262

5E1740

Total No. of Questions : 22 Total No. of Pages : 04

Roll No. : .....

5E1740

B.Tech. V-Sem. (Main/Back) Exam. - 2024

Civil Engineering

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 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)

1. ..... 2. .....

PART-A [10x2=20]

(Answer should be given up to 25 words only)

All questions are compulsory

Q.1. What is engineering economic analysis procedure?

Q.2. Differentiate between depreciation and depletion.

Q.3. Name the different causes of accident at construction site.

Q.4. Explain the different protective equipments for constructions.

Q.5. What is the construction of element of a building?

Q.6. Give an introduction of job layout.

Q.7. Why quality control is needed in construction?

Q. 8 Write the types of trenching machine.

Q. 9 What is the earth moving equipment?

Q. 10. How many types of hauling equipment?

PART-B [5x4=20]

(Analytical/Problem Solving Questions)

Attempt any five questions

Q.1. What are the principles of engineering economy? Explain.

Q.2 Differentiate between the principles of engineering economy breakeven point analysis and minimum cost point analysis.

Q.3. Explain the role of construction schedule in construction planning and how it is prepared?

Q.4. What is Material Management? Also elaborate the functions of material management.

Q 5. Describe the quality control measures in construction.

Q.6. Explain the steps for preparation of an accident report of a construction site.

Q.7. Describe the types of cranes used in construction work.

PART-C [3x10=30]

(Descriptive/Analytical/Problem Solving/Design Question)

Attempt any three questions

Q1. Explain these Earth moving equipments :

(a) Power Shovel Excavators

(b) Clamshells Excavators

(c) Dragline Excavators

Q.2 What are the safety lacunas in India during demolition of a building?

Q.3. Explain the fire safety provisions for different kind of Buildings as per NBC.

Q.4. Explain the procedure of blasting and drilling with neat sketch.

Q. 5. Describe the working of tunnelling equipment and pile driving equipment with neat sketch.

----- × -----

265

5E1741

Total No. of Questions : 22 Total No. of Pages : 08

Roll No. : .....

5E1741

B.Tech. V-Sem. (Main/Back) Exam. - 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 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)

1. .....

2. .....

PART-A **[10×2=20]**

(Answer should be given up to 25 words only)

All questions are compulsory

Q.1. Define static and kinematic indeterminacy of structural member.

Q.2. State Maxwell's reciprocal theorem.

Q.3. State Betti's reciprocal theorem.

Q.4. Define carry over factor.

Q.5. In the context of structural engineering, discuss how the slope-deflection equation contributes to the analysis of indeterminate structures and the determination of member rotations.

Q.6. Define fixed-end moments and their significance in structural analysis.

Q.7. Define following terms :

(i) Degree of freedom

(ii) Damping.

Q.8. Enumerate the conditions under which a portal frame is prone to lateral sway.

Q.9. State D Alembert's principle.

Q.10. Define Simple harmonic motion.

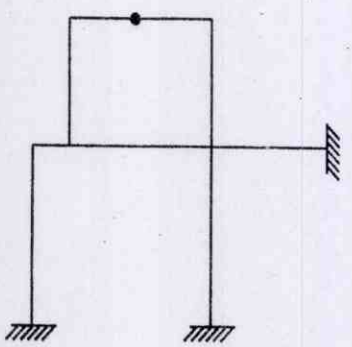
PART-B

[5x4=20]

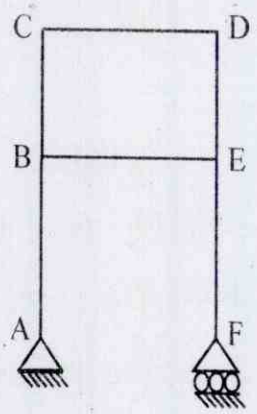
(Analytical/Problem-Solving Questions)

Attempt any five questions.

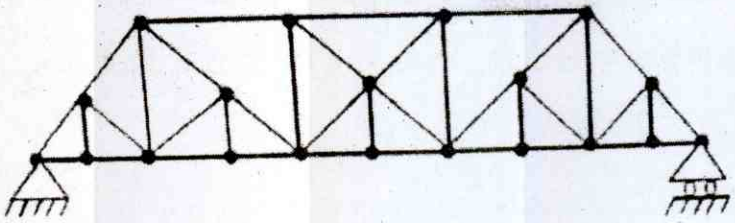
Q.1. Calculate static indeterminacy of portal frame shown in Fig (i) to (v) :



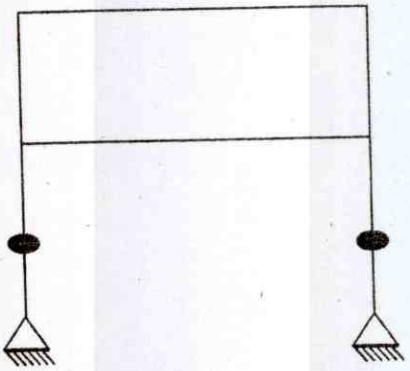
Fig(i)



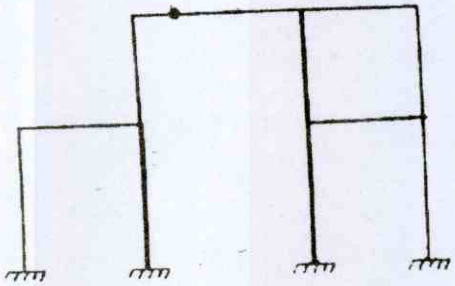
Fig(ii)



Fig(iii)



Fig(iv)



Fig(v)

Q.2. A spring system is shown in Fig (vi). Stiffness of springs $k_1 = 2000$N/m, $k_2 = 1500$ N/m, , $k_3 = 3000$N/m, $k_4 = k_5 = 500$ N/m, find the mass supported by the spring. The system has natural frequency of vibration $f_n = 10$Hz

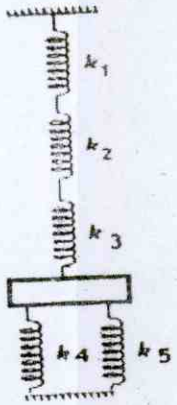


fig (vi)

Q.3. A fixed beam of 6m span supports two-point load of 300kN each at 2m from each end. Find the fixing moments at the end and draw the B.M and S.F. diagram. Take $I = 9 \times 10^6$ mm^4 and E = 200kN/mm^2.

Q.4. A cantilever of uniform flexural stiffness is propped at the remote end as shown in Fig (vii). Find the support reactions and draw bending moment diagram.

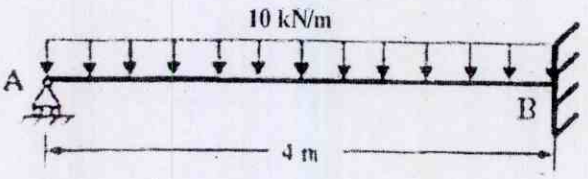


Fig (vii)

Q.5. A beam ABCD, fixed at support A, 16m long is continuous over three spans : AB=6m, BC=5m, CD=5m, the supports being at the same level. There is a UDL load of 20kN/m over BC. On AB there is a point load of 80kN at 2m from A. On CD there is a point load of 60 kN at 3m from D. Calculate the moments and draw bending moment diagram.

Q.6. Derive the equation which gives the relationship between natural frequency and static deflection of the system.

Q.7. Derive the differential equation for free vibration of undamped single degree of freedom systems.

PART-C

[3x10=30]

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

Attempt any three questions.

Q.1. A portal frame ABCD is fixed at A and D and loaded as shown in fig (viii). Treating joint B and C as rigid, calculate the moment at A, B, C and D. Draw the bending moment diagram and sketch the deflected shape of the frame using slope deflection method of analysis :

269

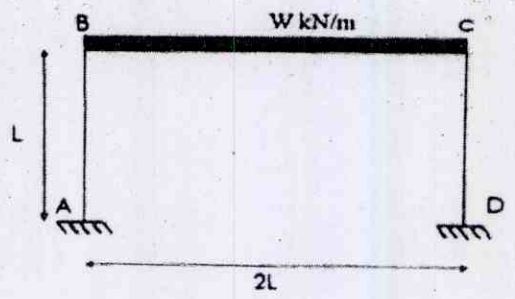


Fig (viii)

Q.2. A continuous beam ABC, having span length 14m as shown in fig (ix). Calculate bending moment and draw bending movement diagram using moment distribution method.

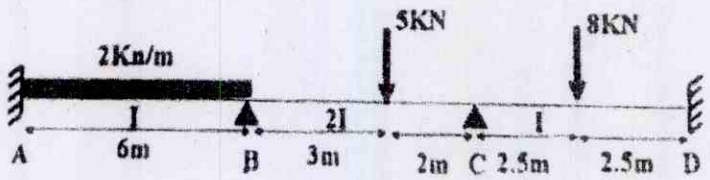


Fig. (ix)

Q.3. Derive the equation of motion for damped single degree of freedom system having free vibration.

Q.4. What are the key characteristics of simple harmonic motion and how do they contribute to understanding the behaviour of oscillating systems?

Q.5. Examine the critical role of the equation of motion in the field of structural engineering. Discuss how this equation contributes to the understanding of structural dynamics, seismic analysis and response predictions.

----- × -----

270

5E1742

Total No. of Questions : 22 Total No. of Pages : 04

Roll No. : .....

5E1742

B.Tech. V-Sem. (Main/Back) Exam. - 2024

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 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.

(As mentioned in Form No. 205)

1. IS : 456 (2000) 2. .....

PART-A **[10×2=20]**

(Answer should be given up to 25 words only)

All questions are compulsory

Q. 1. Differentiate between one way shear and punching shear. Also show critical section for both cases.

Q. 2. What is the difference between balanced, under reinforced, and over reinforced sections?

27

Q.3. Explain effective depth and effective cover with schematic diagram.

Q.4. Differentiate between short column and long column.

Q.5. Discuss about isolated footing and combined footing.

Q.6. Differentiate between one-way slab and two-way slab.

Q.7. Discuss singly reinforced and doubly reinforced beam.

Q.8. Differentiate between anchorage length and development length.

Q.9. Define flanged beam. Write the expression for finding effective width of T- beam and L-beam.

Q.10. Discuss torsion in beams.

PART-B

[5×4=20]

(Analytical/Problem solving questions)

Attempt any five questions

Q.1. Determine the moment of resistance (MR) of a rectangular beam section 250 mm × 350 mm having clear cover 25mm using working stress method (WSM) as per IS 456:2000. The tensile reinforcement is provided with 3 nos. of 16 mm HYSD bars of Fe415. The grade of concrete used is M25.

Q2. Determine the moment of resistance (MR) of the rectangular beam section 250 mm × 400 mm having effective cover 35 mm using limit state method (LSM) as per IS 456:2000. The tensile reinforcement is provided with 3 nos. of 20 mm HYSD bars of Fe 415. The grade of concrete used is M25.

Q.3. Mention effective length for all ideal conditions of column along with neat sketch of deflected shape.

(a) Column fixed at both ends

(b) Column fixed at one end and hinged at another end

(c) Both end hinged;

(d) Fixed at one end and free at another end

Q.4. Calculate the ultimate moment capacity of a rectangular beam section having 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 2 bars of 25 mm diameter. The effective cover to the compression reinforcement being 50 mm. Use M20 and Fe-415 grades of concrete and reinforcement, respectively.

Q.5 Design an RCC column to carry an axial load of 2500 kN. The unsupported length of the column is 4 m and both ends of the column are pin supported. Use M20 concrete and Fe-415 steel.

Q.6 Discuss the various design philosophies used for designing RCC structures.

Q.7 A RCC beam 250 mm × 500 mm has a clear span of 5.5 m. The beam has 2 -20 mm diameter bars going into the support. The factored shear force is 140 kN. Check the development length if M20 grade of concrete and Fe 415 steel is used. Take effective cover 30 mm.

PART-C **[3×10=30]**

(Descriptive/Analytical/Problem Solving/Design question)

Attempt any three questions

Q.1. Design the rectangular beam 30 cm wide and 55 cm deep up to the center of reinforcement. Find the area of reinforcement & no. of bars required if it has to resist a factored moment of 150 kN-m. Use M20 and Fe-415 grade of concrete and reinforcement, respectively. Sketch the section showing number of bars and other dimensions.

Q.2. Design a simply supported RCC. slab for a room having clear dimensions of 3m × 6.5m with 230mm thick walls all-round. Take live load 4 kN/m^2 and floor finish load 0.6 kN/m^2 Draw a neat plan showing reinforcement detail. Use M25 grade of concrete and Fe 415 grade of steel.

Q.3. A simply supported RCC beam 250 mm wide and 450 mm deep (effective) is reinforced with 4 - 20 mm diameter bars. Calculate the shear reinforcement if M25 grade of concrete and Fe 415 steel is used and the beam is subjected to a shear force of 150 kN at service state.

Q.4. Determine the reinforcement required for a beam of size 300 mm × 600 mm subjected to a factored bending moment of 150 kN-m, factored shear force of 100 kN and torsional tensional moment of 50 kN-m. Use M20 concrete and Fe 415 steel.

Q.5. A footing supports a square column of size 400mm x 400mm with a service load of 900 kN. Design the footing, if the safe bearing capacity of soil is 200 kN/m^2. Use M25 concrete and Fe 415 steel. Also draw a neat sketch showing reinforcement detail.

----- × -----

274

5E1743

Total No. of Questions : 22 Total No. of Pages : 04

Roll No. : .....

5E1743

B.Tech. V-Sem. (Main/Back) Exam. - 2024

Civil Engg.

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 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)

1. ..... 2. .....

PART-A **[10×2=20]**

(Answer should be given up to 25 words only)

All questions are compulsory

Q.1. Describe the outcome of the course.

Q.2. Define block diagram and its uses.

Q.3. Define the particle size distribution curve and its uses.

Q.4. Describe the Coulomb's failure envelope.

Q.5. Differentiate Boussinesq's and Westergaard's analysis for vertical pressure and its distribution in a soil mass.

Q.6. Differentiate compaction and consolidation of soil.

Q.7. Differentiate Rankine's and Coulomb's theories of earth pressure.

Q.8. Define the Taylor's stability number.

Q.9. Define the types of earth pressure, with neat sketches.

Q.10. Describe the need of site investigation.

PART-B **[5×4=20]**

(Analytical/Problem solving questions)

Attempt any five questions

Q.1. Discuss the Indian Standard classification of soil, also draw the plasticity chart.

Q.2 A mass of a sample of moist soil is 20kg and its volume is 0.011 m^3. After drying in an even the mass reduces to 16.5kg. Take G = 2.7. Determine :

(1) Water content, (2) Density of moist soil, (3) Dry density, (4) Void ratio, (5) Porosity (6) Degree of saturation.

Q.3. Derive the expression for vertical stresses due to concentrated loads as per Boussinesq theory. Discuss the limitations of this theory.

Q.4. Define coefficient of consolidation and derive the expression to indicate the combined effects of permeability and compressibility on coefficient of consolidation.

Q.5. Discuss the Spring Analogy of Terzaghi's one dimensional consolidation theory.

Q.6. Discuss Rankine's method for minimum depth of foundation.

Q.7. Define "Preconsolidation pressure" and explain how it is determined.

PART-C [3×10=30]

(Descriptive/Analytical/Problem Solving/Design questions)

Attempt any three questions

Q. 1. (a) Derive the inter-relationship among void ratio, water content, specific gravity and the degree of saturation.

(b) A moist soil sample weight 3.52N. After drying to 2.9N. The specific gravity of solid is 1.85 Determine the water content, void ratio, porosity & the degree of saturation. Take $\gamma_w = 10KN/m^3$. [5+5=10]

Q.2. Classify different types of slopes with neat sketches. Determine the stability of finite slopes by Swedish Circle Method. [5+5=10]

Q.3. Write short notes on the following : [5×2=10]

(a) Activity of soils

(b) Clay minerals

(c) Quick sand phenomenon

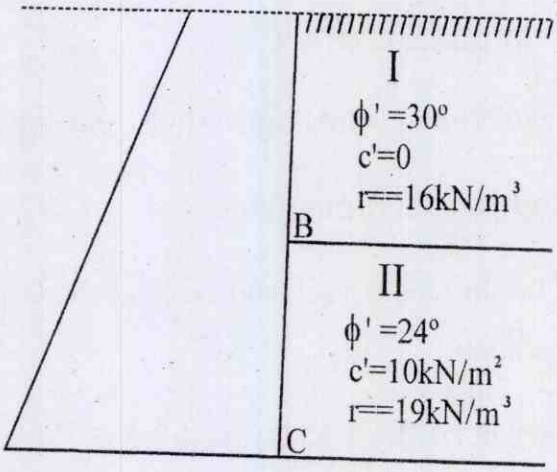
(d) Newmark's chart

(e) Transportation and storage of samples

Q.4. A square footing is to be designed to carry a load of 500 kN. if the depth of foundation is 1.5 m, determine a suitable size of foundation with a factor of safety of 3. The water table is at foundation level. Take

$\phi = 25°, \gamma = 16\ kN/m^3, \gamma_{sat} = 19kN/m^3, C' = 20kN/m^2$. [10]

Q.5. Determine the Rankine passive force per unit length of the wall shown in figure given below. The water level is at the level of B. Take γ_w=10 kN/m³. Draw the pressure distribution diagram also. [10]



----- × -----

278

5E1744

Total No. of Questions : 22 Total No. of Pages : 04

Roll No. : .....

5E1744

B.Tech. V-Sem. (Main/Back) Exam - 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)

1. Nil 2. Nil

PART-A **[10×2=20]**

(Answer should be given up to 25 words only)

All questions are compulsory

Q.1. What is meant by consumptive use of water?

Q.2. Define silting and scouring.

Q.3. What is a Unit Hydrograph?

Q.4. Define DUTY and DELTA.

Q.5. What is Lacey's silt factor?

Q.6. Define infiltration and run-off.

Q.7. What are the forces acting on a gravity dam?

Q.8. What is the necessity of cross-drainage structures?

Q.9. Define base period and crop period.

Q.10. Write down the water budget equation for a catchment.

PART-B **[5×4=20]**

(Analytical/Problem solving questions)

Attempt any five questions

Q.1. Discuss the various functions, advantages and disadvantages of irrigation.

Q.2. What are the different types of Canals? Distinguish between perennial and inundation canals.

Q.3. What do you understand by a fall in a canal? Why is it necessary? How do you select its location?

Q.4. Describe with the help of sketches, various types of cross-drainage works. What do you understand by level crossing?

Q.5. What is meant by a Gravity Dam? Distinguish between a low gravity dam and high gravity dam. Discuss in brief, various modes of failure of a gravity dam.

Q.6. Differentiate between Kennedy's and Lacey's theory for design of alluvium channels. Also explain defects in Kennedy's theory.

Q.7. Write a short note on unit hydrograph. What is the use of it and how will you determine it?

PART-C [3×10=30]

(Descriptive/Analytical/Problem Solving/Design question)

Attempt any three questions

Q.1. What is the meaning of Water Logging? What are its ill effects? Describe some suitable remedial measures against water logging.

Q.2. Using Lacey's, theory design a trapezoidal irrigation channel (side slope, 1H : 2V) carrying discharge of 40 m^3/sec. Take silt factor as 1.0.

Q.3. Using Kennedy's method of channel design; find the dimensions of an irrigation canal to carry a discharge of 1.4 cumecs. Assume N=0.0225, m=1 and (B/D)=5.7.

Q.4. Define Well Efficiency. What are the various factors governing the selection of suitable site for a tube-well?

Q.5. What is meant by Crop Rotation? What are its advantages? Describe various methods of irrigation system.

----- × -----

5E1745

Total No. of Questions : 22 Total No. of Pages : 04

Roll No. : .....

5E1745

B.Tech. V-Sem. (Main/Back) Exam - 2024

Civil Engg.

5CE5-11 Air and Noise Pollution & 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)

1. ..... 2. .....

PART-A **[10×2=20]**

(Answer should be given up to 25 words only)

All questions are compulsory

Q. 1. What is Primary and Secondary air pollutants?

Q. 2. What is Noise Pollution?

Q.3. What is Ultrasound?

Q.4. What is Photo-Chemical Smog?

Q.5. What is meant by Air Sampling?

Q.6. Write the effect of noise on Health.

Q.7. What is electrostatic precipitators?

Q.8. Define Inversion.

Q.9. What do you mean by Green House Effect?

Q.10. Distinguish between radon pollution and indoor air pollution.

PART-B **[5×4=20]**

(Analytical/Problem solving questions)

Attempt any five questions

Q.1. Explain the effects of air pollutaints on human health and global climate change.

Q2. Define Noise. Explain sources and effects of noise pollution.

Q.3. What is Adsorption? How gaseous pollutants remove using adsorption process. Explain it.

Q.4. Explain briefly the emission of the gasoline driven vehicles and diesel driven vehicles.

Q.5 What is biological air pollution control technologies? Explain.

Q.6 What is Fabric Filters? Explain.

Q.7 Name the four factors affecting the efficiency of combustion as a pollution control device and explain it.

PART-C **[3×10=30]**

(Descriptive/Analytical/Problem Solving/Design questions)

Attempt any three questions

Q.1. What is Cyclone Separation? Explain principle of cyclone separation.

Q.2. What are the different methods of noise control? Explain.

283

Q.3. Briefly explain the particular matter removal by gravity settler with the neat sketch.

Q.4. Explain any three methods of calculation of air pollution indices for monitoring of air pollutants.

Q.5. Write short notes on the following :

(i) Air Act, legislation and regulation

(ii) Noise indices

----- × -----

284

5E1748

Total No. of Questions : 22 Total No. of Pages : 04

Roll No. : .....

5E1748

B.Tech. V-Sem. (Main/Back) Exam. - 2024

CIVIL ENGG.

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)

1. .....NIL..... 2. .....NIL.....

PART-A **[10×2=20]**

(Answer should be given up to 25 words only)

All questions are compulsory

Q.1. State the properties of corrosion inhibitors?

Q.2. Differentiate between the terms rehabilitation and maintenance.

Q.3. Write short note on Ferrocement.

Q.4. How can we determine the cause of deterioration of concrete structure?

Q.5. What are the applications of sulphur infiltrated concrete?

Q.6. Write a short note on grouting.

Q.7. What is Rebar Locator and how it is used?

Q.8. State the preventive measure taken during demolition.

Q.9. What do you mean by Jacketing?

Q.10. List out the repairing method of excessive deflection of beam.

PART-B [5x4=20]

(Analytical/Problem-solving questions)

Attempt any five questions

Q.1. Explain the term alkali aggregate reaction and sulphate attack on concrete and the reason behind it.

Q.2. Write short note on mechanism of epoxy injections.

Q.3. Explain the different type of polymers used for repair.

Q.4. Explain "Grouting" and "Externally bonded plates".

Q.5. Explain the preliminary tests to identify the distress in structure.

Q.6. Discuss a case study of rehabilitation of dam.

Q.7. Explain the procedure of Rebound Hammer test and draw a neat sketch.

PART-C [3x10=30]

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

Attempt any three questions

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

Q.2. What is Underpinning? Explain various methods of underpinning with the help of diagram.

Q.3. Explain the principal and mechanism of cathodic protection techique.

Q.4. What are the different types of cracks in concrete? Explain with neat sketches the preventive measures of cracks.

Q.5. Explain the following :

(a) Polymer Concrete

(b) Shoring

(c) Under Water Repair

(d) Corrosion Meter

----- × -----

287

5E1342

Total No. of Questions : 14 Total No. of Pages : 04

Roll No. : .....

5E1342

B.Tech. V-Sem. (Re-Back) Exam. - 2024

PCC / PEC CIVIL ENGG.

5CE4-02 / Structural Analysis-I

Time : 2 Hours Maximum Marks : 80

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).

1. ..... 2. .....

PART-A [5x2=10]

(Answer should be given up to 25 words only)

All questions are compulsory.

Q.1. Explain the terms Degree of Freedom with example.

Q.2. Discuss Degree of static indeterminacy.

Q.3. Develop the distribution factor in tabular form.

Q.4. Discuss causes of structural vibration.

Q.5. Write about conjugate beam method in detail.

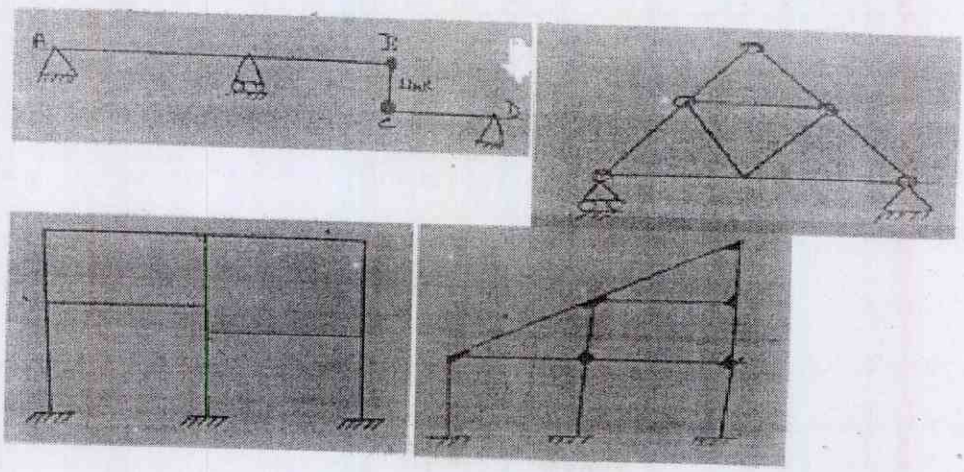
PART-B [4x10=40]

(Analytical/Problem-solving Questions)

Attempt any four questions.

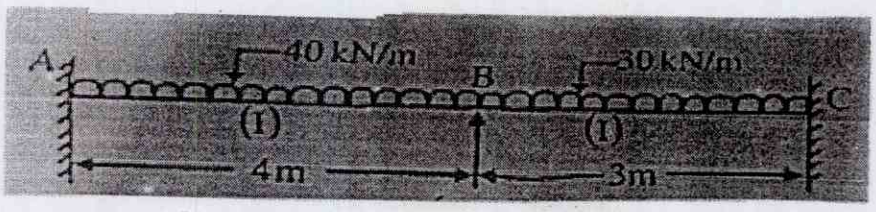
Q.1. Write about Maxwell's reciprocal theorem and Betti's theorem.

Q.2. Analyze the stability of the structure by calculating the static indeterminacy.



Q.3. Derive Fixed end moment for a fixed beam (AB) with length L and subjected to a point load at mid span.

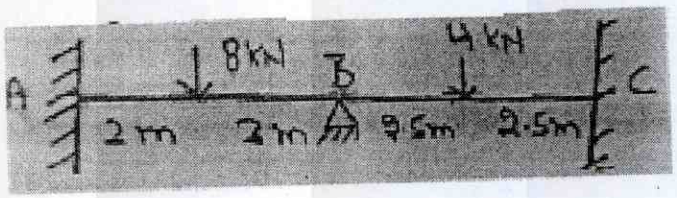
Q.4. Analyze the continuous beam ABCD and plot the bending moment diagram by using moment distribution method.



Q.5. Derive the expression for equivalent stiffness for spring in series and parallel.

289

Q.6. Using Slope Deflection method, compute the end moments and plot the bending moment diagram. (EI constant)

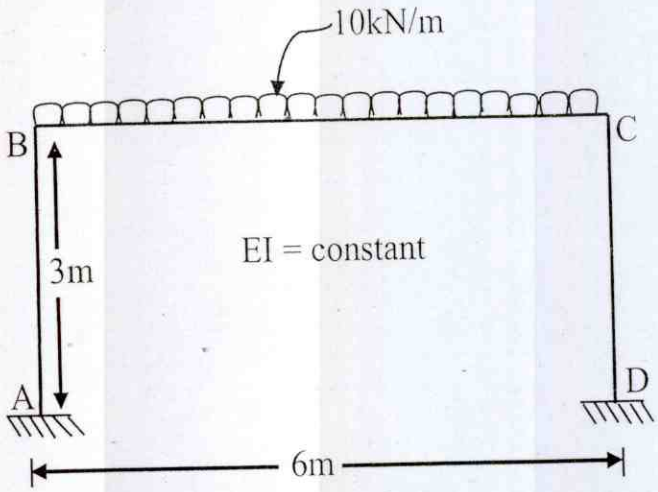


PART-C **[2x15=30]**

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

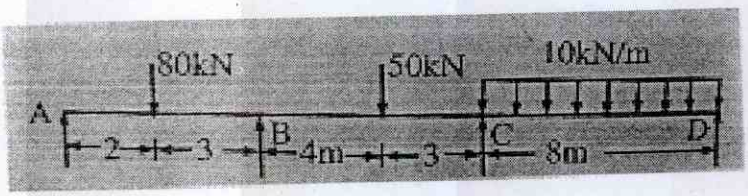
Attempt any two questions.

Q.1. Analyze the PORTAL FRAME, ABCD and plot the bending moment diagram by using moment distribution method.



Q.2. Derive the solution of differential equation of motion of SDOF-system.

Q.3. Using theorem of three moments, analyze the continuous beam and plot the bending moment diagram.



----- × -----

290

5E1343

Total No. of Questions : 22 Total No. of Pages : 04

Roll No. : .....

5E1343

B.Tech. V-Sem. (Re-Back) Exam. - 2024

CIVIL ENGINEERING

5CE4-03 / Design of Concrete Structures

Time : 3 Hours Maximum Marks : 120

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 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).

1. IS 456 : 2000 2. .....

PART-A [10x2=20]

(Answer should be given up to 25 words only)

All questions are compulsory

Q.1. What are the assumptions in the design of RC members?

Q.2. What are the primary functions of reinforcement in RC members?

Q.3. What is the characteristic strength of concrete?

Q.4. Define development length.

Q.5. What is a Pu-Mu interaction curve?

Q.6. What is the difference between short and long columns?

Q.7. What is the difference between one-way slab and two-way slab?

Q.8. What is torsion in beams?

Q.9. Differentiate between singly-reinforced and doubly-reinforced beams.

Q.10. Differentiate between isolated footing and combined footing.

PART-B [5x8=40]

(Analytical/Problem solving questions)

Attempt any five questions

Q.1. Determine the moment of resistance (MR) of a rectangular beam section is 300 mm × 400 mm with a clear cover of 30 mm. It has tensile reinforcement of 4 bars of 18 mm diameter (Fe 500). The concrete grade is M30. Use the Working Stress Method (WSM) as per IS 456:2000.

Q.2. Determine the moment of resistance (MR) of a rectangular beam section is 300 mm × 450 mm with an effective cover of 40 mm. Tensile reinforcement consists of 3 bars of 16 mm diameter (Fe 500). The concrete grade is M25. Use the Limit State Method (LSM) as per IS 456:2000.

Q.3. Design an RCC column to carry an axial load of 3000 kN. The unsupported length of the column is 5 m, and both ends are fixed. Use M30 concrete and Fe 500 steel.

Q.4. What is the concept of bond stress and its significance in RC design?

Q.5. Calculate the ultimate moment capacity of a rectangular beam section having a width of 300 mm and an effective depth of 600 mm. It has tension reinforcement of 4 bars of 200 mm diameter and compression reinforcement of 2 bars of 16 mm diameter with an effective cover of 60 mm. Use M25 concrete and Fe 415 steel.

Q.6. Discuss the Working Stress Method (WSM), Limit State Method (LSM), and the Ultimate Load Method (ULM) with their advantages and limitations.

Q.7. Check the development length for an RCC beam section of 300 mm × 550 mm with a clear span of 6 m. It has reinforcement of 3 bars of 20 mm diameter. The factored shear force is 160 kN, with M30 concrete and Fe 500 steel. The effective cover is 40 mm.

PART-C [4x15=60]

(Descriptive/Analytical/Problem Solving/Design Question)

Attempt any four questions

Q.1. Design a rectangular beam 35 cm wide and 60 cm deep up to the center of reinforcement. Determine the required area of reinforcement and the number of bars if it resists a factored moment of 200 kN-m. Use M25 concrete and Fe-500 steel. Sketch the section showing the bar details and dimensions.

Q.2. A simply supported RCC beam 300 mm wide and 500 mm deep (effective) is reinforced with 4 - 25 mm diameter bars. Determine the shear reinforcement required if M30 concrete and Fe 500 steel are used, and the beam is subjected to a shear force of 180 kN at service state.

Q.3. Design a slab for a room with clear dimensions 3.5 m × 7 m with 230 mm thick walls on all sides. Consider a live load of 3.5 kN/m^2 and floor finish load 0.8kN/m^2.Use M20 concrete and Fe 500 steel. Provide a neat plan with reinforcement details.

Q.4. A footing supports a square column of size 450 mm × 450 mm with a service load of 1200 kN. Design the footing, assuming the soil's safe bearing capacity is 250 kN/m^2. Use M20 concrete and Fe 415 steel. Provide a sketch showing the reinforcement details.

Q.5. Determine the reinforcement required for a beam of size 350 mm × 700 mm subjected to a factored bending moment of 180 kN-m, a factored shear force of 120 kN, and a factored torsional moment of 60 kN-m. Use M25 concrete and Fe 500 steel.

----- × -----

5E1344

Total No. of Questions : 22 Total No. of Pages : 04

Roll No. : .....

5E1344

B.Tech. V-Sem. (Re-Back) Exam. - 2024

CIVIL ENGG.

5CE4-04 / Geotechnical Engineering

Time : 3 Hours **Maximum Marks : 120**

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 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 the following supporting material is permitted during examination. (Mentioned in Form No. 205).

1. ..... 2. .....

PART-A **[10x2=20]**

(Answer should be given up to 25 words only)

All questions are compulsory

Q.1. Discuss consistency limits.

Q.2. Explain I.S. Classification of soil system.

Q.3. Mention the Darcy's law of permeability of soil.

Q.4. Explain the different types of minerals present in clayey soil.

Q.5. What do you understand by quick sand condition?

Q.6. Explain the difference between standard and modified proctor test in detail.

Q.7. Differentiate between compaction and consolidation.

Q.8. Mention the different tests conducted to determine the water content of soil.

Q.9. Explain the Bishop's method of stability analysis.

Q.10. Discuss the Mohr's circle of stress for shear strength of soil.

PART-B

[5x8=40]

(Analytical/Problem solving questions)

Attempt any five questions

Q.1. Determine the permeability of soil using variable head permeability test.

- √ Cross-sectional area of the standpipe: 0.0008 m^2
- √ Cross-sectional area of the soil specimen: 0.05 m^2
- √ Length of the soil specimen: 0.15 m
- √ Initial head (h1): 1.2m
- √ Final head (h2): 0.6 m
- √ Time for head to drop from h_1 to h_2: 200 seconds.

Q.2. Derive the relation between void ratio, porosity.

Q.3. Explain the index and engineering properties of soil.

Q.4. Calculate the horizontal and vertical permeability of soil deposit consisting of three layers 5m, 1m and 2.5m thick with permeability of 3×10^{-2}, 3×10^{-5} and 4×10^{-2} mm/sec respectively.

Q.5. Explain the Newmark's chart in detail.

Q.6. The mass of a chunk of moist soil is 20 kg and its volume is 0.011m^3. 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.7. Discuss the various methods of site explorations.

PART-C

[4x15=60]

(Descriptive/Analytical/Problem Solving/Design Questions)

Attempt any four questions

Q.1. A moist soil sample weight 3.5 N. after drying in an oven its weight is reduced to 2.9 N. The specific gravity of solids and mass specific gravity are respectively 2.65 and 1.85. Determine the water content, void ratio, porosity and degree of saturation. Take unit weight of water = 10 kN/m^3.

Q.2. Explain the Terzaghi theory of Bearing Capacity of Soils.

Q.3. Explain the concept of Active, passive and earth pressure at rest.

Q.4. A Sand deposit consists of two layers. The top layer is 2.5 m thick (Y = 1709.67 kg/m^3) and the bottom layer is 3.5 m thick (Y_{sat} = 2064.52 kg/m^3). The water table is at a depth of 3.5 m from the surface and the zone of capillary saturation is 1 m above the water table. Draw the diagrams showing the variation of total stress, neutral stress and effective stress.

Q.5. Discuss Plate load test to measure bearing capacity of soil also draw the site arrangements and mention limitation of this method.

----- × -----

296

5E1345

Total No. of Questions : 14 Total No. of Pages : 04

Roll No. : .....

5E1345

B.Tech. V-Sem. (Re-Back) Exam. - 2024

PCC / PEC CIVIL ENGG.

5CE4-05 / Water Resource Engineering

Time : 2 Hours **Maximum Marks : 80**

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).

1. ..... 2. .....

PART-A **[5x2=10]**

(Answer should be given up to 25 words only)

All questions are compulsory

Q.1. State the difference between the base period and the crop period.

Q.2. What do you understand by hydrography?

Q.3. State the various forces acting on gravity dam.

Q.4. State the difference between open well and tube well.

Q.5. Enlist the factor affecting the duty.

PART-B [4x10=40]

(Analytical/Problem solving questions)

Attempt any four questions

Q.1. Find the delta of a crop if the duty is 1800 ha/cumec and base period is 150 days. What would be the duty if delta is increased by 30% and base period is increased by 20 days.

Q.2. Design an irrigation channel having silt factor 1 and Q = 20 cumec and side slope is 0.5:1 by Lacey Theory.

Q.3. Design an irrigation canal using Kennedy's Theory when S = 1 : 5000, Q = 10 cumec, m=1 and N=0.0225 and side slope is 0.5:1.

Q.4. A direct runoff hydrograph is triangular in shape has a base period of 70 hours. Peak flow rate is $30m^3$ and catchment area is 70 square km. Determine the rainfall excess resulted by the hydrograph.

Q.5. Derive relation between duty, delta and base period of a crop.

Q.6. Determine the optimum no. of rain gauges required in a catchment area if 5 rain gauges are already existing, the permissible errors allowed are 6% and mean annual rainfall at gauges are 800, 902, 986, 1024 and 700 mm.

PART-C [2x15=30]

(Descriptive/Analytical/Problem Solving/Design Questions)

Attempt any two questions

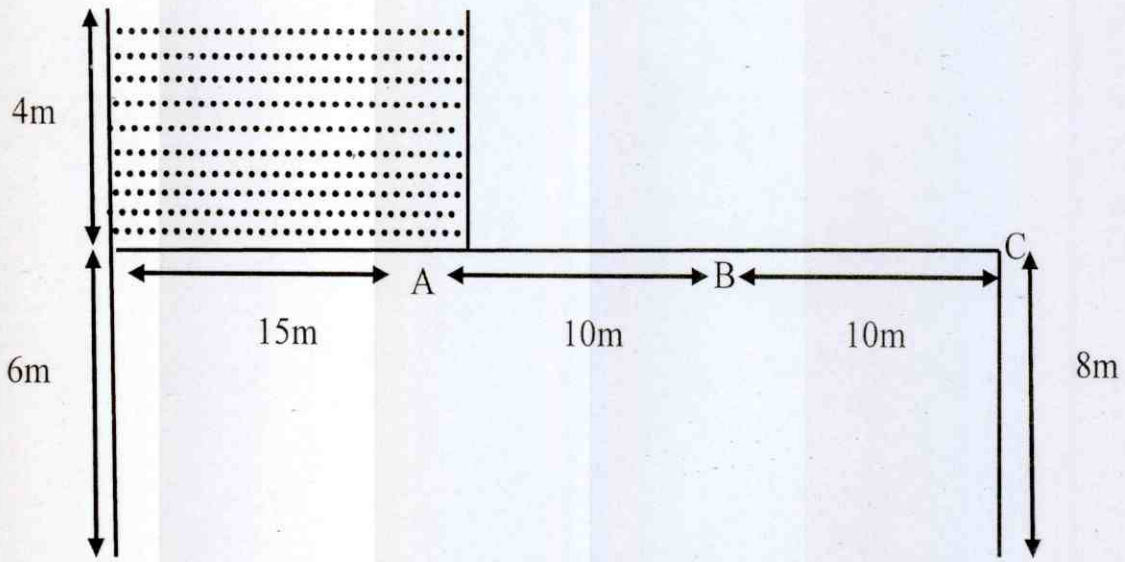
Q.1. Explain in detail different types of tube well.

Q.2. State advantages and disadvantages of canal lining.

Q.3. Hydraulic structure shown in the figure is constructed on fine sand [c=15].

(i) Determine whether the hydraulic gradient is safe.

(ii) Also, calculate the thickness of flow.



----- × -----

259

5E1346

Total No. of Questions : 14 Total No. of Pages : 04

Roll No. : .....

5E1346

B.Tech. V-Sem. (Re- Back) Exam. - 2024

PCC / PEC CIVIL ENGINEERING

5CE5-11 / Air and Noise Pollution and Control

Time : 2 Hours **Maximum Marks : 80**

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).

1. ..... 2. .....

PART-A **[5x2=10]**

(Answer should be given up to 25 words only)

All questions are compulsory

Q.1. What are the primary sources of air pollution?

Q.2. Describe the difference between smoke and smog.

Q.3. What are the main principles behind the removal of gaseous pollutants through adsorption?

Q.4. What is the concept of noise pollution?

Q.5. What is the greenhouse effect, and how does it contribute to global warming?

PART-B **[4x10=40]**

(Analytical/Problem solving questions)

Attempt any four questions

Q.1. How do combustion processes contribute to air pollution? Explain with examples of specific pollutants emitted during combustion.

Q.2. Compare and contrast the effects of air pollution on human health and vegetation. Provide examples of diseases or damage caused by specific pollutants.

Q.3. Explain the role of particulate matter in air pollution. Analyze the effectiveness of different particulate emission control technologies like cyclone separators and electrostatic precipitators.

Q.4. Describe the methods used for ambient air quality measurement. How do you determine if air quality meets the required standards? Provide examples of air quality instruments.

Q.5. What are the key differences between indoor and outdoor air quality concerns? Discuss the factors that affect indoor air quality and the technologies used for air pollution control indoors.

Q.6. Discuss the principles of sound intensity, sound pressure levels, and their relationship with noise pollution. How would you approach a study on noise propagation in an urban environment?

301

PART-C

[2x15=30]

(Descriptive/Analytical/Problem Solving/Design Question)

Attempt any two questions

Q.1. Explain the various stages and reactions involved in the formation of smog. How do these reactions affect atmospheric quality and human health?

Q.2. Discuss the Air Act and relevant environmental regulations for controlling air pollution. Analyze how these legislative measures influence industries and urban areas in reducing air pollution.

Q.3. Provide a detailed explanation of noise pollution's effects on human health. Include the concepts of psychoacoustics, annoyance rating, and noise standards. What are the most effective methods for controlling noise pollution in residential areas?

----- × -----

302

5E1349

Total No. of Questions : 14 Total No. of Pages : 02

Roll No. : .....

5E1349

B.Tech. V-Sem. (Re-Back) Exam. - 2024

PCC / PEC CIVIL ENGG.

5CE5-14 / Repair and Rehabilitation of Structures

Time : 2 Hours **Maximum Marks : 80**

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).

1. ..... 2. .....

PART-A **[5x2=10]**

(Answer should be given up to 25 words only)

All questions are compulsory

Q.1. What is permeability of concrete?

Q.2. What are the different types of cracks in concrete?

Q.3. Describe abrasion.

303

Q.4. Explain Corrosion.

Q.5. Write down objectives of Repair and Rehabilitation of Concrete Structures.

PART-B

[4x10=40]

(Analytical/Problem Solving questions)

Attempt any four questions

Q.1. Describe Carbonation with chemical reaction.

Q.2. Explain Alkali Aggregate Reaction.

Q.3. Describe various preventive measures to prevent corrosion.

Q.4. Explain Half Cell Potentiometer with neat sketch.

Q.5. Write down the preventive measures to prevent cracks in concrete.

Q.6. Explain the various protective coatings used in concrete surface.

PART-C

[2x15=30]

(Descriptive/Analytical/Problem Solving/Design questions)

Attempt any two questions

Q.1. Explain Grouting and Jacketing.

Q.2. Write a short note on Polymer and Ferrocement Concrete.

Q.3. Describe the process of Underwater Repair in concrete structures.

----- × -----