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

5E1740

5E1740

B.Tech. V-Sem. (Main/Back) Examination, January/February - 2024

Civil Engg.

5CE3-01 Construction Technology and 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** question 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).

PART - A

(Answer should be given up to 25 words only)

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

1. What is the significance of material management?   (2)

2. Define the term depreciation.   (2)

3. What are the quality control measures during the construction of a building?   (2)

4. What are the causes of an accident?   (2)

5. How will you calculate the output of a scraper?   (2)

6. What are the different factors on which power shovel depends?   (2)

7. What is the purpose of drilling?   (2)

8. What are the safety measures during the storage and handling of building materials?   (2)

9. What is the purpose of tunnelling equipment?   (2)

10. Enumerate the different hauling equipment.   (2)

PART - B

(Analytical/Problem solving questions)

Attempt any Five questions. (5×4=20)

1. Explain in brief the principle of engineering economy. (4)

2. Classify the different accidents during building demolition. What should be the safety lacuna during demolition of building as per Indian Scenario (4)

3. What are the functions on which material management depends? (4)

4. What are the fire safety provisions as per NBC? (4)

5. What is the use of dragline? Also, explain the working of dragline with neat sketches. (4)

6. What are the objects of planning a building projects? Also, explain in detail the construction stages. (4)

7. Name the basic parts of power shovel. Explain in detail the steps used for complition of one cycle of excavation operation. (4)

PART - C

(Descriptive/Analytical/Problem solving/Design questions)

Attempt any Three questions. (3×10=30)

1. What is the difference between minimum cost and break even point analysis? Explain in detail the break even point analysis with neat sketches. (10)

2. How will you prepare the construction schedule? Explain the different methods which are used in preparation of construction schedule. (10)

3. What do you mean by pile driving? What are the different pile driving epuipments used on ground? Explain in detail with their advantages and disadvantages. (10)

4. Explain in brief the construction elements of a building. (10)

5. Enumerate different types of earth moving equipments. Also explain the basic, parts and operation of hoe and trenching machine. (10)

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5E1741

5E1741

B.Tech. V-Sem. (Main and Back) Examination, January/February - 2024
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** question 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).

PART - A

Answer should be given up to 25 words only. All questions are compulsory.

(10×2=20)

1. What are the scope and objectives of Structure Analysis Civil Engineering?   (2)

2. What do you understand by determinate and indeterminate structures? Explain with the help of example.   (2)

3. Explain different type of supports and also enumerate different type of beams along with their respective static indeterminacies.   (2)

4. Define Degrees of freedom per node.   (2)

5. What is the basic difference between Static and Kinematic indeterminacy?   (2)

6. Discuss about portal frame structure and its advantages.   (2)

7. Write statement of Maxwell's reciprocal theorem.   (2)

8. What do you understand by stiffness of springs and give name of basic elements of vibratory system?   (2)

9. Explain damped and forced vibration.   (2)

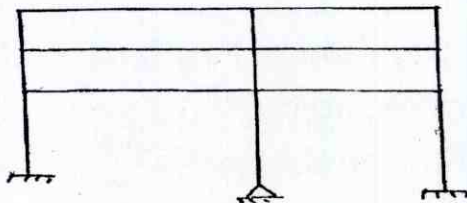10. Find kinematic indeterminacy for the following given figure for the following cases: **(2)**

Fig.1

i) Members are flexible

ii) Members are inextensible

iii) Beam is axially rigid

iv) Column is axially rigid

PART - B

(Analytical/Problem solving questions)

Attempt any Five questions. $(5\times4=20)$

1. For the given fixed beam find end reactions and draw the bending moment diagram by using Area-Moment method. **(4)**
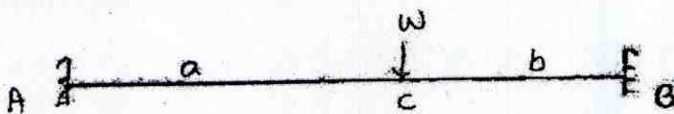

Fig. 2

2. Draw BMD for given fixed beam, also calculate the maximum deflection with the help of conjugate beam method. **(4)**

Fig. 3

3. Find the maximum deflection and draw the SFD and BMD for the given beam. **(4)**
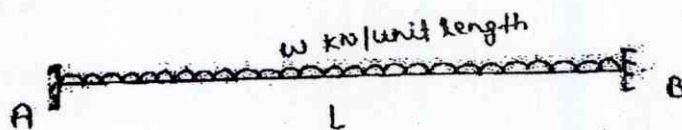

Fig. 4

4. State and explain conjugate beam method. Explain its properties and support behavior under real and conjugate beam. **(4)**

5. State and explain Newton's Law of Motion Also obtain the mathematical expression for the same. **(4)**

6. Define Simple Harmonic Motion and Difference between Periodic, Oscillation and Simple Harmonic Motion. And also discuss about characteristics and addition of harmonic motions. **(4)**

7. What is D' Alembert's Principle? Mathematical Representation, Examples and Applications of D' Alembert's Principle. **(4)**

PART - C

Descriptive/Analytical/Problem solving/Design questions.

Attempt any Three questions. **(3×10=30)**

1. A Continuous beam ABCD is shown in figure-5 below. Calculate the moment induced at the ends if support B settle by 30 mm. Draw the BMD and the deflected shape of the beam. Take $E=2\times10^5 N/mm^2$ and $I=3\times10^6 mm^4$ constant for the whole beam. Use slope deflection method. **(10)**
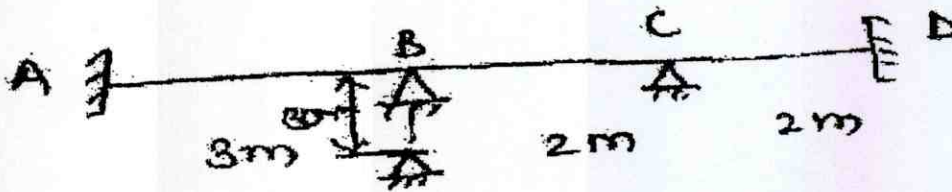

Fig.5

2. A continuous beam ABCD consists of three span and is loaded as shown in figure - 6. Determine the bending moments at the supports and plot the BMD with the help of moment distribution method. **(10)**
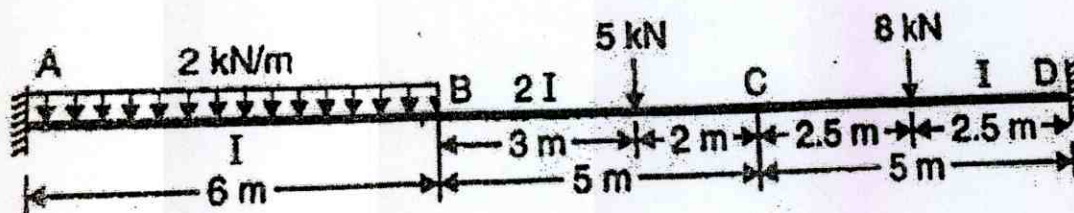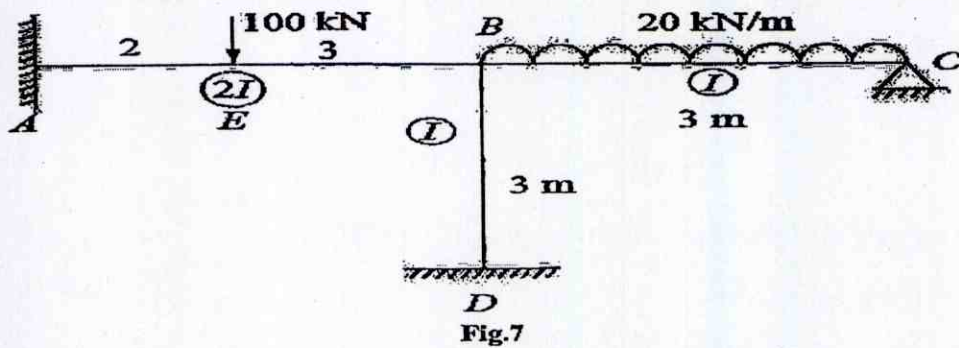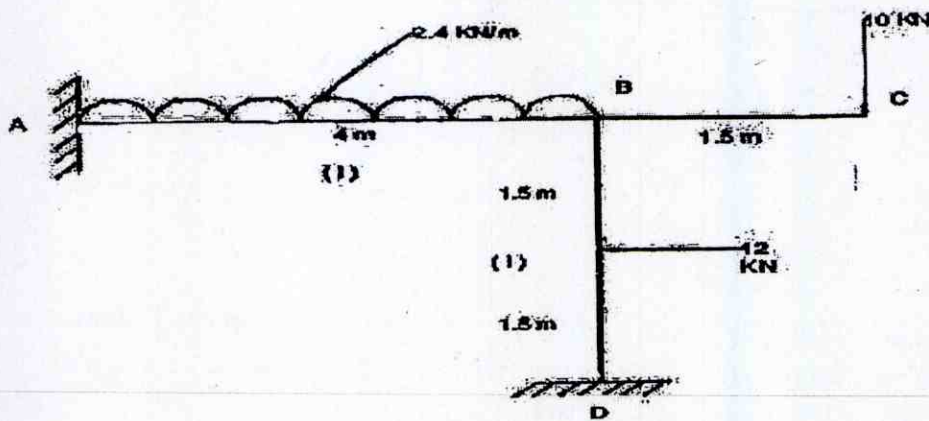

Fig.6

5E1741 (3) [Contd....

3. Obtain the expression for spring equivalent for both series and parallel connection. **(10)**

4. Analyse the frame by the moment distribution method and draw bending moment diagram. **(10)**

Fig.7

5. Analyse the frame by slope deflection method. Draw the bending moment diagram. **(10)**

Fig.8

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

5E1342

5E1342

B.Tech. V-Sem. (Back) Examination, January/February - 2024

PCC/PEC Civil Engg.

5CE4-02 Structural Analysis - I

Time : 2 Hours   Maximum Marks : 80

Mm. 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** questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data 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)

PART - A

(Answer should be given up to 25 words only)

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

1. Describe the Maxwell's Reciprocal theorem with the statement.

2. Calculate static and kinematic indeterminacies of given Figure.

3. Define Moment Distribution method, also explain Distribution factor.

4. Define equivalent stiffness of springs for series & parallel.

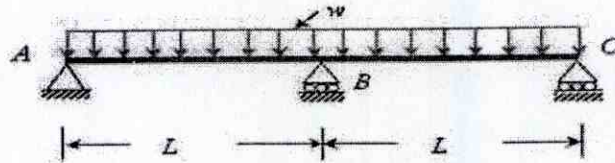5. List the characteristics of simple harmonic motion.

PART - B

(Analytical/Problem solving questions)

Attempt any Four questions.   **(4×10=40)**

1. Determine the support reactions of the continuous beam ABC as shown in Fig. 2 using area moment method.

2. Analyse the beam as in Figure given below by using three-moment theorem when support B sinks by 5mm and I = 9300 cm⁴; E = 2.1×10⁵ N/mm² throughout the span.
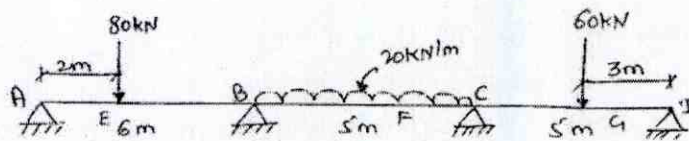
3. Analyze continuous beam ABCD by slope deflection method and then draw BM diagram along with deflected shape pf the beam. Take EI constant all over the spans.
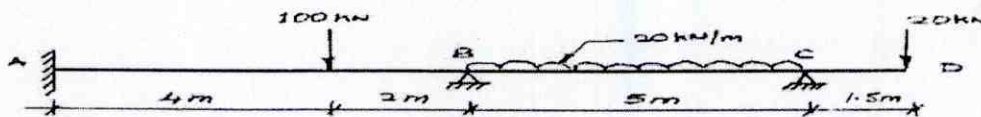
4. Analyze the beam shown in Figure given below. Draw the bending moment diagram by using Slope deflection method.
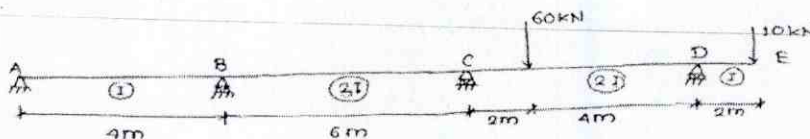
5. Derive an equation, which gives the relationship between natural frequency and the static deflection of the system.

6. Define the D Almbert' s principle. Write down the basic elements of vibratory system.

PART - C

(Descriptive/Analytical/Problem Solving/Design question)

Attempt any Two questions. (2×15=30)

1. Analyse the portal frame ABCD. Support A and D both are fixed. Span BC is loaded as per given figure. Draw the BM diagram by using slope deflection method. Also sketch the deflected shape of the frame.
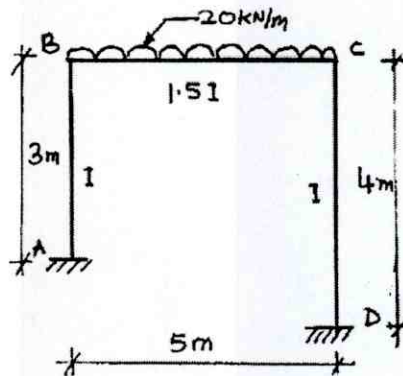
2. Analyze the frame ABCDE by moment distribution method and draw the BMD. Assume EI is constant. Dimension of lengths are in meter. CD=6m.
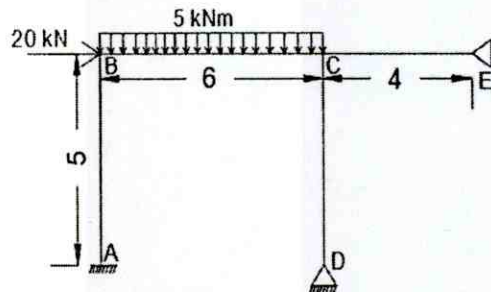
3. Describe Angular oscillation. Derive the differential equation for free vibration of undamped single degree of freedom systems, also give the solution of the differential equation.

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

5E1343

5E1343

B.Tech. V-Sem. (Back) Examination, January/February- 2024

Civil Engg

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 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)

PART - A

(Answer should be given up to 25 words only)

All questions are compulsory   (10×2=20)

1. Define effective depth and effective cover with a schematic diagram.

2. List any two differences between short column and long column.

3. Write any two differences between one-way slab and two-way slab.

4. Write the conditions when doubly reinforced beam is preferred over singly reinforced beam.

5. Define the factor of safety.

6. Define anchorage length and development length.

7. Define characteristic load and characteristic strength.

8. What is one-way shear and punching shear in footing?

9. Write expressions for equivalent bending moment and equivalent shear for beams subjected to torsion.

10. Differentiate restrained and unrestrained slabs.

PART - B

(Analytical/Problem solving questions)

Attempt any Five questions.   (5×8=40)

1. Discuss the difference between balanced, under-reinforced, and over-reinforced sections with the schematic diagrams.

2. Write a short note on:

   a) Partial safety factor

   b) Bond stress

   c) Lap length

   d) Curtailment of bars

3. Determine the factored moment of resistance of a rectangular beam section 230 mm × 450 mm with a clear cover of 25 mm. The tensile reinforcement is provided with 3 nos. of 16 mm HYSD bars of Fe 415. The grade of concrete used is M 20.

4. Calculate the ultimate moment capacity of a rectangular beam section that has width of 250 mm and effective depth of 500 mm. The beam is provided with tension reinforcement of 5 bars of 25 mm diameter and compression steel of 3 bars of

   20 nun diameter. The effective cover to the compression reinforcement is 50 nun. Use M20 and Fe 415 grades of concrete and reinforcement, respectively.

5. Design a short axially loaded square colunm for a service load of 2000 kN. The colunm is 4m long, effectively held in position and restrained against rotation at both ends. Use M20 concrete and Fe 415 grade steel.

6. Simply supported RCC beam 250 mm wide and 450 mm deep (effective) is reinforced with 4 -20 mm diameter bars on the tension side. Calculate the shear reinforcement if M25 grade of concrete and Fe 415 steel is used and the beam is subjected to a shearforce of 150 kN at service state.

7. Describe in detail the difference between the limit state method and the working stress method of reinforced concrete structure design.

PART - C

(Descriptive/Analytical/Problem Solving/Design questions)

Attempt any Four questions. (4×15=60)

1. Design a rectangular beam 30 cm wide and 55 cm deep up to the center of reinforcement. The beam has to resist a factored moment of 150 kN-m. Use M20 and Fe- 415 grade of concrete and reinforcement, respectively. Draw a neat section of the beam showing reinforcement detail.

2. Design a simply supported R.C.C. slab for a room having clear dimensions of 3m × 6.5m with 230mm thick walls allround. Take live load 4 kN/m² and floor finish load 0.6 kN/m². Draw a neat plan showing reinforcement details. Use M20 grade of concrete and Fe 415 grade of steel.

3. Design a slab over a room 4m × 6m. The slab is subjected to live load of 3kN/m² and has 230mm thick wall all-around. The slab is simply supported with corners not held down. Use M20 grade of concrete and Fe 415 grade of steel. Draw a neat plan showing reinforcement detail.

4. A footing supports a square colunm of size 400mm × 400mm with a service load of 900 kN. Design the footing, if the safe bearing capacity of soil is 200 kN/m². Use M25 concrete and Fe 415 steel. Also thaw a neat sketch showing reinforcement detail.

5. Determine the reinforcement required for a beam of size 300 x 600 lmn subjected to an ultimate bending moment of 150 kN-m, ultimate shear force of 100 kN, and ultimate torsional moment of 50 kN-m. Use M20 concrete and Fe 415 steel. Draw the neat sketch also.

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

5E1742

5E1742

B.Tech. V-Sem. (Main&Back) Examination, January/February - 2024

Civil Engg.

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** question 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).

PART - A

Answer should be given up to 25 words only)

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

1. Define One way slab and Two way slab.

2. Describe dead load, live load and wind load.

3. What is design mix concrete and nominal mix concrete.

4. Explain tension reinforcement and compression reinforcement in beams.

5. Describe balanced, under reinforced and over reinforced sections.

6. Explain the term Bond and Anchorage in Reinforced concrete members.

7. What is torsional shear stress.

8. Explain design principles of one way slab.

9. Enumerate the assumptions of short columns under axial loading.

10. Describe Isolated Column footing and combined footing.

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PART - B
(Analytical/Problem solving questions)
Attempt any Five questions. (5×4=20)

1. Explain types of shear reinforcement and its detailing for prismatic sections.

2. A reinforced concrete beam of rectangular section is required to resist a service moment of 120 kNm. Design suitable dimensions and reinforcements for the balanced section of the beam assuming M-20 grade Concrete and Fe - 415 grade HYSD bars.

3. Explain shear failure mechanism.

4. Describe the analysis of doubly reinforced sections.

5. Explain Primary Torsion and Secondary Torsion.

6. Write down the steps of design of shear reinforcements.

7. Describe short term deflection, shrinkage deflection and creep deflection.

PART - C
(Descriptive/Analytical/Problem solving/Design questions)
Attempt any Three questions. (3×10=30)

1. Determine ultimate flexural strength of T-beam having following section properties:

Width of Flange	= 800 mm
Depth of Flange	= 150 mm
Width of Rib	= 300 mm
Effective Depth	= 420 mm
Area of Steel	= 1470 mm^2

    Use M-25 Grade Concrete and Fe - 415 grade HYSD bars.

2. Design a two way slab for a room of size 4m×5m with discontinuous and simply Supported edges on all the sides with corners prevented from lifting to support a live load of 4kN/m^2. Adopt M-20 Grade concrete and Fe - 415 HYSD bars.

3. A T-beam slab Floor of reinforced concrete has a slab 150 mm thick spanning between the T-beams which are spaced 3m apart. The beams have a clear span of 10 m and the end bearings are 450 mm thick Walls. The live load on the floor is 4KN/m^2. using M-20 Grade concrete and Fe 415 HYSD bars. Design one of the intermediate T-beams.

4. Design the reinforcement in column of size 400 mm × 600 mm subjected to an axial Working load of 2000KN. The Column has an unsupported length of 3m and is braced against side Way in both directions. Adopt M-20 Grade Concrete and Fe-415 HYSD bars.

5. Explain the steps in design of beams for torsion as per Codal method.

Total No. of Questions: 22

Total No. of Pages: 02

5E1344

Roll No. _____

B.Tech.V-Sem.(Back)Exam 2024
Civil Engg.
5CE4-04 Geotechnical Engineering
5E1344

Time: 3 Hours

Maximum Marks: 120
Min. Passing Marks: 42

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. _____NIL_____   2. _____NIL_____

Part A (Answer should be given up to 25 words only)
All questions are compulsory

Q.1   What are the Index properties of soil?
Q.2   Explain Darcy's law of permeability.
Q.3   What are the different types of earth pressures?
Q.4   What do you understand by the shear strength of soil?
Q.5   Differentiate between normally consolidated and overconsolidated soils.
Q.6   What do you understand by 'Quicksand condition'?
Q.7   What are the different types of slope failures?
Q.8   Differentiate between disturbed and undisturbed soil samples.
Q.9   Explain the terms "void ratio" and "porosity".
Q.10   What is isobar diagram?

                                                                        10 x 2 = 20

Part B(Analytical/Problem solving questions)
Attempt any Five questions

Q.1   Explain the structure of montmorillonite mineral. What makes it different from other minerals?
Q.2   What are the tests conducted to determine the shear strength of soil? Explain any one test in detail.
Q.3   Derive the expression for Terzaghi's one-dimensional consolidation theory.
Q.4.   What is the significance of preconsolidation pressure in soil? Explain the graphical method of determining preconsolidation pressure.
Q.5   Derive the expression for stability of infinite slopes in cohesionless soils.
Q.6   Discuss the approximate methods for determining vertical stress at a point. What are its limitations?
Q.7   What are the assumptions of Terzaghi's bearing capacity theory? Discuss its limitations.

                                                                        5 x 8 =40

Part C(Descriptive/Analytical/Problem Solving/Design questions)
Attempt any four questions

Q.1   The mass of a chunk of moist soil is 20 kg and its volume is 0.011 m³. After drying in an oven, the mass reduces to 16.5 kg. Determine the water content, the density of moist soil, the dry density, void ratio, porosity and the degree of saturation. Take G = 2 .70.

Q.2   A clay stratum 8 m thick is located at a depth of 6 m 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 2 m below the ground surface. The submerged unit weight of fine sand is 10.5 kN/m^3 and its bulk unit weight above the water table is 18.68 kN/m^3. Plot the pressure distribution diagram.

Q.3   A 3 m thick clay layer beneath a building is overlain by a permeable stratum and in underlain by an impervious rock. The coefficient of consolidation of the clay was found to be 0.025 cm^2/min. The final expected settlement for the layer is 8 cm. (a0 How much time will it take for 80 % of the total settlement to take place? (b) Determine the time required for settlement of 2.5 cm to occur. (c) Compute the settlement that would occur in one year.

Q.4   What is the significance of conducting standard penetration test (SPT)? Explain the corrections applied to SPT readings.

Q.5   A strip footing of 2 m width is founded at a depth of 4 m below the ground surface. Determine the net ultimate bearing capacity using (i) Terzaghi's equation (N_c = 5.7, N_q = 1, N_γ = 0) (ii) Skempton's analysis (iii) IS code method. The soil is clay (c = 10 kN/m^2). The unit weight of soil is 20 kN/m^3.

$$4 \times 15 = 60$$

Roll No. _____

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5E1743

5E1743

B.Tech. V Sem. (Main&Back) Examination, January/February - 2024
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 question 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).

PART - A

(Answer should be given up to 25 words only)

ALL questions are Compulsory. (10×2=20)

1. Define void ratio and porosity.

2. What is an isobar?

3. Differentiate between uniform and differential settlement.

4. Discuss about disturbed and undisturbed soil samples.

5. Define the term permeability.

6. What are the consistency limits of fine grained soil?

7. What is the significance of SPT-N value?

8. Explain the terms OMC and MDD.

9. Define net ultimate bearing capacity.

10. Distinguish between normally and over consolidated soils.

PART - B
(Analytical/Problem solving questions)
Attempt any FIVE questions. $\qquad$ (5×4=20)

1. The bulk unit weight of a soil sample is 16 kN/m³. The specific gravity of the soil solids in 2.67. The water content of the soil is 17%. Calculate the dry unit weight, Porosity, void ratio and degree of saturation.

2. What is quick sand condition? Derive the relation for critical hydraulic gradient. $i_{cr} = (G-1)/(1+e)$

3. A sample of dry cohesionless soil was tested in a triaxial machine. If the angle of shearing resistance is 40° and the confining pressure applied is 150 kN/m², determine the deviatoric stress applied at which the sample failed.

4. Explain with a neat sketch: active, passive and earth pressure at rest.

5. A stratified soil deposit consists of five layers of equal thickness. The Co-efficient of permeability of the second, third, fourth and fifth layers are 1/3, 1/2, 2/3 and twice of the co-efficient of permeability of the topmost layer. Compute the average permeability of the deposit, parallel and perpendicular to the direction of stratification in terms of permeability of the top layer.

6. An undisturbed sample of a clay stratum, 2 m thick, was tested in the laboratory and the coefficient of consolidation was found to be 2×10^{-4} cm²/sec. Assuming double drainage conditions calculate the time required to attain 50% consolidation.

7. Discuss briefly on different types of slope failure.

PART - C
(Descriptive/Analytical/Problem solving/Design questions)
Attempt any THREE questions. $\qquad$ (3×10=30)

1. Elaborate on the IS soil classification systems and different symbols used. Also, draw the plasticity chart as per IS soil classification.

2. A retaining wall 10 m high retains a cohesionless soil having an angle of internal friction of 30°. The surface of the soil is level with the top of the wall. The top 3 m of the fill has a unit weight of 20 kN/m³ and that of the rest is 30 kN/m³. Find the magnitude per meter run and point of application of the resultant active thrust. Assume same value of ϕ for both the strata.

3. Elaborate the procedure to construct the Newmark's Influence Chart.

4. At a construction site, a 3 m thick clay layer is followed by a 4 m thick sand resting on an impervious rock. A load of 25 kN/m² is applied suddenly at the surface. The saturated unit weight of the soils are 19 kN/m³ and 20 kN/m³ for the clay and sand layer respectively. The water table is at the surface. Draw the diagrams showing variation of total, neutral and effective stress with depth. Assume unit weight of water as 10 kN/m³.

5. Discuss the procedure of Standard Penetration Test (SPT). Elaborate on the corrections to be applied to the observed SPT - N value.

5E5064	R.ll No. _____	[Total No. of Pages : 3]

5E5064

B.Tech. V - sem. (Back) Examination, January/February - 2024
Civil Engineering
5CE4A Surveying - II

Time : 3 Hours

Maximum Marks : 80
Min. Passing Marks : 24

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.*

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

Unit - I

1. a. What do you mean by axis signal correction. Derive the expression to compute the axis signal correction. Draw the appropriate sketch. **(8)**

   b. Following observation were taken to determine the reduced level of the top of an overhead tank (o) from two stations P and Q being in different planes with respect to object.

   i. Angle of elevation from P to object - 6°13'20"

   ii. Horizontal angle at P - 85°30'20"

   iii. Reading on level staff from P - 1.45 m

   iv. Angle of elevation from Q to object - 6°7'40"

   v. Horizontal angle at Q - 80°32'40"

   vi. Reading on level staff from Q - 1.56 m.

   vii. Distance b/w P and Q is 44.5 m.

   Make a neat sketch of the problem and determine the R.L. of the top of the overhead tank (o) if R.L. of the bench mark is 258.70m. **(8)**

   (OR)

1. a. The following observation were made in trigonometric leveling from a situation P at ground to another station Q. **(8)**

    i.   Observe altitude = 3°45'30"

    ii. Height of instrument a P = 1.56 m.

    iii. Height of Signal at Q = 3.84 m

    iv. Horizontal distance between P and Q = 2350 m.

    v.   RL of P = 326.75 m

    vi. If m = 0.07 and radius of earth = 6371 km. Find RL of station Q.

    b. Explain how will you find level of top of overhead tank by trigonometric leveling, if instruments are set in different vertical planes. **(8)**

Unit - II

2. a. Derive the expression for setting out simple circular curve by "offsets from chord produced method". **(8)**

    b. A compound curve has radius of short curve as 400 m, long curve 800 m, deflection angle for short curve is 40° and long curve is 55°. If the chainage of point of intersection is 2050 m. Find the chainages of point of curve (T_1), point of compound curvature (D) and point of tangency (T_2). **(8)**

(OR)

2. a. Determine the offset to be set out at half chain interval along the tangent to locate a 16 - chain curve, the length of each chain being 20 m. **(8)**

    b. In a compound curve radius of the arcs of two curves are R_1 and R_2 respectively, the total deflection angle for the curve is and distance between point of curve and point of intersection V is "Ts" are known, Get the expression for computation of T_L (distance between P.I. and P.T), deflection angle. **(8)**

Unit - III

3. a. Derive the condition for well-conditional triangle? **(8)**

    b. Two triangulation station A and B are 40 KM apart and have elevations of 178 m and 175 m respectively. Find the minimum height of signal required at B so that the line of sight may not pass nearer the ground than 3 meters. The intervening ground may be assumed to have uniform elevation of 150 meters. **(8)**

(OR)

3. a. What is Captain McCaw's method, Explain. **(8)**

    b. From a satellite station S, 15 m from a traingulation station A, the angles measured to three station B, C and A are as follows : $\angle CSA = 35°12'15"$, $\angle BSC = 60°38'40"$. The length of sides AC and AB are 5815 m and 1673 m respectively. Calculate the angle BAC. **(8)**

Unit - IV

4. a. Describe various criteria for selection of triangulation stations. (8)

   b. Find the most probable values of the angles A and B from the following observations at a station O :

   A = 20°10'10", Weight = 6; B = 30°20'30" Weight = 4 ; A+B= 50°30'50" Weight = 2. (8)

(OR)

4. a. Explain the law of Accidental Errors and probability curve? (8)

   b. What do you understand by station or figure adjustment? (8)

Unit - V

5. a. What is a spherical triangle? Discuss its properties. (8)

   b. What are different methods of determination of azimuth of a star? Discuss ex-meridian observation system. (8)

(OR)

5. a. Make a neat sketch and explain following :
   i. Observer's meeridian.
   ii. Ecliptic.
   iii. Declination circle.
   iv. Solstices. (8)

   b. Discuss briefly the preparations required for measurements with total stations. (8)

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5E1345

5E1345

B.Tech. V Sem. (Back) Examination, January/February - 2024

PCC/PEC Civil Engg.

5CE4-05 Water Resource Engineering

Time : 2 Hours

Maximum Marks : 80

Mm. 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 questions 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)

PART - A

(Answer should be given up to 25 words only)

ALL questions are Compulsory. (5×2=10)

1. Define crop period and base period.
2. Write down the advantage and disadvantage of irrigation.
3. Differentiate between Kennedy's theory and Lacey's theory
4. Differentiate between shallow well and deep well.
5. Define unit hydrograph.

PART - B

(Analytical/Problem solving questions)

Attempt any FOUR questions. (4×10=40)

1. Explain any two methods to determine Consumptive use of water.
2. Find the delta of a crop if the duty is 1800 ha/cumec and base period is 150 days. Now delta is increased by 10% and base period is reduced by 10 days than calculate the duty of the crop.

5E1345/2024 (1) [Contd....

3. Draw and explain any four elements of diversion headwork in detail.

4. Discuss different types of tube well in detail with neat and clean diagram.

5. Enlist the different forces acting on the gravity dam. Explain any two forces in detail

6. Define hydrological cycle and its elements in detail.

PART - C

(Descriptive/Analytical/Problem Solving/Design questions)

Attempt any TWO questions. (2×15=30)

1. Explain the different types of cross drainage work in following condition.

   a) When canal over the drainage.

   b) When drainage over the canal.

2. Design an irrigation channel having mean silt diameter (d) 0.49 mm and discharge (Q) = 15 cumec and side slope (s) is 0.5:1 by Lacey's theory.

3. A direct runoff hydrograph of a storm obtained from a catchment is triangular in shape and has a base period of 90 hours. The peak flow rate is 35 m³/s and catchment area is 106.4 km² Determine the rainfall excess.

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5E1744

B.Tech. V-Sem. (Main & Back) Examination, January/February - 2024
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 questions 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)

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

1. Define consumptive use of Water.

2. Differentiate between major irrigation and minor irrigation schemes.

3. Name the two stages of planning an irrigation project.

4. Enlist major crops of Kharif and Rabi seasons in India.

5. Name the instruments used for measurement of rainfall.

6. What is a unit hydrograph?

7. What is meant by well interference?

8. Define duty of water and factors affecting it.

9. Why the cross - drainage structures are required to construct?

10. What is the major difference between an embankment dam and a gravity dam?

5E1744 /2024   (1)   [Contd....

PART - B
(Analytical/Problem solving questions)
Attempt any Five questions.   (5×4=20)

1. Justifying the need of irrigation in India, describe its development in the country.

2. What are the causes of waterlogging? How can a waterlogged land be made useful for cultivation?

3. Discuss the factors which influence the design of an embankment dam.

4. What are the main causes of failure of a gravity dam?

5. Describe different methods of well drilling, mentioning their merits and suitability for different field conditions.

6. What is the purpose of providing a cross-drainage structure? In which reach of a canal, does the need of such structures arise and why?

7. Define hydrologic cycle and draw its neat sketch explaining its components

PART - C
(Descriptive/Analytical/Problem Solving/Design questions)
Attempt any Three questions.   (3×10=30)

1. Using Kennedy's method, design a channel carrying a discharge of 30 m³/s with critical velocity ratio and Manning's n equal to 1.0 and 0.0225 respectively. Assume that bed slope is equal to 1 in 5000. Other necessary data may be assumed suitably.

2. Design a stable channel for carrying a discharge of 30 m³/s using Lacey's method. Assume silt factor equal to 1.0 and other data suitably.

3. Discuss and compare Bligh's creep theory and Khosla's method for the analysis of seepage below hydraulic structures.

4. Explain the concept of unit hydrograph with the basic assumptions inherent in the unit hydrograph theory.

5. Describe the common forces acting on a gravity dam with a neat sketch.

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Total No. of Questions: 10

Total No. of Pages: 3

Roll No. _____

B.Tech. V-Sem (Back) 2024
Civil Engineering
5CE5A Building Design
5E5065

Time: 3Hours

Maximum Marks: 80
Min Passing Marks: 24

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.

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

1. IS: 875 Part-3   2. IS 1893 Part-1

UNIT -I

Q.1 a)   Describe the "Core-Outrigger" type structural system in detail with the neat schematic sketch. (8)

b)   Write the contributory area principle of load flow from slab to supporting beams. (8)

OR

Q.1 a)   Describe the different structural systems in the high-rise buildings in detail. (8)

b)   Describe the importance and characteristic features of a shear wall with the help of neat sketch. (8)

UNIT -II

Q.2 a)   Differentiate between "Basic Wind Speed" and "Design Wind Speed". (8)

b)   Describe the factors affecting the "risk coefficient in case of wind analysis. (8)

OR

Q.2   Calculate wind load on walls and roof of a rectangular clad building having pitched roof and located in a farm house, height of building is 4.0m, width 12 m and length 20 m. Roof angle 10°, opening in wall is 15%, overhang on either side is 0.5m, Building is located in Jaipur. (16)

UNIT -III

Q.3 a)   Describe the earthquake loads. How do they adversely affect the existing structures? Describe the effect of type of foundation soil on the seismic forces. (2+3+3 = 8)

b)   Differentiate between center of mass and center of rigidity. With the help of neat sketch explain how the position of shear walls does induce torsion in lateral direction. (3+5= 8)

OR

Q.3   For the building plan shown in Fig. 1., determine the seismic loads and shear force at each floor level. Give the neat sketch of base shear at each floor. Consider the following data:
   i.   Type of structure: Special moment resisting frame with ordinary shear walls.
   ii.   Building is located in seismic zone IV.
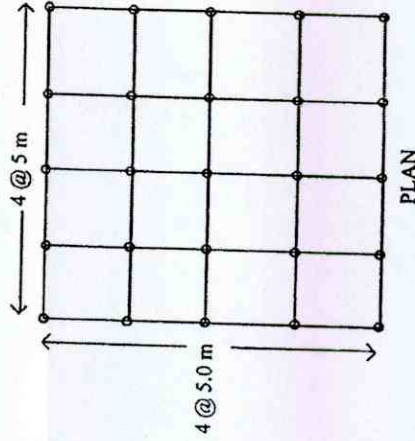   iii. Soil below the foundation is "hard soil". (16)

4 @ 5 m

4 @ 5.0 m

PLAN

Fig. 1

UNIT -IV

Q. 4 a) Write short note on ductile detailing of beam, column, and beam-column joint.   (8)

b) What are the construction practices to ensure earthquake resistance for masonry buildings?   (8)

OR

Q.4 Write short notes on the following:

i. Soft and weak story.
ii. Integrity and ductility in earthquake resistant construction.
iii. Short column effect.
iv. Ponding of adjacent building.   (4 x 4 = 16)

UNIT -V

Q. 5 a) Explain mass housing and precast element in detail.   (8)

b) Differentiate between the membrane theory and beam theory for analyzing the shells.   (8)

OR

Q.5 a) Discuss the advantages and disadvantages of prefabricated mass housing construction.   (8)

b) Differentiate between the grid and ribbed floor with their neat typical sketches.   (8)

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5E1745

B.Tech. V-Sem. (Main &Back) Examination, January/February – 2024
Civil Engineering
5CE5-11 Air and 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 questions 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)

PART-A

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

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

1. Define aerosols and discuss the classification of aerosols.

2. Explain the working principle of Electrostatic precipitator.

3. What do you mean by Air Quality Index?

4. Discuss the consequences of Ozone layer depletion.

5. Differentiate between RSPM, SPM and PM10.

6. Differentiate between adsorption and absorption.

7. What is the difference between acoustic and psychoacoustic?

8. Differentiate between plane, point and line sources of noise.

9. What is difference between sound power and sound pressure?

10. What do you understand by Noise indices?

5E1745 /2024   (1)   [Contd....

PART - B
(Analytical/Problem solving questions)
Attempt any Five questions.   (5×4=20)
1. What are the harmful effects of sulphur dioxide, carbon monoxide and particulate matter on human beings?

2. What are the advantages and disadvantages of dilution method for controlling air pollution?

3. What do you understand by Indoor air pollution? How is it harmful to mankind?

4. Explain the working of a settling chamber with the help of a neat sketch.

5. What are the standards of noise for different types of areas as per CPCB standards?

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

7. What are various sources of noise; both indoors and outdoors.

PART - C
(Descriptive/Analytical/Problem Solving/Design questions)
Attempt any Three questions.   (3×10=30)
1. Describe the natural self-cleansing properties of the environment for air pollution.

2. What is biological control of air pollution? explain various technologies of biological control of air pollution.

3. What are the sources of air pollution? classify them. What are the types of raw materials which are responsible for causing air pollution?

4. What are the measures which may be taken to have an effective control on noise pollution?

5. Distinguish between Infrasound, ultrasound, impulsive sound and sonic boom. How these are harmful to human being? Explain their control strategies.

5E1346

5E1346

B.Tech. V-Sem. (Back) Examination, January/February - 2024

PCC/PEC Civil Engg.

5CE5-11 Air and 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.

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

PART - A

(Answer should be given up to 25 words only)

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

1. Define air pollution and its effects on vegetation.

2. Write salient features of air act 1981?

3. What are the methods for air pollution measurements?

4. Differentiate sound pressure level, sound intensity and sound power.

5. What is psychoacoustics?

PART - B

(Analytical/Problem solving questions)

Attempt any Four questions. (4×10=40)

1. What are the various unnatural sources of air pollution? Discuss the harmful effects of sulphur dioxide, carbon monoxide and particulate matter on human being.

2. Define the term "Ambient Air Quality"? Also discuss the functions of CPCB and SPCB to prevent it.

3. Discuss the removal methods of gaseous pollutants using adsorption and absorption techniques along with their chemical reactions.

4. What is particulate emission control technology? Discuss the working of gravitational settling chamber along with suitable diagram.

5. Define the term "Noise Pollution"? Also discuss the harmful effects of noise pollution on human health.

6. What are the permissible noise level in India? Discuss the control measures to avoid it.

PART - C

(Descriptive/Analytical/Problem solving/Design questions)

Attempt any Two questions.   (2×15=30)

1. What is green house effect and global warming? Explain their harmful effects and suggest remedial measures to control it.

2. What are the multiple source of noise pollution? Also explain noise indices and working of the instrument used to monitor noise level.

3. Explain the following (Any 5)
   a) Acid rain along with the chemical ractions involved
   b) Ozone layer depletion and its effects
   c) Advantage and disadvantage of fabric filter system
   d) Indoor air quality and its impacts on human health
   e) Working of electrostatic precipitator with suitable diagram
   f) Biological air pollution control technologies
   g) Difference between infrasound, ultrasound, impulsive sound and sonic boom
   h) Practical and efficient method to reduce the noise in a dense crowd area

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5E1748

5E1748

B.Tech. V-Sem. (Main & Back) Examination, January/February - 2024
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 questions 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)

PART - A

(Answer should be given up to 25 words only)

ALL questions are compulsory.   (10×2=20)

1. Write down the properties of corrosion inhibitors.

2. Differentiate between "Repair and Rehabilitation".

3. Define "Guniting" and "Bonding Aspect".

4. What are the causes of deterioration of concrete structures?

5. Enumerate the applications of Sulphur infiltrated concrete.

6. What is the effect of temperature on concrete?

7. State the application of Ferro-Cement.

8. State the preventive measure taken during demolition of structures.

9. Write short note on :

    a) Grouting   b) Externally bonded plates

10. Write short note on repairing method of a beam having excessive deflections.

5E1748/2024   (1)   [Contd....]

PART - B
(Analytical/Problem solving questions)

Attempt any FIVE questions.   (5×4=20)

1. Discuss the methods of repair of concrete structures.

2. Explain the following:
   i)   Alkali-Aggregate reaction
   ii) Carbonation of concrete.

3. Describe the mechanism of epoxy injections.

4. Explain the uses of rebar locator and corrosion meters.

5. Mention the role of rust eliminations in concrete?

6. Explain the preliminary tests to identify the distress in structure.

7. Discuss the case study of Heritage Structure with proper steps.

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

Attempt any THREE questions.   (3×10=30)

1. Describe the steps in the assessment procedure to evaluate damages in a structure and to carry out rehabilitation work.

2. How under water repairing is done in Marine structures? Also mention their repairing materials.

3. Explain the NDT methods to assess the quantity of concrete.

4. a) Explain the Principle and mechanism of cathodic protection technique.
   b) Explain in detail about expansive cement.

5. How do you repair various types of cracks? Explain in detail with neat sketches.

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5E1349

5E1349

B.Tech. V-Sem. (Back) Examination, January/February - 2024

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.

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

PART - A

(Answer should be given up to 25 words only)

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

1. Define deterioration.

2. Mention the properties of corrosion inhibitors.

3. Differentiate between the term repair and rehabilitation.

4. Mention the crack measurement devices.

5. Explain the purpose of jacketing.

PART - B

(Analytical/Problem solving questions)

Attempt any Four questions.   (4×10 =40)

1. Explain in detail the carbonation process.

2. Explain in detail the abrasion and erosion process.

3. Explain the preliminary investigation of damage assessment.

4. Discuss the properties and selection criteria of epoxy, polyester, and resins.

5. Discuss the grouting and shotcrete process.

6. Explain the rebound hammer and ultrasonic pulse velocity techniques.

PART - C

(Descriptive/Analytical/Problem Solving/Design question)

Attempt any Two questions.   (2×15 =30)

1. Explain the corrosion mechanism in steel reinforcement. Also discuss the various causes of corrosion.

2. Define the waterproofing of concrete structures? Also discuss in detail the various techniques of waterproofing.

3. Explain a case study of rehabilitation of masonry structures.

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