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5E1341

Roll No. _____

Total No of Pages: 2

5E1341

B. Tech. V - Sem. (Main / Back) Exam., Feb.-March - 2021

ESC Civil Engineering

5CE3 - 01 Construction Technology & Equipment's

Time: 2 Hours

[To be converted as per scheme]

Max. Marks: 65

Min. Marks: 23

Instructions to Candidates:

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

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

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

1. NIL

2. NIL

PART – A

(Answer should be given up to 25 words only)

[5×2=10]

All questions are compulsory

- Q.1 Write the scope of construction technology. [2]
- Q.2 Explain the breakeven point analysis. [2]
- Q.3 Write the safety measures in demolition of buildings. [2]
- Q.4 What are the objectives of material management? [2]
- Q.5 How can scrapers help in increasing speed of construction? [2]

PART – B

(Analytical/Problem solving questions)

[4×10=40]

Attempt any four questions

- Q.1 Explain the minimum cost point analysis. [10]
- Q.2 Describe the depreciation and depletion. [10]
- Q.3 What are the causes of an accident? How the accidents can be classified? [10]
- Q.4 How the construction schedule is prepared? [10]
- Q.5 Describe the quality control measures in construction. [10]
- Q.6 What are the various forms of earth movers? What are the major earth moving operations? [10]

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions)

[1×15=15]

Attempt any one questions

- Q.1 (a) What are the safety measures for storage and handling of building materials? [8]
(b) Describe the various stages in construction. [7]
- Q.2 (a) Describe the principles of engineering economy. [7]
(b) What are the basic functions of material management? [8]
- Q.3 (a) What is pile driving? Explain the various equipments for pile driving. [8]
(b) Describe the different equipments used for tunneling. [7]
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5E5061

Roll No. _____

Total No of Pages: **4****5E5061****B. Tech. V - Sem. (Back) Exam., Feb.-March - 2021****Civil Engineering****5CE1A Theory of Structures - I****Time: 2 Hours****Maximum Marks: 48****Min. Passing Marks: 15***Instructions to Candidates:*

Attempt **three questions**, selecting **one question each** from any three 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. NIL2. NIL**UNIT-I**

Q.1 (a) Explain the following briefly -

[4×2=8]

- (i) Static indeterminacy
- (ii) Kinematic indeterminacy
- (iii) Maxwell's Reciprocal Theorem
- (iv) Betti's Theorem

(b) Analyze the continuous beam loaded as shown is fig.1 by using slope deflection method. Also draw bending moment diagram- **[8]**

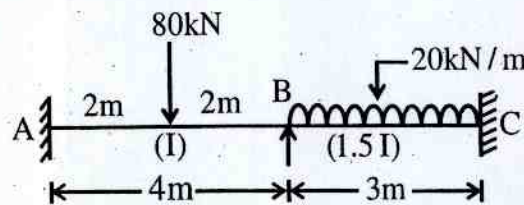


Fig.1

OR

- Q.1 Using slope deflection method, determine the end moment at A, B, C & D of the members of frame as shown in fig.2 EI is constant throughout. Draw bending moment diagram and deflected shape of the frame- [16]

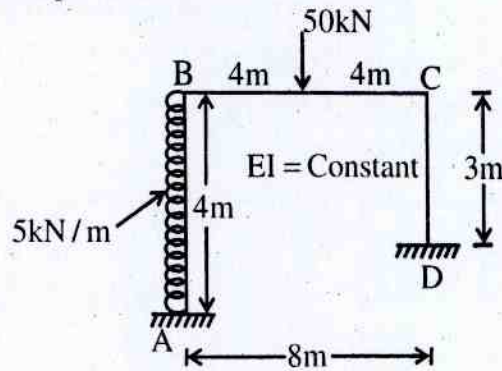


Fig.2

UNIT- II

- Q.2 (a) Define the following terms for a prismatic member in moment distribution method- [3×2=6]

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

- (b) Analyze the continuous beam ABCD as shown in fig.3 by using the moment distribution method. Also draw the Bending moment diagram- [10]

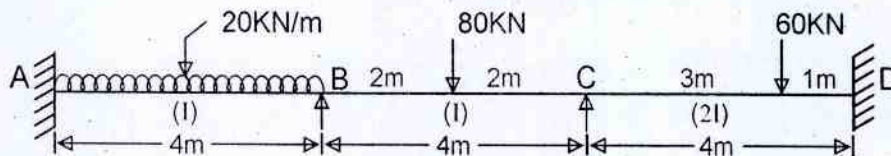


Fig.4

OR

- Q.2 Using moment distribution method, find out the end moments of the members of the frame as shown in fig.4. Draw Bending moment diagram and deflected curve for the frame- [16]

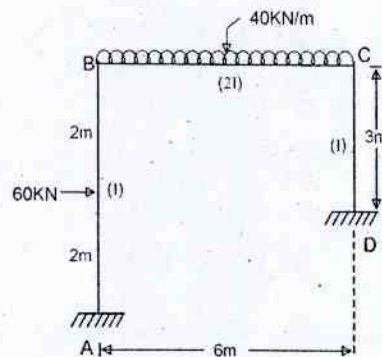


Fig.4

UNIT- III

- Q.3 (a) State Castigliano's first and second theorem. [4]
 (b) Using the principal of least work, analyze the portal frame as shown in fig.5. EI is constant. Draw bending moment diagram also- [12]

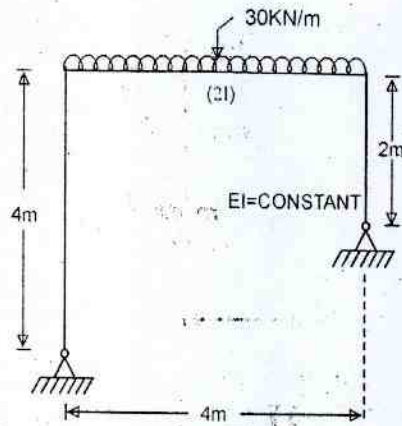


Fig.5
OR

- Q.3 Using unit load method, find the vertical deflection at joint D of the truss as shown in fig.6. Area of cross section of each member is 900 mm^2 . Take $E = 2 \times 10^5 \text{ N/mm}^2$ [16]

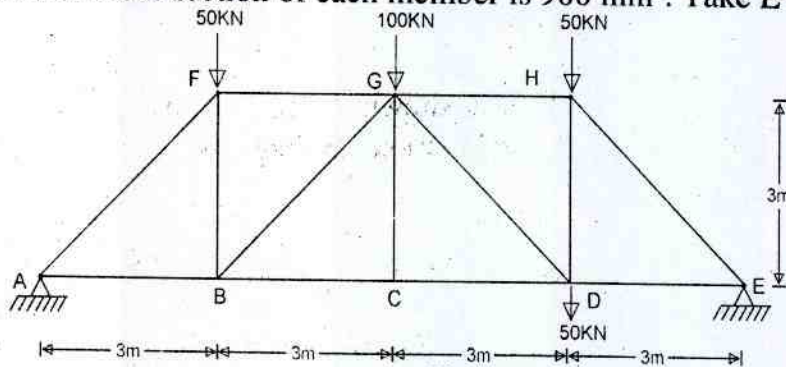


Fig.6

UNIT- IV

- Q.4 Using column analogy method, determine the end moments of the portal frame hinged at A and D as shown in fig. 7- [16]

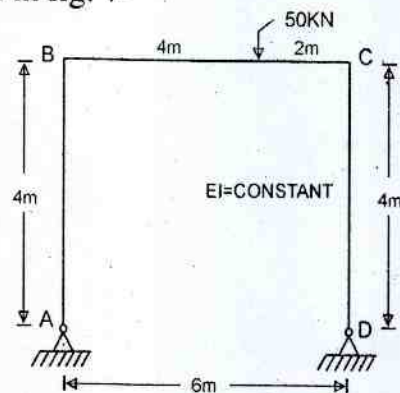


Fig.7

OR

Q.4 Analyze the continuous beam as shown in fig.8 by using Kani's method. Also draw BMD and SFD of the beam. [16]

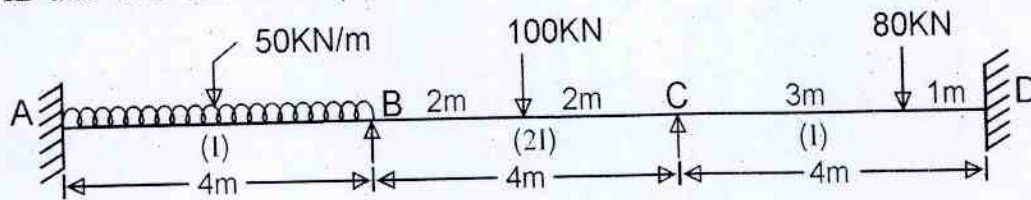


Fig.8

UNIT- V

Q.5 Analyze the building frame subjected to horizontal forces as shown in fig.9 by using portal method. Also draw B.M.D. for the frame. [16]

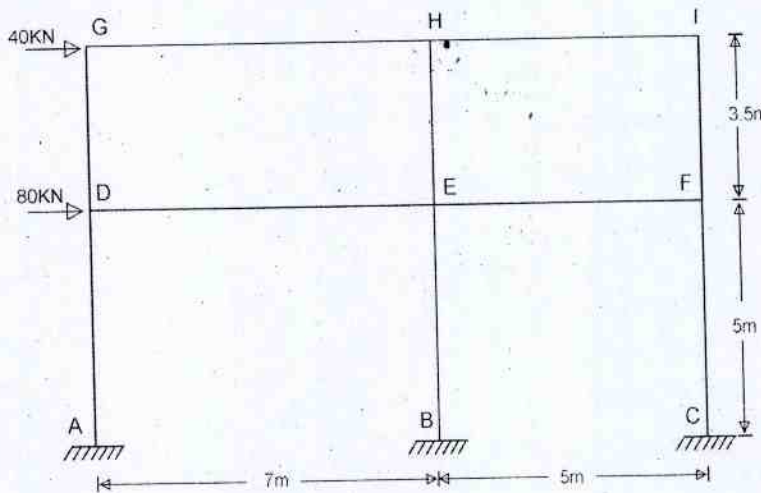


Fig.9

OR

- Q.5 (a) Write procedure to solve building frame with lateral load by factor method. [8]
(b) What do you understand by tension coefficient? Derive the equations used in tension coefficient method applied to plane frame. [8]

5E1342

Roll No. _____

Total No. of Pages: **3**

5E1342

B. Tech. V - Sem. (Main / Back) Exam., Feb.-March - 2021

PCC/PEC Civil Engineering

5CE4 - 02 Structural Analysis - I

Time: 2 Hours

[To be converted as per scheme]

Max. Marks: 65

Min. Marks: 23

Instructions to Candidates:

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

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

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

1. NIL

2. NIL

PART – A

(Answer should be given up to 25 words only)

[5×2=10]

All questions are compulsory

Q.1 Define Degree of Freedom.

Q.2 Explain Maxwell's Reciprocal Theorem.

Q.3 Define degree of static indeterminacy.

Q.4 Explain Simple Harmonic Motion.

Q.5 State D – Alembert's Principle.

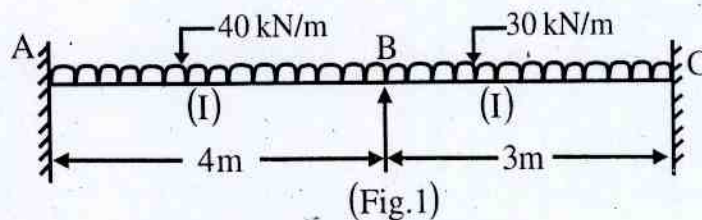
PART – B

(Analytical/Problem solving questions)

[4×10=40]

Attempt any four questions

- Q.1 Explain Betti's Law with Proof.
- Q.2 Describe basic elements of Vibratory system.
- Q.3 Explain Distribution theorem and define Distribution factor.
- Q.4 Discuss Damped and Forced Vibration.
- Q.5 Describe development of slope deflection equation? Also give the steps of slope deflection method for Analysis of Continuous beam.
- Q.6 Analyse the continuous beam as shown in Fig. 1 by using slope deflection method. EI is constant.



PART – C

(Descriptive/Analytical/Problem Solving/Design Questions)

[1×15=15]

Attempt any one questions

- Q.1 Analyse the continuous beam loaded as shown in Fig.2 by using slope deflection method. Also draw the Bending Moment diagram and Shear Force diagram.

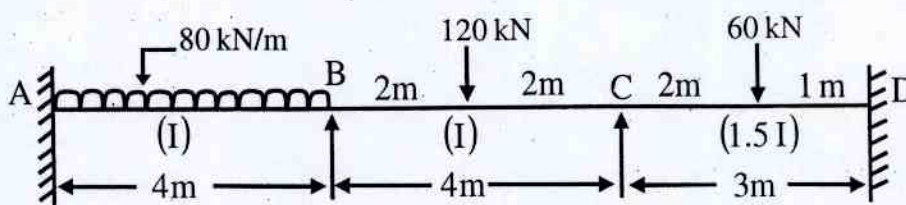
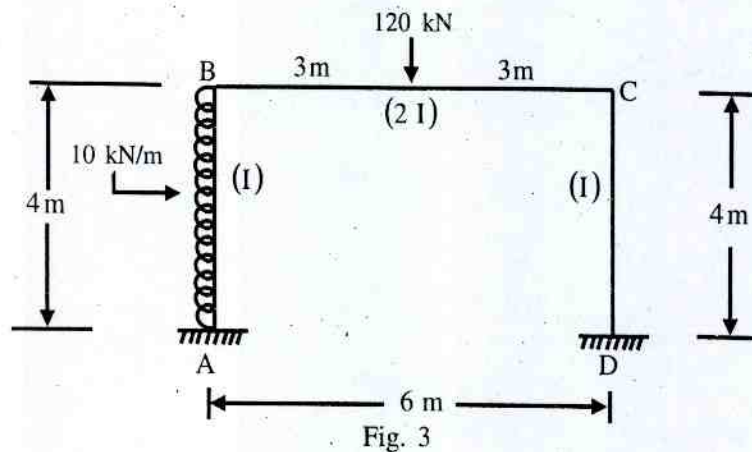


Fig.2

Q.2 Analyse the portal frame loaded as shown in Fig.3 by using Moment Distribution Method. Also draw the Bending Moment diagram and sketch the deflected curve for the frame.



Q.3 Describe solution of differential equation of Motion in undamped free vibration of SDOF system.

5E1343

Roll No. _____

Total No of Pages: 3

5E1343

B. Tech. V - Sem. (Main / Back) Exam., Feb.-March - 2021

PCC/PEC Civil Engineering

5CE4 – 03 Design of Concrete Structures

Time: 2 Hours

[To be converted as per scheme]

Max. Marks: 82

Min. Marks: 29

Instructions to Candidates:

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

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

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

1. IS 456 : 2000

2. NIL

PART – A

(Answer should be given up to 25 words only)

[10×2=20]

All questions are compulsory

- Q.1 Differentiate between one way slab & two way slab.
- Q.2 What do you understand by Poison ratio? How we calculate it?
- Q.3 Define depth of Neutral axis. Give formula to calculate depth of Neutral Axis.
- Q.4 Write Suitability of Combined Footing.
- Q.5 Explain limit state of collapse.
- Q.6 Explain development length.
- Q.7 Define the term torsion and critical shear stress.
- Q.8 Differentiate between short and long column.
- Q.9 Explain limit state of collapse.
- Q.10 Define the need of doubly reinforced beam over singly reinforced beam.

PART – B

(Analytical/Problem solving questions)

[4×8=32]

Attempt any four questions

- Q.1 Analyse a rectangular beam 300 mm wide & 550 mm effective depth to determine the ultimate moment of resistance for the tension reinforcement of 4-16 mm dia bars. Consider M-20 concrete & Fe -415 steel.
- Q.2 Design a short RCC column to carry an axial load of 1600 kN. It is a 4m long effectively held in position and restrained against rotation at both ends. Use M-20 concrete and Fe – 415 steel.
- Q.3 Design a simply supported RC slab for a room measuring 2.8m × 8m size. It is subjected to live load of 3 kN/m² and floor finishes of 0.75 kN/m². Use M-20 & Fe – 415 steel.
- Q.4 Differentiate between working stress method and limit state method. Define the advantage of limit state method over working stress method.
- Q.5 A simply supported RCC beam 250 mm wide and 450 mm deep (effective depth) is reinforced with a 4 -18 mm dia. bar. Design the shear reinforcement. The beam is subjected to shear force of 150 kN. Use M-20 & Fe-415.
- Q.6 Write down the design steps of Flat slab including all formulas and IS specification.
- Q.7 Design a helically reinforced circular column of diameter 400 mm to support a factored load of 1800 kN. Use M – 20 and Fe – 415.

PART – C

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

Attempt any two questions

- Q.1 Design a two – way slab having thickness 200 mm, which is simply supported on all the four walls of a hall with effective span of 6.3 m and 4.5 m. Assume service live load 10 kN/m^2 and dead load including self-weight is 3 kN/m^2 . Use M -25 & Fe- 415 steel. Determine the reinforcement along long and short span. Check for deflection.
- Q.2 A footing supports a square column of $500 \times 500 \text{ mm}$ width, having a service load of 850 kN. Find out the size, depth & reinforcement required in it. If the safe bearing capacity of soil is 200 kN/m^2 . Use M-20 & Fe – 415.
- Q.3 (a) Define the term “Moment redistribution.”
- (b) Design a rectangular beam section $300 \text{ mm} \times 500 \text{ mm}$ effective depth subjected to ultimate moment of 175 kN – m , ultimate shear force of 25 kN & ultimate torsional moment of 10 kN-m . Consider concrete of grade M-20 & Fe – 415.
- Q.4 Explain the following –
- (a) Limit state of serviceability
 - (b) Balanced, over-reinforced & under reinforced beam
 - (c) Limit state of collapse in shear and bond
- Q.5 Determine the factored moment of resistance of a beam $230 \text{ mm} \times 460 \text{ mm}$. The beam is reinforced with 2-16 mm dia. bar on compression side and 4-20 mm diameter bars on tension side. The compression bars are placed at a distance of 40 mm from top. Use M-20 concrete & Fe-415 steel.
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5E5062

Roll No. _____

Total No of Pages: 3

5E5062

B. Tech. V - Sem. (Back) Exam., Feb.-March - 2021

Civil Engineering

5CE2A Environmental Engineering - I

Time: 2 Hours

Maximum Marks: 48

Min. Passing Marks: 15

Instructions to Candidates:

*Attempt **three** questions, selecting **one** question each from any three 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. NIL

2. NIL

UNIT- I

Q.1 (a) Give a flow chart of water supply scheme. [8]

(b) State the factors that affect the rate of water demand. [8]

OR

Q.1 (a) What are the various types of water demand? [8]

(b) The census records of a town show the population as follows – [4+4=8]

(i) Present Population = 50,300

(ii) Population before one decade = 46,500

(iii) Population before two decades = 43,100

(iv) Population before three decades = 40,500

Calculate the probable population after one, two and three decades by using-

(a) Arithmetical increase method (b) Geometrical increase method

UNIT- II

- Q.2 (a) Find the expression for finding the yield from an unconfined aquifer. [8]
(b) Explain the various underground sources of water. [8]

OR

- Q.2 (a) Give the maximum acceptable limits of the following for the public drinking water – [6]
(i) Turbidity
(ii) Colour
(iii) Hardness
(iv) pH
(b) Explain the importance of chemical and bacteriological analysis of water used for domestic purpose. [10]

UNIT- III

- Q.3 (a) Describe with sketches, the different types of pipe joints. [8]
(b) Explain the working process of centrifugal pump with advantages and disadvantages. [8]

OR

- Q.3 (a) Describe working process of rectangular types of sedimentation tank. [8]
(b) A water supply project has to supply water to a town having population of 50,000. Design a suitable sedimentation tank with the following data – [8]
(i) Per capita demand = 150 / day
(ii) Peak demand = 1.5* Avg. Demand
(iii) Velocity of flow = 30 cm/min
(iv) Detention period = 4 hours

UNIT- IV

- Q.4 (a) Give a comparative details between slow sand filter and rapid sand filter. [8]
(b) Explain the action of chlorine, when mixed with water. Discusses the break point chlorination. [2+6=8]

OR

- Q.4 (a) What do you mean by aeration? Why and how is it done? [4]
(b) Design six slow sand filter beds from the following data and show the arrangements of bed in plan- [12]
(i) Population to be served = 50,000 persons
(ii) Quantity water to be supplied = 20 L/day
(iii) Rate of filtration = 300 L/m²/day
(iv) Length of each bed is twice the breadth

UNIT- V

- Q.5 (a) Describe with sketches, the methods of distribution system. [8]
(b) Write short notes on the following with neat sketch- [2×4=8]
(i) Air valve
(ii) Reflux valve
(iii) Relied value
(iv) Sluice value

OR

- Q.5 Write short notes on following –
(a) Hard cross method [4]
(b) Fixture units [4]
(c) Fire hydrants [4]
(d) Distribution reservoirs [4]
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5E1344

Roll No. _____

Total No of Pages: 3

5E1344

B. Tech. V - Sem. (Main / Back) Exam., Feb.-March – 2021

PCC/PEC Civil Engineering

5CE4 – 04 Geotechnical Engineering

Time: 2 Hours

[To be converted as per scheme]

Max. Marks: 82

Min. Marks: 29

Instructions to Candidates:

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

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

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

1. NIL

2. NIL

PART – A

(Answer should be given up to 25 words only)

[10×2=20]

All questions are compulsory

- Q.1 What do you mean by the term Thixotropy of soil?
- Q.2 What is normally consolidated soil?
- Q.3 What do you understand by the term sensitivity of soil?
- Q.4 Define the terms –
- (a) Net ultimate bearing capacity
 - (b) Allowable bearing pressure
- Q.5 What is normally consolidated and over consolidated soil?
- Q.6 Define the term permeability.

- Q.7 What is pre-consolidation ratio?
- Q.8 What do you mean by disturbed and undisturbed sample of soil?
- Q.9 What is an Isobar Diagram?
- Q.10 Give any four differences between compaction and consolidation.

PART – B

(Analytical/Problem solving questions)

[4×8=32]

Attempt any four questions

- Q.1 A partially saturated sample from a borrow pit has a natural moisture content of 15 percent and bulk unit weight of 1.9 g/cc, the specific gravity of solids is 2.70. Determine the degree of saturation and void ratio.
- Q.2 What is quick sand condition? Derive the relation for critical hydraulic gradient,
- $$i_{cr} = \frac{G-1}{1+e}$$
- Q.3 What are the factors affecting permeability of soil?
- Q.4 What are the disadvantages of direct shear test?
- Q.5 Find the intensity of vertical pressure at a point 4 m directly below a 20 kN point load acting at a horizontal surface. What will be the vertical pressure 2 m horizontally away from the axis of loading? Solve according to Boussinesq theory.
- Q.6 Derive relation for vertical stress under a circular loading.
- Q.7 Derive relation for permeability for falling head method.

PART – C

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

Attempt any two questions

- Q.1 Write soil IS soil classification system with symbol and their names.
- Q.2 Determine the ultimate bearing capacity of a strip footing 2 m in width with its base at a depth of 1.5 m below ground surface and resting on a dry sand stratum with the following properties:
 $\Phi = 38^\circ$, $N_q = 60$; $N_\gamma = 75$. Use Terzaghi's theory. Determine the change in bearing capacity of soil when water table is at the base of footing.
- Q.3 An infinite slope is to be constructed of clay soil at a slope angle of 30° . The ground water table is at ground itself, with seepage parallel to the ground. The soil properties are:
 $C = 15 \text{ kN/m}^3$; $\Phi = 22^\circ$, $\gamma_{\text{sat}} = 20 \text{ kN/m}^3$
What is the factor of safety against movement along a parallel to the ground surface at depth of 4m and 5.5m?
- Q.4 A clay soil, tested in a consolidometer, showed decrease in void ratio from 1.20 to 1.10 when pressure was increased from 0.25 to 0.50 kgf/cm^2 . Calculate coefficient of compressibility (a_v) and coefficient of volume compressibility (m_v). If coefficient of consolidation (C_v) = $10 \text{ m}^2/\text{year}$, calculate coefficient of permeability in cm/s .
- Q.5 Explain the procedure to calculate vertical stress under a given loading using Newmarks influence chart.
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5E5063

Roll No. _____

Total No of Pages: 4

5E5063

B. Tech. V - Sem. (Back) Exam., Feb.-March - 2021

Civil Engineering

5CE3A Geotechnical Engineering - I

Time: 2 Hours

Maximum Marks: 48

Min. Passing Marks: 15

Instructions to Candidates:

*Attempt **three** questions, selecting **one** question each from any three 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. NIL

2. NIL

UNIT- I

Q.1 (a) What are regional soil deposits of India? Explain in brief. [8]

(b) Derive relationship between saturated unit weight (γ_{sat}), specific gravity (G), void ratio (e) and degree of saturation (S) and unit weight of water (γ_w). Also derive relationship between submerged unit weight (γ_{sub}), specific gravity (G), void ratio (e) and Degree of saturation (S) and unit weight of water (γ_w). [8]

OR

Q.1 (a) Why it is important to classify soil? Classify the soil according to particle size. [8]

- (b) An airport runway fill needs $6,00,000 \text{ m}^3$ of soil compacted to a void ratio of 0.75. There are two borrow pits A and B from where the required soil can be taken and transported to the site. [8]

Borrow Pit	In-situ void ratio	Transportation cost
A	0.80	₹ 10/ m^3
B	1.70	₹ 5/ m^3

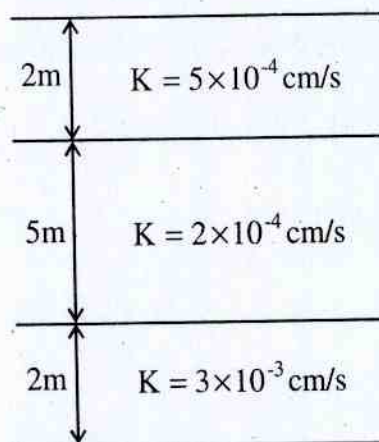
Which of the two borrow pits are economical.

UNIT- II

- Q.2 (a) Derive relationship of coefficient of permeability (K) using falling head permeability method. [8]
- (b) What are the different types of soil water? Describe in brief. Also discuss the phenomena of capillary rise in brief. [8]

OR

- Q.2 (a) In a falling head permeability test on a sample 12.2 cm high and 44.41 cm^2 in cross sectional area, the water level in a stand pipe of 6.25 mm internal diameter dropped from a height of 75 cm to 24.7 cm in 15 minutes. Find coefficient of permeability. [8]
- (b) A stratified soil deposit is shown in figure below along with the coefficients of permeability of individual strata. Determine the ratio of K_H to K_V . [8]

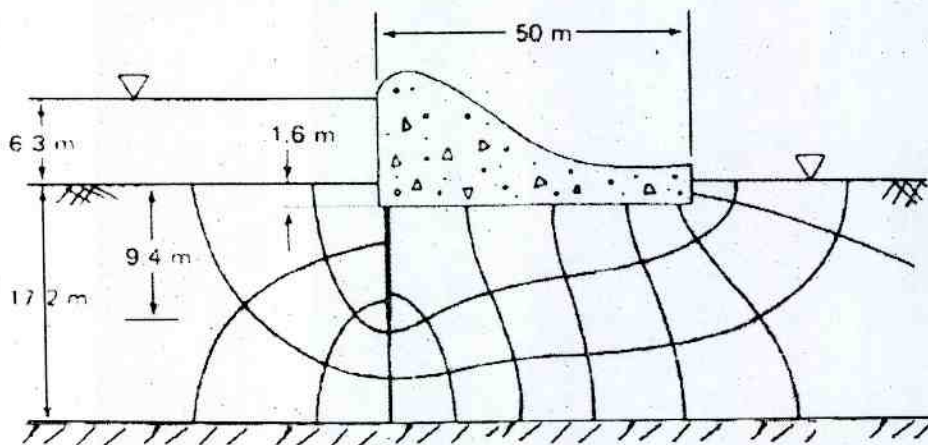


UNIT- III

- Q.3 (a) The water table in a certain area is at a depth of 4m below the ground surface. To depth of 12 m, the soil consists of every fine sand having an average voids ratio of 0.7. Above the water table the sand has an average degree of saturation of 50%. Calculate the effective pressure on a horizontal plane at a depth 10 meters below the ground surface. What will be the increase in the effective pressure if the soil gets saturated by capillarity up to a height of 1m above the water table? Assume $G = 2.65$. [8]
- (b) What is flow net? Describe its properties and uses. [8]

OR

- Q.3 (a) What is quick sand condition? Derive an expression for critical hydraulic gradient. [8]
- (b) The flow net constructed for the dam is shown in the figure below. Taking coefficient of permeability as 3.8×10^{-6} m/s, calculate the quantity of flow (in cm^3/s) under the dam per meter of dam. [8]



UNIT- IV

- Q.4 (a) Determine the shear strength in terms of effective stress on a plane within a saturated soil mass at a point where the total normal stress is 200 kN/m^2 and pore water pressure is 80 kN/m^2 . The effective shear strength parameters for soil are $C' = 16 \text{ kN/m}^2$ and $\phi' = 30^\circ$. [8]
- (b) What are disadvantages of direct shear test? [8]

OR

- Q.4 (a) Explain Mohr-Coulomb shear strength theory. [8]
- (b) In a triaxial test on dry sand the sample failed when major and minor principal stresses were 980kN/m^2 and 280kN/m^2 respectively. What would be the shear strength of same sample when tested in direct shear test under a normal stress of 300kN/m^2 . [8]

UNIT- V

- Q.5 (a) Compute compactive energy for IS light weight and IS heavy weight compaction test. [8]
- (b) What are the factors affecting compaction? [8]

OR

- Q.5 (a) What is relative compaction? Explain different methods for field compaction. [8]
- (b) What do understand by lime and bitumen stabilization? For what type of soils, it is suitable. [8]
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5E1345

Roll No. _____

Total No of Pages: 2

5E1345

B. Tech. V - Sem. (Main / Back) Exam., Feb.-March - 2021

PCC/PEC Civil Engineering

5CE4 - 05 Water Resource Engineering

Time: 2 Hours

[To be converted as per scheme]

Max. Marks: 65

Min. Marks: 23

Instructions to Candidates:

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

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

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

1. NIL

2. NIL

PART – A

(Answer should be given up to 25 words only)

[5×2=10]

All questions are compulsory

Q.1 Define Hydrological cycle. [2]

Q.2 Define consumptive use of water. [2]

Q.3 Enumerate various factors affecting duty. [2]

Q.4 Write the necessity of cross drainage structures. [2]

Q.5 Describe the Phreatic line. [2]

PART – B

(Analytical/Problem solving questions)

[4×10=40]

Attempt any four questions

- Q.1 Write the drawbacks in Kennedy's theory. [10]
Q.2 Draw a neat diagram for a diversion Headwork. [10]
Q.3 Describe Khosla's theory. [10]
Q.4 Discuss various modes of failure of a gravity dam. [10]
Q.5 Discuss various types of tube wells. [10]
Q.6 Write the various uses of Unit Hydrograph. [10]

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions)

[1×15=15]

Attempt any one questions

- Q.1 What are Lacey's basic regime equations? Starting from the equations derive following equations - [15]
(a) Wetted Perimeter
(b) Hydraulic Radius
(c) Bed Slope
- Q.2 A canal has a culturable commanded area of 1,00,000 ha. The intensities of irrigation for Kharif (Rice), Rabi (Wheat) and Sugarcane are respectively 20%, 30% and 10%. The consumptive use of water for the three crops is as under - [15]
(a) Rice: July = 21cm, August = 24 cm, September = 12 cm, October = 12 cm.
(b) Wheat: December = 9cm, January = 9cm, February = 9cm, March = 9cm.
(c) Sugarcane: November = 6cm, December to April = 9cm every month, May = 12cm.
- Q.3 Design an irrigation channel by Kennedy's theory to carry a discharge of 5 cumecs. Take $m = 1.0$, $N = 0.0225$ and B/D ratio = 4.40. [15]
-

5E5064

Roll No. _____

Total No of Pages: **4****5E5064****B. Tech. V - Sem. (Back) Exam., Feb.-March - 2021****Civil Engineering
5CE4A Surveying - II****Time: 2 Hours****Maximum Marks: 48
Min. Passing Marks: 15***Instructions to Candidates:*

*Attempt **three questions**, selecting **one question each** from any three **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. NIL2. NIL**UNIT- I**

Q.1 (a) Derive necessary expression for axis signal correction in trigonometric levelling. [8]

(b) Find the R. L. of Q from the following observations: [8]

Horizontal distance between P & Q	– 8300 m
Angle of elevation from P to Q	– 2° 6'18"
Height of signal at Q	– 3.96 m
Height of Instrument at P	– 1.45 m
Co. eff of refraction	– 0.07 m
R sin 1"	– 30.88 m
R. L. of P	– 400 m

OR

Q.1 The following reciprocal observations were made from two points P and Q: [16]

Horizontal distance = 16440 m

Angle of depression of Q at P = $0^{\circ} 3' 45''$

Angle of depression of P at Q = $0^{\circ} 2' 6''$

Height of signal at P = 4.07 m

Height of signal at Q = 3.87 m

Height of instrument at P = 1.27 m

Height of instrument at Q = 1.48 m

Determine:

(a) R. L. of Q, If the P is 326.39 m.

(b) The average coefficient of refraction at the same time of observation.

Take $R \sin 1'' = 30.88$ m.

UNIT- II

Q.2 (a) Explain the function of following curves: [4×2=8]

(i) Simple circular curve

(ii) Compound curve

(iii) Reverse curve

(iv) Transition curve

(b) Describe the method of setting out a simple circular curve by deflection angles using a tape and a theodolite. [8]

OR

Q.2 (a) What is a transition curve? Derive an equation for an ideal transition curve. [8]

(b) Compute the distance between two parallel straight between which the reverse curve has been provided. The radius of two arcs R_1 & R_2 and central angle D_1 & D_2 are known. Any suitable condition required may be assumed. [8]

UNIT- III

- Q.3 (a) What is meant by extension of a base line? Explain with a neat sketch, how a base line is extended in the field? [8]
- (b) Two triangulation stations 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 line of sight may not pass nearer the ground than 3 m. The intervening ground may be assumed to have a uniform elevation of 150 m. [8]

OR

- Q.3 (a) What is triangulation? How is it different from traversing and trilateration? [8]
- (b) Explain, what do you understand by a well-conditioned triangle? Derive condition for well conditioned triangle. [8]

UNIT- IV

- Q.4 (a) Discuss types of errors in surveying. State laws of accidental errors. [8]
- (b) Adjust the following angles closing the horizon: [8]
- A = $110^{\circ} 20' 48''$ wt 4
- B = $92^{\circ} 30' 12''$ wt 1
- C = $56^{\circ} 12' 00''$ wt 2
- D = $100^{\circ} 57' 04''$ wt 3

OR

- Q.4 (a) Explain the following with examples: [4×2=8]
- (i) Residual Error
- (ii) Most Probable value
- (iii) Weight of an observation
- (iv) True Error
- (b) Write Laws of weights with suitable examples. [8]

UNIT- V

- Q.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

- Q.5 (a) Discuss briefly the preparations required for measurements with total station. [8]
- (b) Explain method of determining the Azimuth by ex-meridian observation on the sun. [8]
-

5E1346

Roll No. _____

Total No of Pages: 3

5E1346

B. Tech. V - Sem. (Main / Back) Exam., Feb.-March - 2021

PCC/PEC Civil Engineering

5CE5 – 11 Air & Noise Pollution and Control

Time: 2 Hours

[To be converted as per scheme]

Max. Marks: 65

Min. Marks: 23

Instructions to Candidates:

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

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

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

1. NIL

2. NIL

PART – A

(Answer should be given up to 25 words only)

[5×2=10]

All questions are compulsory

- Q.1 Define greenhouse effect and mention gases responsible for it.
- Q.2 What are the characteristics of smog and smoke?
- Q.3 Mention gases measured in air pollution indices and their emission standards.
- Q.4 Enumerate the unnatural sources of air pollution.
- Q.5 Suggest the acceptable noise levels for residential, industrial and institutional buildings.

PART – B

(Analytical/Problem solving questions)

[4×10=40]

Attempt any four questions

- Q.1 What do you understand by ozone layer disturbance? Mention gases responsible for it.
- Q.2 What is ambient air quality standard? Describe in brief instruments involved for measuring air quality.
- Q.3 Give sketches of the following –
- (1) Typical bag house filter unit
 - (2) Typical collector unit
 - (3) Cyclonic scrubber
 - (4) Spray scrubber
 - (5) Venturi scrubber
- Q.4 Define sound power, sound intensity and sound pressure levels. What are the effects of noise on health?
- Q.5 What is Noise indices? What are the instruments used and how noise monitoring is done?
- Q.6 What do you understand by Indoor Air quality? Give necessity for ventilation.

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions)

[1×15=15]

Attempt any one questions

- Q.1 What is an acid rain? Explain its harmful effects and suggest some remedial measures to avoid it.
- Q.2 What are the advantages and disadvantages of the electrostatic precipitator and wet scrubbers?

Q.3 Give reasons for the following –

- (a) The effects of air pollution have no national boundaries.
 - (b) The small changes in the ozone concentrations could have dramatic effects on the life on earth.
 - (c) The urban areas are the victims to the ever increasing air pollution.
 - (d) The wet scrubbers may exhibit plume in the sky.
 - (e) It will be necessary to have international co – operation for attempting the reduction of green – house effect.
 - (f) The range of audible sound to painful sound is covered on the logarithmic scale.
 - (g) It is necessary to design carefully the doors and windows of the room.
 - (h) It is desirable to make massive base for a vibrating machine.
 - (i) A practical and efficient method of reducing noise in a system is to provide enclosures, shields and barriers.
 - (j) Machines are enclosed in a box – like structure with sound absorbing materials on its surface.
-

5E1347

Roll No. _____

Total No of Pages: 2

5E1347

B. Tech. V - Sem. (Main / Back) Exam., Feb.-March - 2021

PCC/PEC Civil Engineering

5CE5 – 12 Disaster Management

Time: 2 Hours

[To be converted as per scheme]

Max. Marks: 65

Min. Marks: 23

Instructions to Candidates:

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

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

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

1. NIL

2. NIL

PART – A

(Answer should be given up to 25 words only)

[5×2=10]

All questions are compulsory

Q.1 Name and elaborate the categories of disaster.

Q.2 Differentiate between Natural and Manmade disaster.

Q.3 What are the factors that affect people's vulnerability?

Q.4 What is seismograph and seismogram?

Q.5 What is Disaster management cycle?

PART – B

(Analytical/Problem solving questions)

[4×10=40]

Attempt any four questions

- Q.1 Discuss various types of natural disasters and highlight their effects.
- Q.2 What are the different types of drought? Suggest relief and rehabilitation measures for any two types of drought.
- Q.3 What is flood? Elaborate the mitigation tools for reducing the risks associated with flood.
- Q.4 Write short notes on –
- (a) Landslide
 - (b) Chemical disaster
- Q.5 List a few of the prominent disaster which occurred in India in last two decades and what are the lesson learnt from them.
- Q.6 Define a natural disaster “Tsunami”. What are the causes of Tsunami and its effect?

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions)

[1×15=15]

Attempt any one questions

- Q.1 Explain Cyclone. What are its adverse effect? Also explain possible measures taken to mitigate cyclone.
- Q.2 What is Earthquake? Explain effect of earthquake on structures. Discuss about the seismic waves in brief.
- Q.3 What is Disaster Management? Discuss in brief the disaster management Act, 2005. Mention National Guidelines and plans on disaster management.
-

5E1348

Roll No. _____

Total No of Pages: 2

5E1348

B. Tech. V - Sem. (Main / Back) Exam., Feb.-March - 2021

PCC/PEC Civil Engineering

5CE5 – 13 Town Planning

Time: 2 Hours

[To be converted as per scheme]

Max. Marks: 65

Min. Marks: 23

Instructions to Candidates:

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

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

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

1. NIL

2. NIL

PART – A

(Answer should be given up to 25 words only)

[5×2=10]

All questions are compulsory

Q.1 Define two guiding principles of town planning.

Q.2 Name and explain the types of town Centre's.

Q.3 Classify public buildings.

Q.4 What is the importance of housing?

Q.5 Why is town planning necessary?

PART – B

(Analytical/Problem solving questions)

[4×10=40]

Attempt any four questions

- Q.1 Describe various types of surveys in town planning. Explain in detail.
- Q.2 Explain following terms –
- (a) Transition zone
 - (b) Zoning powers
- Q.3 What do you understand by slum clearance? Describe any one method of slum clearance.
- Q.4 What are the characteristic features of a satellite town? Explain in detail.
- Q.5 What is the data required to replan an existing town?
- Q.6 Explain civic survey. Explain the method of collection of data with suitable examples.

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions)

[1×15=15]

Attempt any one questions

- Q.1 Outline the importance of zoning and elaborate the classification of zoning in town.
- Q.2 State the special features of garden city. Narrate the garden city concept developed by Ebenezer Howard. Explain with citing some examples.
- Q.3 What do you understand by public building. Explain the grouping of public buildings and its importance for any town with examples.
-

5E5065

Roll No. _____

Total No of Pages: **3**

5E5065

B. Tech. V - Sem. (Back) Exam., Feb.-March - 2021

**Civil Engineering
5CE5A Building Design**

Time: 2 Hours

**Maximum Marks: 48
Min. Passing Marks: 15**

Instructions to Candidates:

*Attempt **three questions**, selecting **one question each** from any three 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-I

UNIT- I

- Q.1 (a) What is Building Configuration? Explain various configuration in building. [6]
- (b) What are the tubes in tube structures of high rise building? [6]
- (c) Describe the various types of dead load and imposed load to be considered for a residential building [4]

OR

- Q.1 (a) Describe the importance and characteristic features of shear wall. [6]
- (b) Describe symmetry and un-symmetry building forms with the help of suitable figure. [6]
- (c) Discuss briefly about torsional effects in unsymmetrical buildings. [4]

UNIT- II

Q.2 For a rectangular clad building with pitched roof. Determine - [16]

- (a) Average design wind pressure on the walls.
- (b) Average design wind pressure on different portion of roof.

The building is industrial building and located in Lucknow, other details are as below -

Length = 20m, width (excluding overhang) = 12m; Height = 3.2m; Roof angle 15° ; permeability of wall 10%; Terrain category = 1; Class of building A; and ground slope $<3^\circ$

OR

Q.2 Calculate wind load on a rectangular clad building with mono slope roof with overhang.

Consider Height (h) = 5.5m; Length (L) = 18m; width (w) = 9m; Roof Angle $\alpha = 20^\circ$ and overhang is 0.5m, ground is flat, Terrain category -2, Life of Building 25 years and building is situated at Ajmer. [16]

UNIT- III

Q.3 A Four storyed symmetrical R.C.C (SMRF) School building situated at Guwahati has following data;

Plan Dimension = 9m \times 9m; Storey height 3.5m each. Total weight of beam and column at each storey is 140 kN and 70 kN respectively. Total weight of storey slab and roof slab is 320 kN and 410 kN respectively. Live load on each floor = 470 kN/m². The structure is resting on hard rock. Determine and show the total base shear and its distribution on each floor. Assume damping 5%. [16]

OR

- Q.3 The plan of building have four shear wall. All four walls are in M25 grade concrete, 230mm thick and 5m long. Storey height 3.2m. Floor consist of cast in-situ reinforced concrete. Design shear force on the building is 270kN in either direction. Determine the design lateral force on different shear walls. [16]

UNIT- IV

- Q.4 (a) Discuss briefly construction practices to be adopted to make a masonry building earthquake resistant. [8]
- (b) Describe the importance and constructional details of plinth band and lintel band. [8]

OR

- Q.4 (a) Explain the ductile detailing in column and beam connections. [8]
- (b) How do you define wall and column in a masonry building? Explain effective length of masonry wall and column. [8]

UNIT- V

- Q.5 (a) Calculate the stress in a cylindrical shell having radius = 7m; span = 22m; Angle $\phi = 60^\circ$; Thickness = 50mm. [10]
- (b) Differentiate between ribbed and grid floor. Draw their neat typical sketches. [6]

OR

- Q.5 (a) Write the advantage and disadvantage of prefabrication and shell roofs. [8]
- (b) Explain in detail about precast and panel elements. [8]
-

5E1349

Roll No. _____

Total No of Pages: 2

5E1349

B. Tech. V - Sem. (Main / Back) Exam., Feb.-March - 2021

PCC/PEC Civil Engineering

5CE5 – 14 Repair and Rehabilitation of Structures

Time: 2 Hours

[To be converted as per scheme]

Max. Marks: 65

Min. Marks: 23

Instructions to Candidates:

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

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

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

1. NIL

2. NIL

PART – A

(Answer should be given up to 25 words only)

[5×2=10]

All questions are compulsory

- Q.1 Define corrosion.
- Q.2 Name any two reactive aggregates with cement.
- Q.3 Define abrasion and erosion.
- Q.4 Define rebar locator.
- Q.5 Define Grouting.

PART – B

(Analytical/Problem solving questions)

[4×10=40]

Attempt any four questions

- Q.1 What are the factors affecting deterioration of concrete?
- Q.2 Describe various types of cracks.
- Q.3 Explain causes and mechanism of carbonation in concrete, and its effect.
- Q.4 Explain 'Ferro cement' and its properties, typical behaviour.
- Q.5 Discuss advantages and disadvantages of 'polymers and resins'.
- Q.6 Describe sulphate attack of concrete and various reactions involved in it.

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions)

[1×15=15]

Attempt any one questions

- Q.1 Name the various NDT methods. Explain with neat sketch rebound hammer test for determination of hardness of the concrete surface.
 - Q.2 Explain with neat sketch Half-cell potential method of corrosion assessment and its limiting values.
 - Q.3 Explain in brief various spots that are to be checked during a detailed inspection of a bridge.
-

5E1350

Roll No. _____

Total No of Pages: 2

5E1350

B. Tech. V - Sem. (Main / Back) Exam., Feb.-March - 2021

PCC/PEC Civil Engineering

5CE5 – 15 Ground Improvement Techniques

Time: 2 Hours

[To be converted as per scheme]

Max. Marks: 65

Min. Marks: 23

Instructions to Candidates:

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

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

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

1. NIL

2. NIL

PART – A

(Answer should be given up to 25 words only)

[5×2=10]

All questions are compulsory

Q.1 Write down the objectives of Ground improvement techniques.

Q.2 Enumerate various types of soil.

Q.3 Define soil stabilization.

Q.4 What is precompression and its purpose?

Q.5 What is mechanism of Reinforced earth?

PART – B

(Analytical/Problem solving questions)

[4×10=40]

Attempt any four questions

- Q.1 Explain installation technique of vertical stone column.
- Q.2 Describe various types of vertical drains.
- Q.3 Explain vibrocompaction and vibrofloatation.
- Q.4 Describe factors affecting compaction in field.
- Q.5 Explain the different methods of Grouting.
- Q.6 Describe sand compaction piles.

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions)

[1×15=15]

Attempt any one questions

- Q.1 Write short notes on Expansive soil and Collapsible soil.
 - Q.2 Describe design procedure of pre-compression by preloading.
 - Q.3 Explain Lime stabilization and Bituminous stabilization of soil.
-

5E5068

Roll No. _____

Total No of Pages: **2**

5E5068

B. Tech. V - Sem. (Back) Exam., Feb.-March - 2021

Civil Engineering

5CE6.3A Solid Waste Management

Time: 2 Hours

Maximum Marks: 48

Min. Passing Marks: 15

Instructions to Candidates:

*Attempt **three** questions, selecting **one** question **each** from any three 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. NIL

2. NIL

UNIT- I

Q.1 (a) What do you mean by solid waste management? Discuss characteristics of solid waste. [8]

(b) Explain problem associated with solid waste disposal. [8]

OR

Q.1 Describe goals and objectives of solid waste. Explain sources and classification of solid waste. [16]

UNIT- II

Q.2 What do you understand by Public health and Aesthetics? Also explain types of storage container with neat sketches. [16]

OR

Q.2 (a) Short note on - [8]

(i) Onsite handling

(ii) Onsite processing methods

(b) Short note on - [8]

(i) Container location

(ii) Dustbins

UNIT- III

Q.3 What are the various collection system used for solid waste management? Discuss the equipment and labor requirement for the collection and transport of solid waste. [16]

OR

Q.3 (a) Explain the criteria for deciding the collection route of vehicle to pick up solid waste. [8]

(b) What are the various facilities that must be available at transfer stations? [8]

UNIT- IV

Q.4 (a) Describe the various factors affecting composting. [8]

(b) Discuss various methods used for disposal of solid waste. [8]

OR

Q.4 Short note on -

(a) Bioremediation [4]

(b) Composting and Incineration [4]

(c) Sanitary land filling [4]

(d) Guidelines for selection of a landfill site [4]

UNIT- V

Q.5 What do you mean by Recycling of solid waste material? Discuss various techniques used for the generation of energy from solid waste. [16]

OR

Q.5 Write short notes on -

(a) Nature of solid waste generated from industries. [8]

(b) Methods used for reducing the generation of solid waste from industries. [8]
