6E1541

B.Tech. VI Sem. (Main/Back) Examination, June - 2022
Civil Engg.
6CE3-01 Wind And Seismic Analysis

Time : 2 Hours

Maximum Marks : 80
Min. Passing Marks : 28

Instructions to Candidates:

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

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

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

PART - A

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

1. What are the various types of structures used in structural systems.   (2)

2. Explain load flow concept in detail.   (2)

3. What do you understand by the term wind load.   (2)

4. Write a short note on earthquake loads in detail.   (2)

5. Describe in brief seismic analysis.   (2)

PART - B

Attempt any four questions   (4×10=40)

1. Explain objective, scope and outcome of wind and seismic analysis: (10)

2. Differentiate between symmetry and Asymmetry in building forms. Also explain framed tubes and various multistorey configurations.   (10)

3. What are the various types of loads used for different types of buildings. (10)

4. Describe the calculation procedure of wind load on flat roof.   (10)

5. Write a short note on seismic failure of masonary and RCC structures. (10)

6. Differentiate between pitched roof and single roof buildings in detail? (10)

Part - C

Attempt any **two** questions: (2×15=30)

1. What is shear wall. Explain its concept of design. Also describe vertical and lateral load resting elements. (15)

2. Describe the calculation procedure of an earthquake loads on framed structures. (15)

3. Explain earthquake resistant construction of buildings in detail. Also write down the various provision as per IS codes. (15)

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Roll No. _____

6E1542

6E1542

B.Tech. VI Sem. (Main/Back) Examination, June - 2022

Civil Engg.

6CE4-02 Structural Analysis - II

Time : 3 Hours

Maximum Marks : 120

Min. Passing Marks : 42

Instructions to Candidates:

Attempt all ten questions from Part A, five questions out of Seven from Part B and Four questions out of Five from Part C.

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

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

Part - A

(Answer should be given up to 25 words only)

All questions are **compulsory.**

(10×2=20)

Write short notes on following:

1. Influence line.

2. Determinate structure.

3. Redundant Frame.

4. Shear centre.

5. Strain energy for impact loads.

6. Unsymmetrical bending.

7. Cantilever method.

8. Unit load method.

9. Fixed type parabolic arches.

10. Muller Breslau principle.

6E1542/2022 (1) [Contd....

Part - B

(Analytical/Problem solving questions)

Attempt any **five** questions.

($5 \times 8 = 40$)

1. Two wheel loads of 16 and 8 kN, at a fixed distance apart of 2m, cross a beam of 10 m span. Draw the influence line for bending moment and shear force for a point 4 m from the left abutment, and find the maximum bending moment and shear force at that point.

2. Determine the vertical and horizontal displacement of the point C of the pin - joined frame shown in fig. The cross - sectional area of AB is 100 sq.mm and of AC and BC sq.mm each $E = 2 \times 10^5 \text{N/mm}^2$.
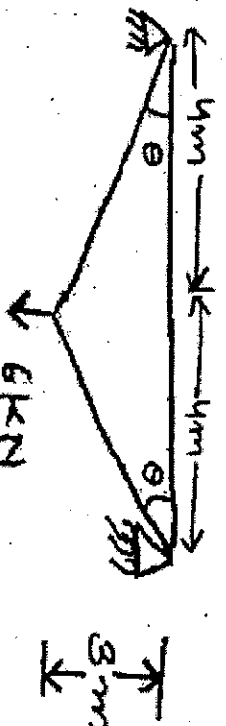
3. Find the force in the member BC of the frame loaded as shown in fig. All the members have the same cross sectional area.
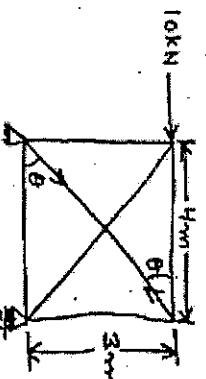
4. Explain cantilever method for analysis of multistory frames.

5. A 60 mm × 40 mm × 6 mm unequal angle is placed with the longer leg vertical and is used as a beam simply supported at the ends, over a span of 2 m. If It carries a uniformly distributed load of such magnitude as to produce the maximum bending moment of 0.12 kN-m determine the maximum deflection of the beam. Take $E = 2.1 \times 10^5 \text{N/mm}^2$.

6. Derive the expression of three hinged parabolic Arch.

7. A freely supported beam of span L carries a central load W. The sectional area of the beam is so designed that the moment of Inertia of the section increases uniformly from I at ends to 1.5 I at the middle. Calculate the central deflection.

Part - C

(Descriptive/Analytical/Problem Solving/Design questions)

Attempt any **Four** questions.   (4×15=60)

1. A parabolic arch, hinged at the ends has a span 30 m and rise 5m. A concentrated load of 12 kN acts at 10 m from the left hinge. The second momnet of area varies asthe secant of the slope of the rib axis. Calculate the horizontal thrust and reactions at the hinges. Also, calculate the maximum bending moment any where on the arch.

2. Four wheel loads of 6,4, 8 and 5 kN cross a girder of 20 m span, from left to right followed by U.D.L of 4 kN/m and 4m long with the 6 kN load leading. The spacing between the loads in the same order are 3m, 2m and 2m. The head of the U.D.L. is at 2m from the last 5 kN load. Using influence lines, calculate the S.F. and B.M. at a section 8 m from the left support when the 4kN load is at centre of the span.

3. Analyse the building frame, subjected to horizontal forces as shown in fig use portal method.
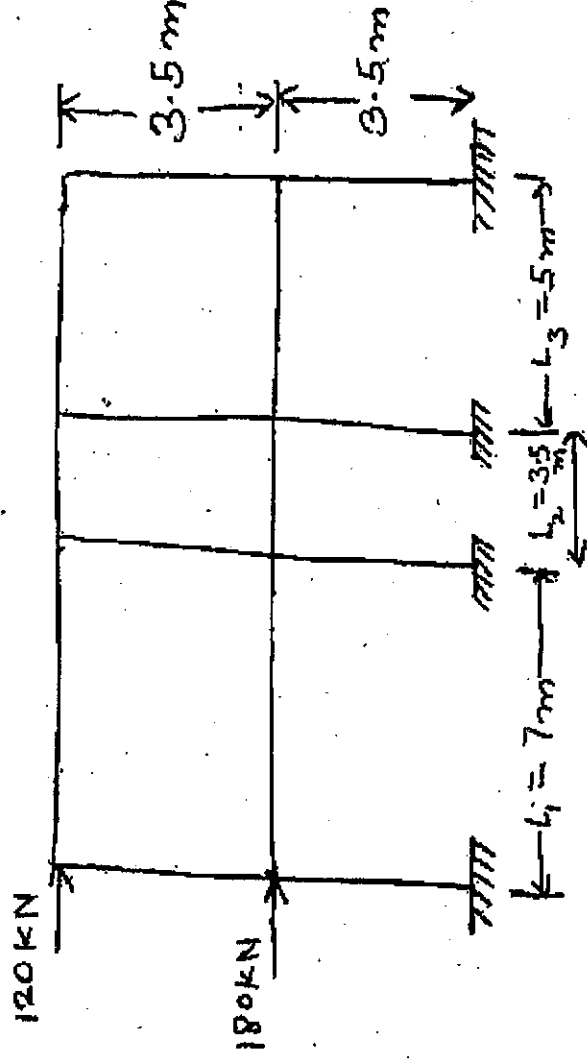
4. Using castigliano's first theorem, determine the deflection and rotation of the overhanging end A of the beam loaded as shown in fig.
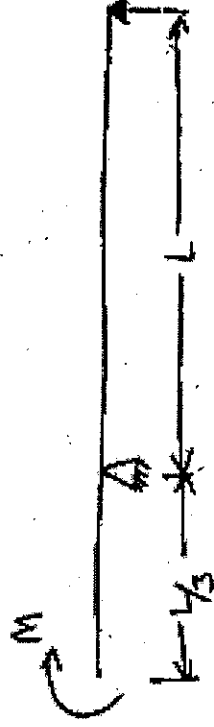
5. Explain Muller - Breslau principle and its application for drawing ILD.

6E1542   (3)   [Contd....

6E1543

6E1543

B.Tech. VI Sem.. (Main/Back) Examination, June – 2022

Civil Engg.

6CE4-03 Environmental Engineering

Maximum Marks : 120

Min. Passing Marks : 42

Time : 3 Hours

Instructions to Candidates:

Attempt all ten questions from Part A, five questions out of Seven from Part B and Four questions out of Five from Part C.

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

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

Part – A

(Answer should be given up to 25 words only)

(10×2=20)

All questions are compulsory

1. Describe about the term 'water softening'.

2. What are the prime functions of service Reservoir.

3. Define Design period.

4. What are the different pipe materials, which are commonly used for water conveyance.

5. Give the maximum acceptable limit of the following for the public drinking water.
   a. Color.
   b. pH.
   c. Chlorides.
   d. Sulphates.

6. What factor control water supply to building.

7. Give the flow diagram of a conventional municipal waste water treatment.

8. List out any four indoor air pollutants.

9. Describe noise pollution standards.

10. Define sullage and sewage.

Part - B

(Analytical/Problem solving questions)

Attempt any five questions   **(5×8=40)**

1. Discuss the merit and demerits of separate and combined system of sewage. (8)

2. Explain the sedimentation process used in water treatment plant. (8)

3. Determine the size of a circular sewer for a discharge of 800 litres per second running half full. Assume $S = 0.0001$ and $n = 0.015$. (8)

4. Define BOD. What is the significance of 5 day BOD determination? What is the role of temperature in BOD satisfaction. (8)

5. Describe noise pollution and the ways of reducing noise pollution. (8)

6. Describe the primary and secondary air pollutants and their ill effects. (8)

7. Describe the various water distribution systems and compare them. (8)

Part - C

(Descriptive/Analytical/Problem Solving/Design questions)

Attempt any **Four** questions   **(4×15=60)**

1. a. What is the effect of SOx, NOx and SPM on human beings? What are their permissible limits in air. (8)

    b. Describe methods of controlling air pollution. (7)

2. a. What is sewage farming? What are its advantages over the methods of disposal of sewage by dilution. (8)

    b. Explain briefly the principles of working of aerobic, anaerobic and Facultative type of stabilization ponds. (7)

3. a. Write down the physical, chemical and biological water quality standards for drinking water. (8)

    b. Discuss the common impurities found in water along with their adverse effect. (7)

4. a. With the help of a flow diagram, describe the unit process in a municipal water treatment system. Also describe what kind of impurities will be removed after the end of each process. (8)

    b. Explain the working of a rapid sand filter with neat sketch. What are the desirable qualities of filter media. (7)

5. a. The population of a city as per the census record available is as follows.

Census year	1951	1961	1971	1981	1991	2001	2011
Population	24835	29578	36147	49960	57620	67832	74638

Estimate the population of the city after four decades by Arithmatical increase, Geometrical increase and Incremental increase method. (8)

    b. The BOD of a sewage sample when incubated for 7 days at 30°C was 450 mg/litre. Calculate the 5 days BOD at 20°C. (7)

Roll No. _____

6E1544

B.Tech. VI Sem. (Main/Back) Examination, June - 2022
Civil Engg.
6CE4-04 Design of Steel Structures

Maximum Marks : 120
Min. Passing Marks : 42

Time : 3 Hours

Instructions to Candidates:

Attempt all ten questions from Part A, five questions out of Seven from Part B and Four questions out of Five from Part C.

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

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

PART - A

(Answer should be given up to 25 words only)

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

1. Write any two advantages of steel as a structural material.

2. What is the plastic hinge?

3. Name any two theorems of plastic analysis.

4. What are prying forces?

5. Name any four types of tension members.

6. Explain the web buckling in beam.

7. Explain how column caps are similar to column base plates.

8. Why the portal bracings are provided in truss girder bridge?

9. Name any four component of gantry and crane truss arrangement.

10. Explain the stiff bearing length in plate girder.

PART - B

(Analytical/Problem solving questions)

Attempt any **five** questions

(5×8=40)

1. Find the shape factor of hollow tube section of external diameter D and internal diameter d.

2. The plates of a 6 mm thick tank are connected by a single bolted lap joint with 20 mm diameter bolts at 60 mm pitch. Calculate the efficiency of the joint. Take f_u of plate as 410 MPa and assume 4.6 grade bolts.

3. Design a stanchion 3.5 m long, in a building, subjected to a factored load of 550 kN. Both the ends of the stanchion are effectively restrained in direction and position. Use steel of grade Fe410.

4. Explain the typical arrangement of gantry girder and crane girder with diagram.

5. What do you understand by outstand of web stiffeners? How does a plate girder derive post - buckling strength?

6. What is Shear lag? Explain the types of failures in tension member.

7. A simply supported steel joist of 4.0 m effective span is laterally supported throughout. It carries a total uniformly distributed load of 40 kN (inclusive of self weight). Design an appropriate section using steel of grade Fe410.

PART - C

(Descriptive/Analytical/Problem Solving/Design questions)

Attempt any **Four** questions

(4×15=60)

1. A column ISHB 350 @ 661.2 N/m carries an axial compressive factored load of 1700 kN. Design a suitable bolted gusset base. The base rests on M 15 grade concrete pedestal. Use 24 mm diameter bolts of grade 4.6 for making the connections.

2. A diagonal member of a roof carries an axial tension of 450 kN. Design the section and its connection with a gusset plate and lug angle. Use f_y = 250 MPa and f_u = 410 MPa.

3. A gantry girder with manually operated travelling crane, to be used in an industrial building, for the following data ;

   Self - weight of the crane girder excluding trolley : 200 kN

   Self - weight of the trolley, hook, electric motor, etc. : 40 kN

   Crane capacity : 200 kN

   Approximate minimum approach of the crane hook to the Gantry Girder : 1.20 m

   Diameter of crane wheels : 150 mm, Wheel base : 3.5m

c/c distance b/w gantry rails : 16 m, c/c distance b/w columns (span of gantry girder)
: 8 m

Self - weight of rail section : 300 N/m

Grade of steel Fe415. Find the suitable trial sections for gantry girder.

4. Design a welded plate girder 25 m in span and laterally restrained throughout. It has to support a uniform load of 100 kN/m throughout the span exclusive of self - weight. Design the web of girder without intermediate transverse stiffeners. The steel for the flange and web plates is of grade Fe410.

5. Find out the fully plastic moment in the portal frame shown in fig. The frame has a uniform cross section throughout.
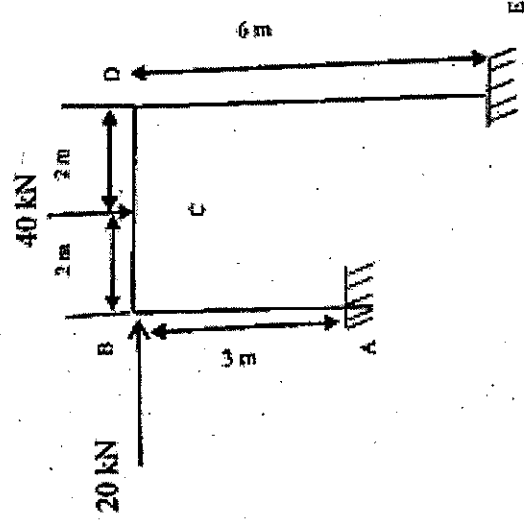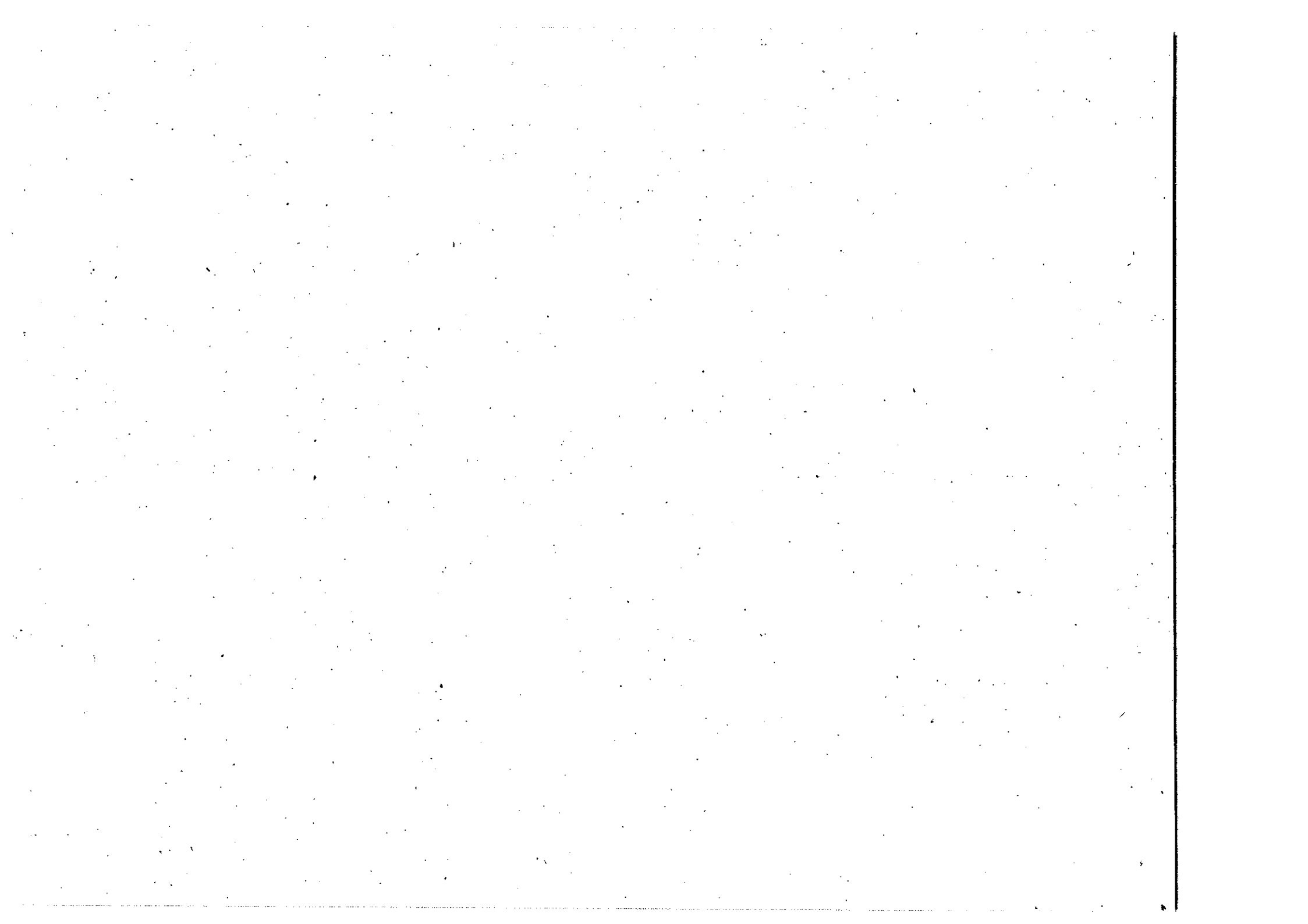
6E1545

6E1545

B.Tech. VI Sem. (Main/Back) Examination, June - 2022
Civil Engg.
6CE4 - 05 Estimating & Costing

Maximum Marks : 80
Min. Passing Marks : 28

Time : 2 Hours

Instructions to Candidates:

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

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

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

PART - A

(Answer should be given up to 25 words only)

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

1. Discuss the scope of the course for you?

2. What is estimate? Discuss the principles of estimating?

3. Describe the bill of quantities?

4. What is rate analysis?

5. What do you mean by valuation?

PART - B

(Analytical/Problem solving questions)

(4×10=40)

Attempt any **four** questions.

1. Explain the methods of estimate in detail?

2. What is the importance of rate analysis? Analyze the rate of following item of work for cement concrete 1:2:4 on floor (assume suitable rate of material and labour)?

3. Prepare detailed rate analysis for providing and laying Brick masonry work for 230 mm thick wall using 1:4 (cement : sand) mortar in foundation and plinth.

4. Define the following :

   a. Measurements sheet and abstract sheet.

   b. Plinth area rate.

   c. Cubical content rate.

   d. Revised and supplementary estimates.

   e. Scrap value.

5. Explain the principle of valuation? Discuss the different method of valuation?

6. Write the detail specification for the following items :

   a. Damp Proof Course.

   b. Brickwork.

PART - C

(Descriptive/Analytical/Problem Solving/Design Question)

Attempt any **two** questions.

(2×15=30)

1. a. What is depreciation? Explain the methods of calculating depreciation?

   b. The owner of a property gets a net annual income of Rs. 40,550/- that he investes at 6% interests. At the end of 13 years he carries out certain repairs at the cost of Rs. 1,22,000/-. He then gets an offer from a buyer to purchase the property for Rs. 6,00,000/-. Determine who is at advantage owner or buyer?

2. Write short notes on :

   a. Sinking fund.

   b. Year's purchase.

   c. Rent fixation of buildings.

3. Estimate the cost of earth work for a portion of road at the rate of Rs. 465/- in banking and Rs. 365/- in cutting for 400 m length from the following data. Formation width of road is 10 m; side slopes are 2:1 in banking and 1·5:1 in cutting.

Station	Distance in meters	R.L of ground	R.L of formation
25	1000	51.00	52.00
26	1040	50.90	Downward gradient of in 200
27	1080	50.50	
28	1120	50.80	
29	1160	50.60	
30	1200	50.70	
31	1240	51.20	
32	1280	51.40	
33	1320	51.30	
34	1360	51.00	
35	1400	50.60	

Draw the longitudinal section of road and a cross section.

6E1547

B.Tech. VI Sem. (Main/Back) Examination, June – 2022
Civil Engg.
6CE5- 12 Solid and Hazardous Waste 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 suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

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

PART - A

(Answer should be given up to 25 words only)

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

1. Define Solid Waste.
2. Define 3R principal.
3. Explain Sanitary landfilling.
4. What is Bioremediation?
5. Define Industrial Waste.

PART - B

(Analytical/Problem solving questions)

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

1. Describe the environmental concerns of solid waste disposal sites.
2. Describe various collection systems. What are the advantages and disadvantages of door - to - door collection system?
3. Sketch and describe the equipment for collection and transport of solid waste?
4. Discuss the treatment and disposal of industrial solid waste.
5. How do we decide the labour requirements for collection of solid waste?
6. What are the various points to be kept in mind while choosing the collection route of vehicle to pick up solid waste?

PART - C

(Descriptive/Analytical/Problem Solving Design Questions)

(2×15=30)

Attempt any **Two** questions.

1. Suggest various methods for reducing the solid waste generation in the industries.

2. What are the different types and materials used for storage containers? Explain with suitable sketches.

3. What do you understand by sanitary land filling? How is it different from a normal land filling? How is it practiced? Explain the filling process with a neat sketch.

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Roll No. _____

6E1520

6E1520

B.Tech. VI Sem. (Main/Back) Examination, June – 2022
Civil Engineering
6CE5-16 3. Geographic Information System & Remote Sensing

Time : 2 Hours

Maximum Marks : 80
Min. Passing Marks : 28

Instructions to Candidates:

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

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

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

PART - A

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

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

1. Define Remote Sensing.   (2)
2. What is difference between arial and terrestrial photographs.   (2)
3. Define atmospheric window.   (2)
4. What is meta data.   (2)
5. Write down any four use of GIS.   (2)

PART - B

(Analytical/Problem solving questions)

Attempt any **four** questions   (4×10=40)

1. Define photogrammetry. Describe classification of photographs.   (10)
2. Write a short note on :
   i.   Scattering.
   ii. Spectral signature.   (5+5)

3. a. Write a short note on characteristics of sensors.

   b. Explain orbital parameters of a satellite. (5+5)

4. Give the salient features of cadastral, thematic and topographic maps. (10)

5. a. What is meant by Ground Truth in remote sensing.

   b. What are advantages of multidate and multiband images in Remote Sensing. (5+5)

6. Write application of GIS in water resources. (10)

PART - C

(Descriptive/Analytical/Problem Solving/Design Questions)

Attempt any **two** questions (2×15=30)

1. a. Define remote sensing and various stages of remote sensing system. (10)

   b. Write a short notes on Electromagnetic Radiation. (5)

2. Describe various techniques used in Digital Image processing. (15)

3. a. Explain vector and raster data structure. (7)

   b. Discuss about application of GIS in urban planning. (8)

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