5E1341

5E1341

B. Tech. V - Sem. (Main / Back) Exam., January - 2022

ESC Civil Engineering

5CE3 – 01 Construction Technology & Equipments

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

Instructions to Candidates:

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

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

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

1. <u>NIL</u> _____   2. <u>NIL</u> _____

PART – A

<u>(Answer should be given up to 25 words only)</u>   [5×2=10]

<u>All questions are compulsory</u>

Q.1 Explain the break-even point analysis.

Q.2 Write down the importance and functions of material management.

Q.3 Explain the need of construction planning.

Q.4 Explain accident report.

Q.5 How does scrapers help in increasing speed of construction?

PART – B

(Analytical/Problem solving questions)   [4×10=40]

Attempt any four questions

Q.1 How can construction management education improve the efficiency of the construction industry?

Q.2 Enlist the fire safety provisions as per NBC.

Q.3 Explain the job layout. What are the factors affecting the job layout?

Q.4 A machine costing ₹ 8,500 will have a scrap value of ₹ 300. Machine of this class have a working hour average life of 25,000 hours. What will be the depreciation charge at the end of the first year, if the machine is operated for a total of 1500 hours?

Q.5 Describe the quality control measures in construction.

Q.6 Explain with neat sketches of tunneling equipments.

PART – C

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

Attempt any two questions

Q.1 What are the technologies used in construction now a days? Explain in detail.

Q.2 Explain in detail the causes, classification, cost and measurement of an accident.

Q.3 Explain the need of construction team and stages in construction.

5E1342

5E1342

B. Tech. V - Sem. (Main / Back) Exam., March - 2022
PCC / PEC Civil Engineering
5CE4 – 02 Structural Analysis - I

Time: 2 Hours

Maximum Marks: 80
Min. Passing Marks: 28

Instructions to Candidates:

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

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

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

1. NIL _____

2. NIL _____

PART – A

(Answer should be given up to 25 words only)   [5×2=10]
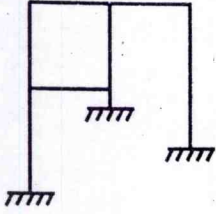
All questions are compulsory

Q.1 Define distribution factor.

Q.2 Write down the characteristics of simple harmonic motion.

Q.3 Define stiffness of a member.

Q.4 Write down the basic elements of viberatory system.

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Q.5 Calculate the static indeterminacy of shown fig.

PART – B

(Analytical/Problem solving questions) [4×10=40]

Attempt any four questions

Q.1 Define D'Alembert's principle and its utility in analysis of dynamic structures.

Q.2 Write and prove Maxwell's Betti's generalized reciprocal theorem.

Q.3 Describe development of slope deflection equation. Also analyze continuous beam using slope deflection method.

Q.4 What do you mean by natural frequency and what factor affect the natural frequency of system?

Q.5 Determine static deflection of spring.

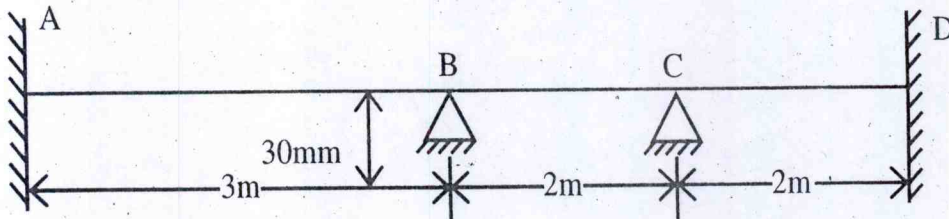Q.6 Analyze the rigid frame shown in fig -
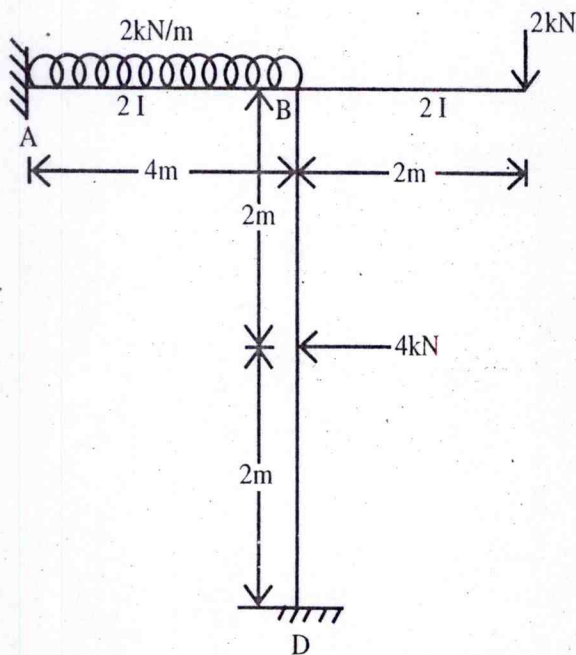
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PART – C

Attempt any two questions

Q.1 Solve the continuous beam ABCD shown in fig.

(a) Calculate the moment induced at the ends if support B settle by 30mm. Draw the bending moment diagram and the deflected shape of the beam. Take $E = 2 \times 10^5$ N/mm^2 and $I = 3 \times 10^6$ mm^4 constant for the whole beam.

Q.2 Derive the differential equation for free vibration of undamped single degree of freedom systems. Also give the solution of the differential equation.

Q.3 A beam ABC, 10m long fixed at ends A and B is continuous over joint B and is loaded as shown in fig (a) using the slope deflection method compute the end moments and plot the BMD and also sketch the deflected shape of the beam. The beam has constant EI for both the spans.

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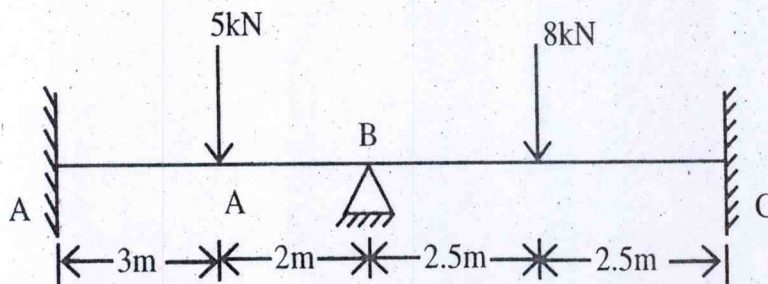
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5E1343

Total No. of Pages: 3

5E1343

B. Tech. V - Sem. (Main / Back) Exam., January - 2022
Civil Engineering
5CE4 – 03 Design of Concrete Structures

Time: 3 Hours

Maximum Marks: 120
Min. Passing Marks: 42

Instructions to Candidates:

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

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

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

1. NIL _____   2. NIL _____

PART – A

(Answer should be given up to 25 words only)   [10×2=20]

All questions are compulsory

Write short notes on the following -

Q.1 Doubly reinforced rectangular beam

Q.2 Prismatic section

Q.3 Short column

Q.4 Flanged beam

Q.5 Development length

Q.6 Anchorage length

Q.7 Two-way slab

Q.8 Combined footing

Q.9 Flexure in beam

Q.10 Shear in beam

PART – B

(Analytical/Problem solving questions) [5×8=40]

Attempt any five questions

Q.1 Design a balance singly reinforce concrete beam with a span of 5m to carry a dead load of 25 kN/m. Use M20 concrete and Fe 415 grade steel.

Q.2 Describe "one way shear" and "punching shear" in isolated footing and critical section for these cases.

Q.3 Explain Characteristic load, Design load and Partial safety factor for load.

Q.4 Design a helically reinforced circular column of diameter 400 mm to support a factored load of 1800 kN. Use M–20 and Fe–415.

Q.5 Define the advantage of limit state method over working stress method.

Q.6 Analyze a rectangular beam 300 mm wide and 600 mm effective depth to determine the ultimate moment of resistance for the tension reinforcement of 4-16 mm diameter bars. Consider M–20 concrete and Fe–415 steel.

Q.7 Design a short RCC column to carry an axial load of 1600 kN. It is a 4 m long effectively held in position and restrained against rotation at both ends. Use M–20 concrete and Fe–415 steel.

PART – C

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

Attempt any four questions

Q.1 Design a slab over a room 4 m × 6 m as per IS code. The edges of the slab are simply supported and the corners are not held down. The live load on the slab is 3000 N/m². The slab has a bearing of 150 mm on the supporting walls. Use M–20 concrete and Fe–415 steel.

Q.2 Design a simple reinforced beam to carry a live load of 20,000 N/m. The beam is 300 mm wide with clear span of 4.50 m. The bearing at each end is 300 mm. Use M-20 concrete and Fe-250 steel.

Q.3 Design a combined column footing with a strap beam for two reinforced concrete columns of size 400 mm × 400 mm spaced at 4 m c/c and each supporting a service axial load of 1000 kN. The safe bearing capacity of soil at site is 150 kN/m². Adopted M–20 grade concrete and Fe–415 HYSD bars.

Q.4 (a) Define the term "Moment redistribution".

(b) Design a rectangular beam section 300 mm × 500 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.5 Explain the following –

(a) Explain limit state of collapse.

(b) Balanced, over-reinforced & under-reinforced beam.

(c) Define the term torsion and critical shear stress.

Roll No. _____   Total No. of Pages: 3

5E1344

5E1344

B. Tech. V - Sem. (Main / Back) Exam., January - 2022
Civil Engineering
5CE4 – 04 Geotechnical Engineering

Time: 3 Hours   **Maximum Marks: 120**
                                                        Min. Passing Marks: 42

Instructions to Candidates:

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

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

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

1. NIL _____   2. NIL _____

PART – A

(Answer should be given up to 25 words only)   [10×2=20]

All questions are compulsory

Q.1 Define void ratio, porosity and degree of saturation.

Q.2 What is total, effective and neutral pressure?

Q.3 State Darcy's law of permeability of soil.

Q.4 What is an isobar diagram?

Q.5 Differentiate between compaction and consolidation.

Q.6 What are the parameters of shear strength of soil?

Q.7 Differentiate between normally consolidated and over consolidated soil.

Q.8 Discuss Quicksand Phenomenon.

Q.9 Write down different types of clay minerals.

Q.10 Differentiate between disturbed and undisturbed samples.

PART – B

(Analytical/Problem solving questions)   [5×8=40]

Attempt any five questions

Q.1 What are the different types of soil structure? Which can occur in nature? Describe in brief.

Q.2 Explain stability of finite slopes by friction circle method.

Q.3 Explain with a neat sketch active, passive and earth pressure at rest.

Q.4 Explain the method for determination of Shrinkage limit of soil.

Q.5 Explain Terzaghi's theory for determining Bearing Capacity of Soil.

Q.6 A falling head permeability test was performed on a sample of clean, uniform sand. One minute was required for the initial head of 100 cm fall to 50 cm in the standpipe of cross sectional area 1.50 cm². If the sample was 4 cm in diameter and 30 cm long. Calculate coefficient of permeability.

Q.7 What is flow net? Explain the method of constructing flow net in an earth dam.

PART – C

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

Attempt any four questions

Q.1 Explain Westergaard's theory for the determination of vertical stress at a point.

Q.2 Explain direct shear test. What are the advantages and disadvantages of this method?

Q.3 Discuss plate load test with neat sketch. What are its limitations and uses?

Q.4 A direct shear strength test was performed on a 6 cm × 6 cm sample of dry sand. The normal-load was 360 N. The failure occurred at a shear load of 180 N. Plot the Mohr's Stress Circle. Determine ϕ, assume C = 0. Also determine principal stresses at failure.

Q.5 Write short notes on Newmark's influence chart for obtaining vertical pressure due to surface loading with neat sketch.

Roll No. _____   Total No. of Pages: 3

5E1345

5E1345

B. Tech. V - Sem. (Main / Back) Exam., January - 2022
PCC / PEC Civil Engineering
5CE4 – 05 Water Resource Engineering

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

Instructions to Candidates:

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

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

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

1. <u>NIL</u>   2. <u>NIL</u>

PART – A

<u>(Answer should be given up to 25 words only)</u>   [5×2=10]

<u>All questions are compulsory</u>

Q.1 Define term "Duty of water" used in crop water requirements.

Q.2 Define concentration factor.

Q.3 Define time of concentration.

Q.4 Define open well and tube well.

Q.5 Define exit gradient.

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PART – B

Q.1 Determine the optimum number of rain gauges in catchment area from the following

data -

(a) Number of existing rain gauges = 8

(b) Mean annual rainfall at the gauges = 1000, 950, 900, 850, 800, 700, 600 and 400 mm.

(c) Permissible error = 6%

Q.2 Determine the diameter of an open well in fine sand, with a percolation intensity coefficient

C equal to 7.5×10^{-5} (m/s)/m to give a discharge of 4lps when operating under a head of

2.50 m.

Q.3 Describe various causes of Dam failure.

Q.4 Determine the uplift pressure at the salient points E, D and C of the intermediate pile shown
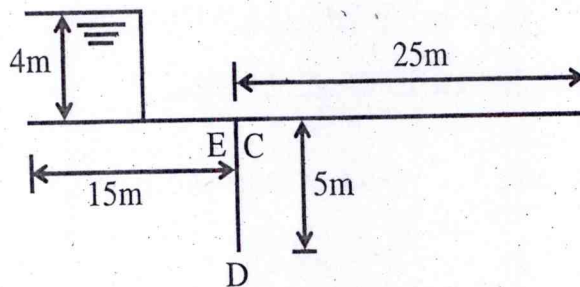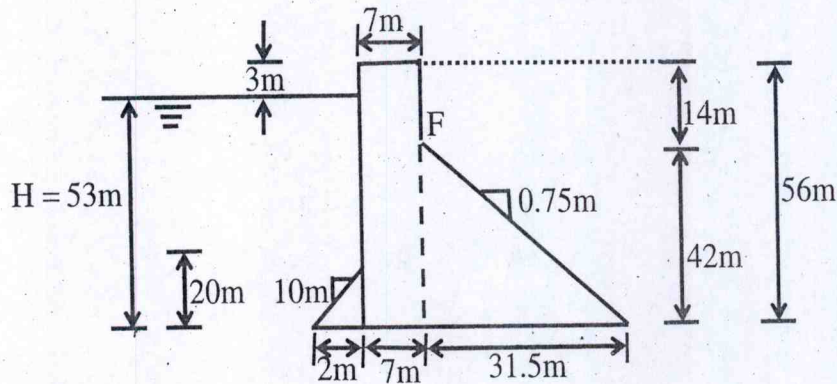
in Figure -1.

Figure – 1

Q.5 Describe the various types of cross drainage works in a canal.

Q.6 Describe the Unit Hydrograph and its uses.

PART – C

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

Attempt any two questions

Q.1 Determine the forces due to self-weight and water pressure on the non-overflow dam.

Take specific weight $w_c = 24$ kN/m³ and w = 9.81 kN/m³

Q.2 Design an irrigation channel by Kennedy's theory to carry a discharge of 15 cumecs.

Take N = 0.0225, m = 1 and S = 1 in 5000.

Q.3 Given below are the observed discharge at 6 hour intervals from an isolated storm of 3 hr

duration for a stream with a drainage area of 320 km²

Time(hr.)	0	6	12	18	24	30	36	42	48	54	60	66	72
Discharge cumecs	17	120	270	200	150	115	85	70	55	40	30	22	17

Assuming a constant base flow of 17 cumecs; derive and plot the 3 hr unit hydrograph.

Also determine the effective rainfall depth.

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Instructions to Candidates:

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

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

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

1. NIL _____   2. NIL _____

PART – A

(Answer should be given up to 25 words only)   [5×2=10]

All questions are compulsory

Q.1 Mention the sources of pollutant PM2.5 & PM10.   [2]

Q.2 Write the formula for finding average sound power level.   [2]

Q.3 How many pollutants are covered in NAAQS?   [2]

Q.4 Mention the instruments used in the measurement of air pollution.   [2]

Q.5 What is the unit of measurement of sound?   [2]

PART – B

(Analytical/Problem solving questions) [4×10=40]

Attempt any four questions

Q.1 Discuss the NAQI (National Air Quality Index) with six different pollution levels, colors & effects. [10]

Q.2 Mention the list of pollutants covered in the NAMP, NAAQS & NAQI. [10]

Q.3 What are the sources of noise pollution? Also mention the sound level/limit of the sources. [10]

Q.4 Discuss the various controlling measures of noise pollution. [10]

Q.5 Explain the cyclonic scrubber & spray scrubber. [5+5=10]

Q.6 Discuss the biological air pollution control technologies. [10]

PART – C

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

Attempt any two questions

Q.1 What is the air pollution? Also discuss the effects of air pollution on plant health, human health, animal health & environment. [3+3+3+3+3=15]

Q.2 What is the noise pollution? Also discuss the effects of noise pollution on plant health, human health, animal health & environment. [3+3+3+3+3=15]

Q.3 Write short notes on the following - [5+5+5=15]

(1) Acid rain and its effects

(2) High Volume Air Sampler (HVAS)

(3) Remedial measures for ozone layer depletion

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5E1347

B. Tech. V - Sem. (Main / Back) Exam., January - 2022
PCC / PEC Civil Engineering
5CE5 – 12 Disaster Management

Time: 2 Hours

Maximum Marks: 80
Min. Passing Marks: 28

Instructions to Candidates:

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

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

Q.2 Define Global Warming.

Q.3 What is risk mapping?

Q.4 What is Industrial Disaster?

Q.5 Define Disaster Management.

2o2

PART – B

(Analytical/Problem solving questions)   **[4×10=40]**

Attempt any four questions

Q.1 Explain Disaster Management cycle.

Q.2 Describe the various types of man- made disasters.

Q.3 Describe the adverse impacts of –

    (a)   Cyclones

    (b)   Landslides

Q.4 Discuss the impacts of climate change.

Q.5 Explain the role of Central Government in disaster preparedness.

Q.6 Briefly discuss major strategies of Risk Reduction.

PART – C

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

Attempt any two questions

Q.1 What is COVID-19? What are the primary symptoms of COVID–19? How to prevent the spread of COVID-19.

Q.2 Describe safety tips for –

    (a)   Floods

    (b)   Road accidents

    (c)   Chemical disaster

Q.3 Explain Disaster Management Act and Policy in India.

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2 of 2

5E1348

5E1348

B. Tech. V - Sem. (Main / Back) Exam., January - 2022

PCC / PEC Civil Engineering

5CE5 – 13 Town Planning

Time: 2 Hours

Maximum Marks: 80
Min. Passing Marks: 28

Instructions to Candidates:

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

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

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

1. NIL _____   2. NIL _____

PART – A

(Answer should be given up to 25 words only)   [5×2=10]

All questions are compulsory

Q.1 State objectives of Town planning.

Q.2 Define zoning and objects of zoning.

Q.3 What is Slum clearance?

Q.4 Enumerate the types of buildings.

Q.5 State objects of replanning.

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PART – B

Q.1 Explain necessity of Town planning and different patterns of town development.

Q.2 Explain various types of surveys in town planning.

Q.3 Discuss Housing problems in India.

Q.4 Explain the causes of Slums and characteristics of slums.

Q.5 Discuss the data required for replanning of existing towns.

Q.6 Write short notes on Garden city concept.

PART – C

Q.1 Describe different methods of collect data for Town-planning.

Q.2 Explain the classification of Industry. Also give requirements of industry and industrial

townships.

Q.3 Explain Urban Renewal projects and data required for these projects.

5E1349

B. Tech. V - Sem. (Main / Back) Exam., January - 2022
PCC / PEC Civil Engineering
5CE5 – 14 Repair and Rehabilitation of Structures

Time: 2 Hours

Maximum Marks: 80
Min. Passing Marks: 28

Instructions to Candidates:

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

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

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

1. NIL _____   2. NIL _____

PART – A

(Answer should be given up to 25 words only)   [5×2=10]

All questions are compulsory

Q.1 Define Sorptivity.

Q.2 What do you mean by carbonation?

Q.3 What is NDT?

Q.4 Name any four self-curing compounds.

Q.5 Draw a neat sketch of UPV circuit.

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PART – B

Q.1 Explain Alkali-Aggregate Reaction. Describe its mechanism, also write about the effect of presence of alkalis in concrete.

Q.2 Describe the method of application of Grouting. Explain different types of Grouting.

Q.3 What is the main purpose of providing Jacketing? Describe the technique with diagram behind this method.

Q.4 Describe types of cracks with neat sketch. How do we can prevent the cracks in concrete?

Q.5 Write a short notes on –

    (a) Clapping of Data

    (b) Sulphate Attack

    (c) Underwater Repair

    (d) Pull-out Test Method

Q.6 What are the preliminary investigations? Write the basic differences between preliminary and detailed investigation by taking an example of rebar locator.

PART – C

Q.1 Explain mechanism for corrosion in concrete. Which factors affect the corrosion and write its preventive measures also?

Q.2 Describe causes and factors affecting the distress and deterioration of concrete. Explain carbonation as a type of deterioration.

Q.3 Explain a case study related to the rehabilitation of masonry structures. Describe all types of masonry with neat sketches.

5E1350

5E1350

B. Tech. V - Sem. (Main / Back) Exam., January - 2022
PCC / PEC Civil Engineering
5CE5 – 15 Ground Improvement Techniques

Time: 2 Hours

Maximum Marks: 80
Min. Passing Marks: 28

Instructions to Candidates:

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

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

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

1. NIL _____   2. NIL _____

PART – A

(Answer should be given up to 25 words only)   [5×2=10]

All questions are compulsory

Q.1 What do you understand by difficult soils?

Q.2 Define compaction.

Q.3 What is load carrying capacity?

Q.4 What do you mean by grouting?

Q.5 Where do we apply reinforced earth?

PART – B

Q.1 Explain purpose and principles of Ground improvements.

Q.2 Describe the effects of composition on different soil properties.

Q.3 Discuss the purpose and mechanism of pre-compression by pre-loading.

Q.4 Explain the failure mechanism of reinforced earth. What are the advantages of reinforced earth?

Q.5 Describe the process of cement stabilization.

Q.6 Explain the mechanism of encashment and field control of stone columns.

PART – C

Q.1 Explain the Laboratory and Field tests of compaction in detail.

Q.2 What are the principles, advantages and disadvantages of vertical drains? Explain their installation method.

Q.3 Describe the purpose, principles and classification of grouts and their properties. Explain grouting methods.

	Roll No. _____	Total No. of Pages: 4

5E5061

5E5061
B. Tech. V - Sem. (Back) Exam., January - 2022
Civil Engineering
5CE1A Theory of Structures - I

Time: 3 Hours

Maximum Marks: 80
Min. Passing Marks: 24

Instructions to Candidates:

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

Units of quantities used/calculated must be stated clearly.

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

1. NIL_____   2. NIL_____

UNIT- I

Q.1 (a) Explain static indeterminacy and Kinetic indeterminacy.   [8]

(b) Explain Maxwell's reciprocal theorem and Betti's theorem.   [8]

OR

Q.1 Analyze the continuous beam using slope deflection method as shown in Fig. 1. Draw the bending moment diagram and shear force diagram.   [16]
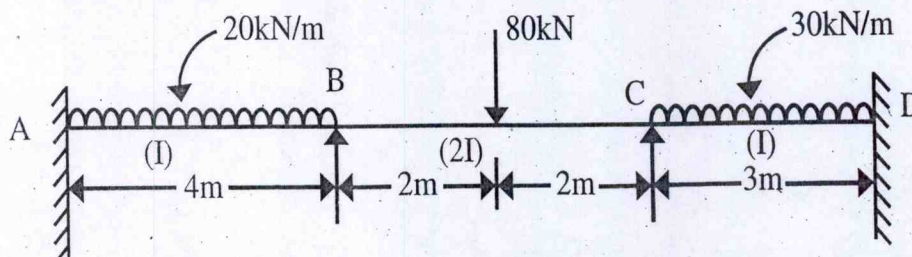

Fig.1.

UNIT- II

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

    (i)   Stiffness of a member

    (ii) Carry over factor

    (iii) Distribution factor

(b) Using moment distribution method, determine the end moments for the three span continuous beam as shown in Fig. 2.   [10]
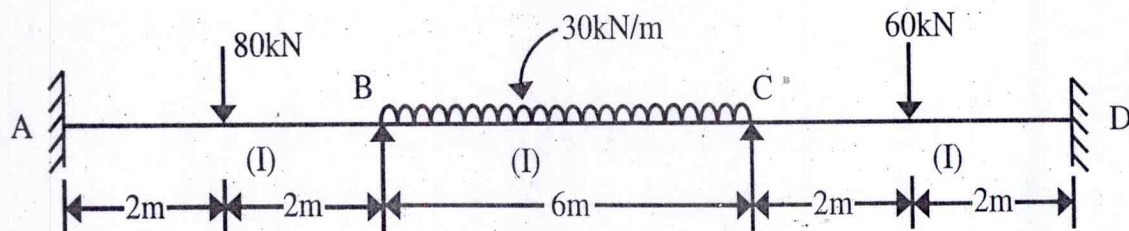

Fig.2

OR

Q.2 Analyze the portal frame as shown in Fig. 3 by moment distribution method. The frame is fixed at A and D and has rigid joints at B and C. Draw the bending moment diagram and sketch the deflected shape of the structure.   [16]
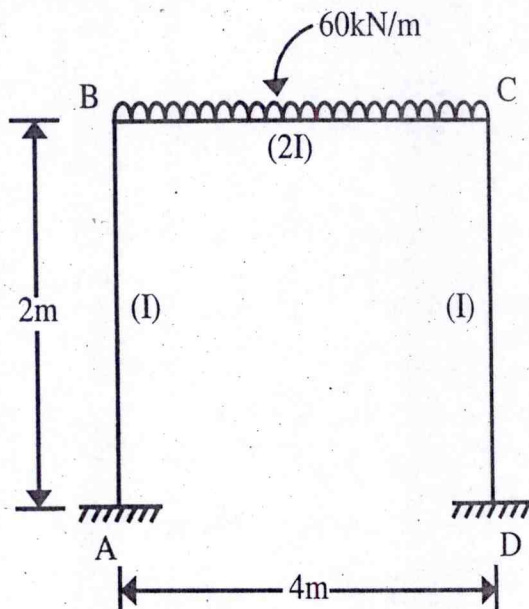

Fig.3

UNIT- III

Q.3 (a) State Castigliano's first and second theorem with relation. [8]

(b) What do you mean by unit load method? Explain in brief. [8]

OR

Q.3 A portal frame ABCD is hinged at A and D and has rigid joint B and C. The frame is loaded as shown in Fig. 4 using the method of minimum strain energy. Analyze the frame and plot the bending moment diagram. EI is constant for whole frame. [16]
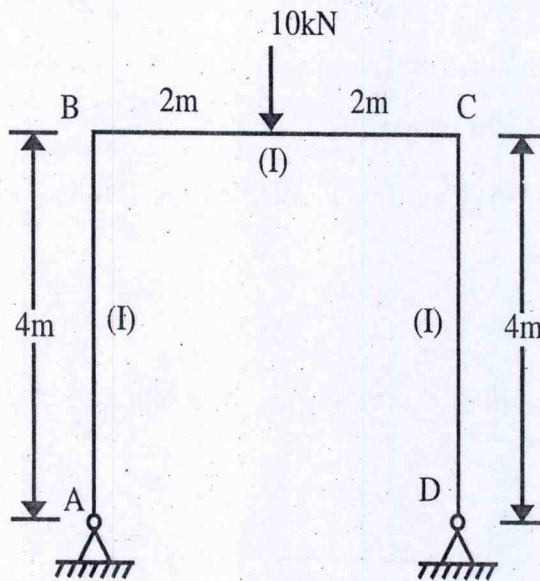
Fig.4

UNIT- IV

Q.4 (a) Explain the basic concept of column analogy method and its utility. [8]

(b) Determine the fixed end moments for the fixed beam as shown in Fig. 5 using column analogy method. [8]
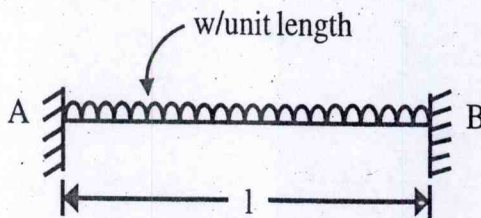
Fig.5

OR

Q.4 Analyze the continuous beam as shown in Fig. 6 using Kani's method. [16]
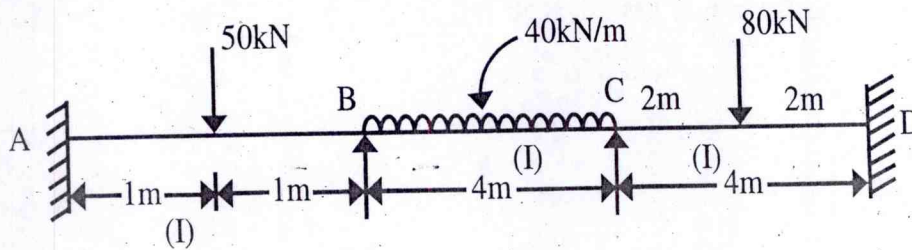

Fig - 6

UNIT- V

Q.5 (a) What do you understand by tension coefficient? Write the equations used in tension coefficient method applied to portal frame. [8]

(b) Write the assumptions made in Cantilever method for lateral load analysis of frames. [8]

OR

Q.5 Using portal method, analyze the frame as shown in Fig. 7 below. Assume that all columns have equal area of cross section. [16]
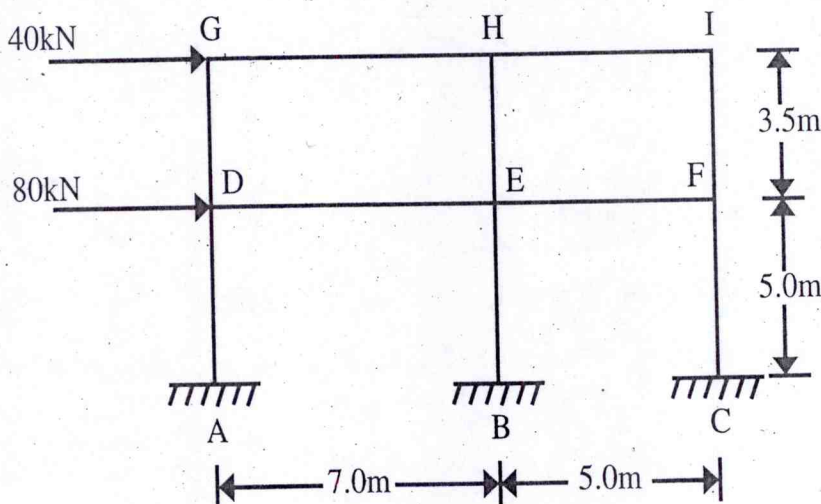

Fig.7

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5E5063

B. Tech. V - Sem. (Back) Exam., January - 2022

Civil Engineering

5CE3A Geotechnical Engg. - I

Time: 3 Hours

Maximum Marks: 80
Min. Passing Marks: 24

Instructions to Candidates:

Attempt any **five questions,** *selecting* **one question** *from* **each unit.**
All questions carry **equal** *marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*
Units of quantities used/calculated must be stated clearly.
Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL _____   2. NIL _____

UNIT- I

Q.1 (a) Differentiate between porosity and void ratio. Also, derive a relationship between void ratio, water content, degree of saturation and specific gravity of solids.   [8]

(b) A soil sample has a volume of 300cc and weighs 498 gm. After drying in oven at 105°C for 24 hours, the weight reduced to 456 gm. Assuming the volume of the sample to be unchanged. Determine its initial water content, dry unit weight, void ratio and degree of saturation.   [8]

OR

Q.1 (a) Define Index properties and Engineering properties of soils. Discuss the importance of Atterberg's limit to a geotechnical engineer.   [8]

(b) What is the use of soil classification? Explain Indian standard classification for fine grained soils.   [8]

UNIT- II

Q.2 (a) Define soil structure. Describe different soil structures for coarse grained soil.   [8]

(b) Describe the structures of the clay minerals with the help of schematic diagram.   [8]

OR

Q.2 (a) State Darcy's law. Describe the factors affecting co-efficient of permeability.   [8]

(b) Derive an expression for equivalent co-efficient of permeability of stratified soil in case of flow perpendicular to bedding plain.   [8]

UNIT- III

Q.3 (a) A soil profile consist of a top layer of sand, 3.5 m thick ($\gamma = 16.77$ kN/m^3) and bottom layer of clay, 2.5 m thick ($\gamma = 20.25$ kN/m^3). The water table is at a depth of 3.5 m from the top and the zone of capillary saturation is 1 m above the water table. Plot the diagram showing the variation of total stress, neutral stress and effective stress. Take $\gamma_w = 10$ kN/m^3.   [8]

(b) Define seepage pressure. Derive an expression for the effective stress at a depth H in a soil when the direction of flow of water through the soil is upward.   [8]

OR

Q.3 (a) What is flow net? Enumerate various methods to construct the flow net. Explain the use of flow net.   [8]

(b) Explain –   [8]
(i) Quick Sand Condition
(ii) Piping Failure

UNIT- IV

Q.4 (a) What is Mohr's circle of stress? Explain with a sketch Mohr – Coulomb failure criterion.   [8]

(b) An unconsolidated undrained triaxial test was carried out on a sample of dry sand. Under a cell pressure of 200 kPa, shear failure of sample occurred when the deviator stress reached 438.6 kPa. Determine the shear strength parameter of the soil. At what deviator stress will the soil fail if the cell pressure is 300 kPa?   [8]

OR

Q.4 (a) Classify the triaxial test based on drainage condition. Discuss the advantage of the triaxial test over the direct shear test.   [8]

(b) 'The unconfined compression test is a special type of triaxial test'. Explain.   [8]

UNIT- V

Q.5 (a) Define compaction and compaction curve. Discuss the factors affecting compaction of soil.   [8]

(b) The optimum moisture content of a soil is 16.5% and its maximum dry unit weight is 15.7 kN/m^3. The specific gravity of solids is 2.70. Determine degree of saturation and percentage of air voids of the soil at OMC. Also, calculate dry density at OMC corresponding to zero air voids.   [8]

OR

Q.5 (a) Define Mechanical Stabilization. Discuss factors affecting cement stabilization.   [8]

(b) Describe process of lime stabilization of soil.   [8]

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B. Tech. V - Sem. (Back) Exam., January - 2022
Civil Engineering
5CE4A Surveying - II

Time: 3 Hours

Maximum Marks: 80
Min. Passing Marks: 24

Instructions to Candidates:

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

Units of quantities used/calculated must be stated clearly.

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

1.   <u>NIL</u>   2.   <u>NIL</u>

UNIT- I

Q.1 (a) Explain the method of determining the RL of top of a tower by trigonometric levelling. The object is inaccessible and two instruments positions are in same vertical plane of object. Derive the expression for the same.   [8]

(b) Two observations were made on the top P of a flag PQ on a hill from two stations A and B, 100 m apart, the stations A and B being in the same line with P. The angle of elevations of P at A and B were 31°05' and 76°42' respectively. The staff reading on the B.M. (R.L.=242.23m), were respectively 2.530 m and 3.615 m when the instrument was at A and B, the telescope being horizontal. Determine the R.L. of the foot of the signal if PQ is 4.5 m.   [8]

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<center>**OR**</center>

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°3'45"
Angle of depression of P at Q	=	0°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 of P is 326.39 m and (b) the average coefficient of refraction at the time of observation.

Take R sin 1" = 30.88 m.

<center># UNIT- II</center>

Q.2 (a) What are the different types of curves used in highways and railways? Describe each with neat sketches.   [8]

(b) Enlist the methods of setting out simple circular curve. Explain any one method in detail.   [8]

<center>**OR**</center>

Q.2 Two straight lines intersect at chainage 1150.50, and the angle of intersection is 60°. If the radius of curve is 500 m, determine the following -   [16]

(a) Tangent distance

(b) Length of the curve

(c) Chainage of points of curvature and tangency

(d) Length of the long chord

(e) Apex distance and the mid-ordinate Degree of curve

(f) Degree of curve

UNIT- III

Q.3 (a) Describe the classification of triangulation system in tabular format. [8]

(b) What is meant by well-conditioned triangles? What is its importance in surveying? [8]

OR

Q.3 (a) What guidelines are followed for selecting the site for base line measurement? [8]

(b) Define base-net and explain base line extension. [8]

UNIT- IV

Q.4 The following are the observations of three angles A, B and C were taken at one station - [16]

A	=	75°32'46".3	with weight 3
B	=	55°09'53".2	with weight 2
C	=	108°09'28".8	with weight 2
A + B	=	130°42'41".6	with weight 2
B + C	=	163°19'28".8	with weight 1
A + B + C	=	238°52'09".8	with weight 1

Determine the most probable value of each angle.

OR

Q.4 (a) What do you understand by weight of a quantity? Explain the laws of weight with suitable examples. [8]

(b) Explain accidental errors with relevant example. [8]

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UNIT- V

Q.5 (a) What is Astronomical Triangle? Make a neat sketch of Astronomical Triangle and write the great circles forming this triangle and its components. [8]

(b) Enumerate the different astronomical coordinate systems. Explain any one of them in detail. [8]

OR

[4×4=16]

Q.5 Write short note on (any four) of the following -

(a) The Zenith and Nadir

(b) The Right Ascension

(c) The Azimuth

(d) Celestial Sphere

(e) Napier's Rule

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B. Tech. V - Sem. (Back) Exam., March - 2022
Civil Engineering
5CE5A Building Design

Time: 3 Hours

Maximum Marks: 80
Min. Passing Marks: 24

Instructions to Candidates:

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

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UNIT- I

Q.1 (a) Discuss briefly about torsional effects in unsymmetrical buildings.   [6]

(b) Explain silent features of tubular structural system.   [6]

(c) Differentiate between the "braced frame" and "shear walled frame" system. Give neat diagram.   [4]

OR

Q.1 (a) What do you understand by overturning in a building? what is the factor of safety against overturning?   [6]

(b) Explain in brief about various types of design loads.   [6]

(c) With the help of suitable examples differentiate between vertical and lateral load resisting members of a building.   [4]

UNIT- II

Q.2 Determine the average wind pressure on walls of a general building with flat roof without over hangs. The building is located in Surat. The topography of the area is fairly leveled and terrain is open with scattered obstructions of less than 10m height. The walls of the building have total 10 openings of 1.10m×1.00m size each. [16]
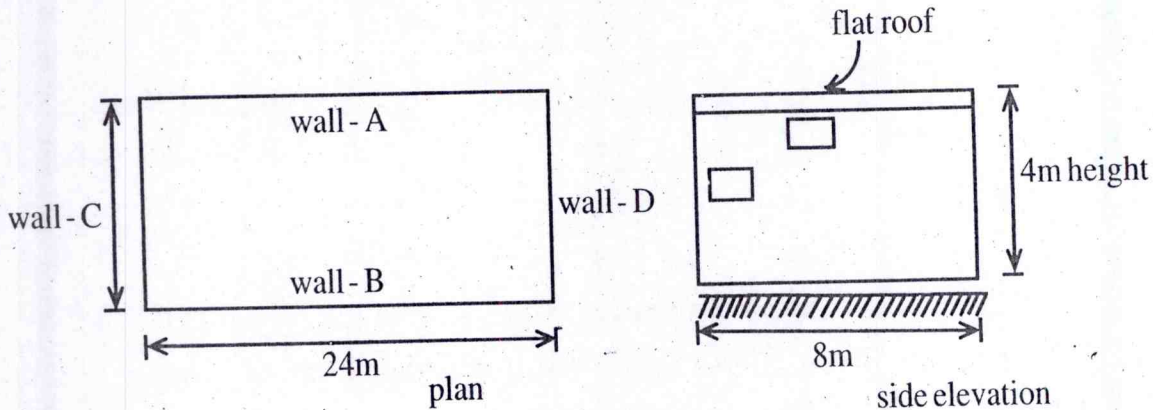
OR

Q.2 Calculate wind load on walls and roofs of a pitched roof building located in a farm. Consider height (h) 5.0m, width (w) =20m, length (ℓ) =25m, roof angle (α) =10°, over hang =0.5m opening in walls 10%, ground is flat and building is at Mumbai. [16]

UNIT- III

Q.3 A three storeyed symmetrical R.C.C (special moment resisting frame) school building situated at Bhuj has following data –

Plan dimension = 7m×7m

Storey height = 3.5m each

Total weight of beams and columns at each storey is 130 kN and 50 kN respectively. Total weight of storey slab and roof slab is 250kN and 300kN respectively. Live load on each floor = 503kN/m². The structure is resting on hard rock. Determine and show the total base shear and its distribution on each floor. Assume damping as 5%. [16]

OR

Q.3 Determine the centre of mass, centre of rigidity. The design torsional eccentricity in x and y direction and the torsional moments in x and y direction for the building shown in fig. The building is single storeyed and covered with rigid diaphragm roof. Height of walls =4m, Self-weight of the roof=3kN/m², self-weight of the walls=5kN/m², Base shear due to earthquake loads=330kN. Relative lateral rigidity of walls C and D are 0.3 and 0.7 respectively and that of wall A and B are 0.2 and 0.8 respectively. [16]
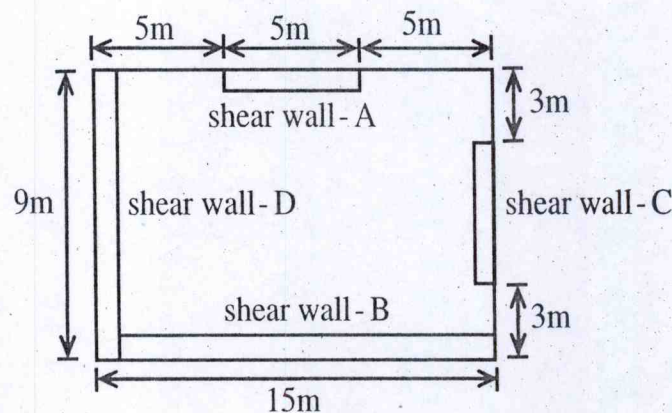
UNIT- IV

Q.4 (a) Discuss briefly construction practices to be adopted to make a masonry buildings earthquake resistant. [8]

(b) What is the importance of ductile detailing in R.C. structure? Explain with typical case study for beam, column and beam-column joint. [8]

OR

Q.4 (a) Write short note on the following – [4×3=12]

(i) Ponding of adjacent buildings

(ii) Soft storey

(iii) Strong column and weak beam design philosophy

(b) Explain the various methods of retrofitting in the masonry buildings. [4]

UNIT- V

Q.5 (a) Differentiate between folded plate and cylindrical shell. Discuss advantages of cylindrical shells. [8]

(b) Explain the utility of precast elements for mass housing construction. [8]

OR

Q.5 (a) Explain with supporting drawings the construction of prefabricated roof. [8]

(b) Write short notes on – [4×2=8]

(i) North light shell roof

(ii) Rankine Grashoff Method