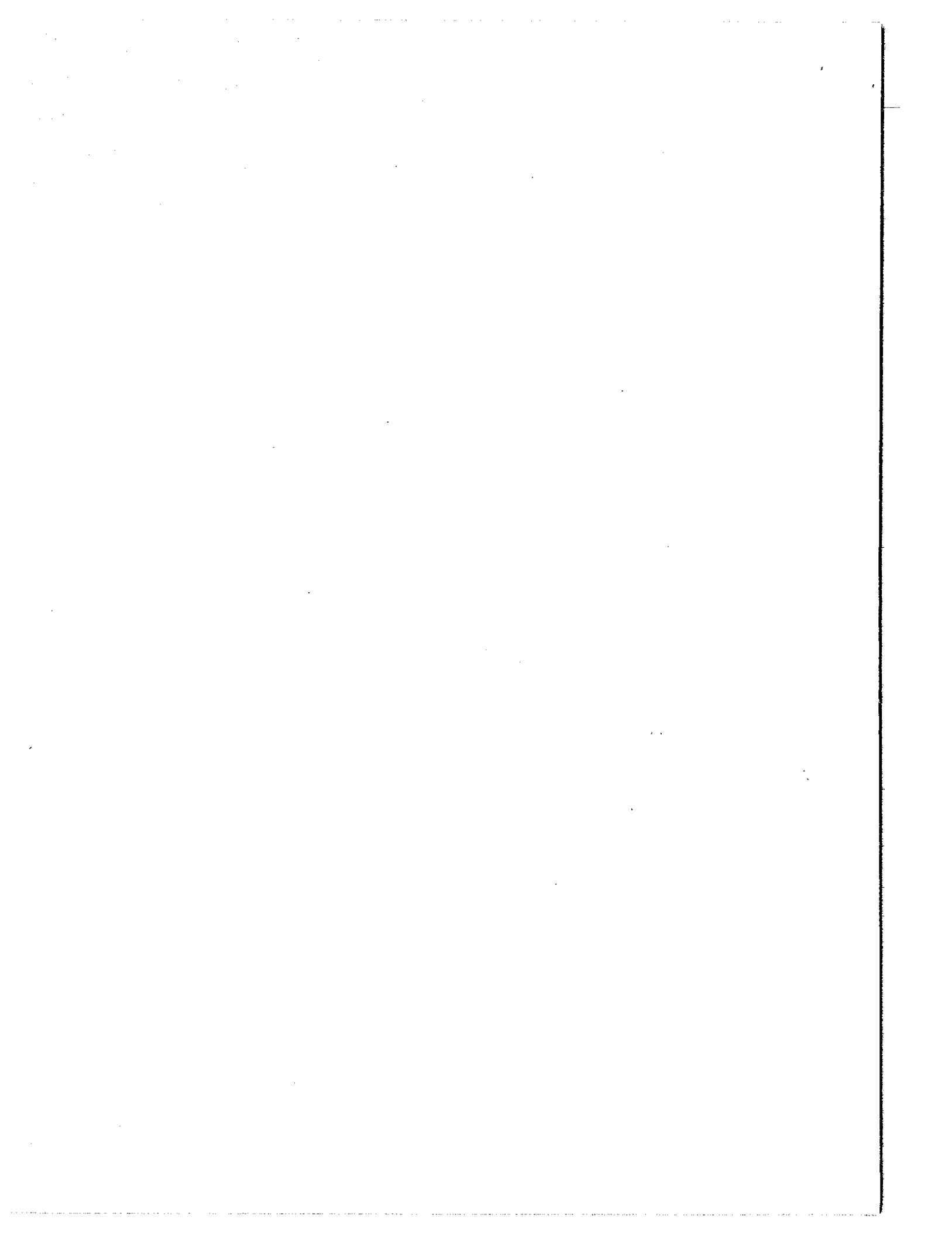
PART -- C

[4×15=60]

(Descriptive/Analytical/Problem Solving/Design Questions)

Attempt any four questions

- Q.1 A sample of saturated clay weighs 15.45 g and its moisture content is 38%. If the particle specific gravity is 2.70, find the void ratio, porosity, dry and bulk unit weights of the soil.
- Q.2 A concentrated load of 40 kN acts on the surface of a soil. Determine the vertical stress increment at points directly beneath the load upto a depth of 10 m and draw a plot. Also plot the variation of vertical stress increment due to load on horizontal planes at depths of 1 m, 2 m and 3 m upto a horizontal distance of 3 m on either side of centre.
- Q.3 A sample of sand from a natural deposit has a porosity of 35%. For a volume of 495 cc, the dry weight in the densest and loosest states are 950 g and 700 g, respectively. Compute the relative density.
- Q.4 (a) Describe plate load test. Also, explain its limitation and uses.
(b) Discuss the standard penetration test for determining the bearing capacity of soil.
- Q.5 Explain Tri-axial compression test, also write their merits.
-



5E1345

Roll No. _____

Total No. of Pages: 2

5E1345

B. Tech. V - Sem. (Back) Exam., February - 2023

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 may 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. NIL

2. NIL

PART – A

(Answer should be given up to 25 words only)

[5×2=10]

All questions are compulsory

Q.1 What is meant by duty of a crop?

Q.2 Write down drawbacks of Kennedy's Theory.

Q.3 What are the functions of irrigation?

Q.4 Write a short note on open well.

Q.5 Define Hydrology.

[5E1345]

Page 1 of 2

PART – B

(Analytical/Problem solving questions)

[4×10=40]

Attempt any four questions

- Q.1 Write a note on present status of irrigation in India.
- Q.2 Describe the procedure of design of channels by Hacey's Theory.
- Q.3 Write a brief note on canal classification.
- Q.4 Describe the various types of tube wells with neat sketches.
- Q.5 What are the assumptions made in unit Hydrograph Theory?
- Q.6 Write a short note on infiltration capacity.

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions)

[2×15=30]

Attempt any two questions

- Q.1 Design an irrigation channel by Kennedy's theory to carry a discharge of 15 cumecs. Take $N = 0.0225$, $m = 1$, $S = 1$ in 4000.
- Q.2 Design a Vertical drop weir, on Bligh's theory for the following data -
- (i) Maximum flood discharge = 1200 cumecs.
 - (ii) H. F. L. before construction of weir = 172.5 m.
 - (iii) River bed level = 168.0 m.
 - (iv) Allowable afflux = 1 m.
 - (v) F. S. L. of canal = 171.5 m.
 - (vi) Coefficient of creep = 11
- Assume any other data not given. The weir wall need not be designed and its dimensions may be taken as follows –
- (i) top width = 3m.
 - (ii) bottom width = 6m.
- Q.3 Describe the theory of Unit hydrograph. Explain the method of derivation of a unit hydrograph from an isolated storm hydrograph.

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Roll No. _____

Total No. of Pages: 2

5E1346

B. Tech. V - Sem. (Back) Exam., February - 2023

PCC/ PEC Civil Engineering

5CE5-11 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 may 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. NIL

2. NIL

PART – A

[5×2=10]

(Answer should be given up to 25 words only)

All questions are compulsory

- Q.1 What are the reasons behind the ozone hole?
- Q.2 What is Particulate Matter?
- Q.3 What equipment's are used in the measurement of noise levels?
- Q.4 What are the sources of noise?
- Q.5 How to measure the quality of the air?

PART – B

[4×10=40]

(Analytical/Problem solving questions)

Attempt any four questions

- Q.1 What is Air (Prevention and Control of Pollution) Act 1981?
- Q.2 What is noise? Why it should be considered an environmental pollutant?
- Q.3 How is to control noise at source?
- Q.4 What is Smog and how is it created? Also, mention the types of smog.
- Q.5 What is the role of Environmental Impact Assessment?
- Q.6 Examine the effects of the ozone layer and the greenhouse effect.

PART – C

[2×15=30]

(Descriptive/Analytical/Problem Solving/Design Questions)

Attempt any two questions

- Q.1 Explain briefly -
 - (i) Noise measurement instruments
 - (ii) Noise sampling
 - Q.2 Explain the major classification of air pollutants.
 - Q.3 What are the control devices for particulate emissions?
-

5E1349

Roll No. _____

Total No. of Pages: 2

5E1349

B. Tech. V - Sem. (Back) Exam., February - 2023
PCC/ PEC Civil Engineering
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 may 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. NIL _____

2. NIL _____

PART – A

[5×2=10]

(Answer should be given up to 25 words only)

All questions are compulsory

- Q.1 Explain alkali aggregate reaction.
- Q.2 What is FRP?
- Q.3 Describe about jacketing.
- Q.4 What is water proofing techniques?
- Q.5 What is rebar locator?

PART – B

[4×10=40]

(Analytical/Problem solving questions)

Attempt any four questions

- Q.1 What constitutes a sulphate attack in concrete and how is it prevented?
- Q.2 What kinds of cracks can be found in concrete? Explain the crack preventative measures using clear diagrams.
- Q.3 Describe the significance of non-destructive testing and its advantages.
- Q.4 What are self-curing compounds? Explain in detail.
- Q.5 Describe briefly on:
- (i) Grouting
 - (ii) Under water repair
 - (iii) Externally bonded plates
- Q.6 Discuss the process of concrete carbonation and how it affects the start of corrosion?

PART – C

[2×15=30]

(Descriptive/Analytical/Problem Solving/Design Questions)

Attempt any two questions

- Q.1 (a) What exactly do you mean by Ferro-cement? Discuss the advantages and usages. [7]
- (b) Describe the many types of polymers used in repair. [8]
- Q.2 Describe the following : (5 marks each)
- (i) Core cutting [5]
 - (ii) Pull out tests [5]
 - (iii) Rebar locator [5]
- Q.3 (a) Explain the causes of distress and deterioration. [7]
- (b) A case study of rehabilitation of dam. [8]
-