

Roll No. _____

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6E7121

6E7121

B.Tech. VI sem. (Main) Examination, July - 2023
Civil Engineering
6CE3-01 Wind & Seismic Analysis

Time : 3 Hours**Maximum Marks : 70****Instructions to Candidates:**

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

Schematic diagram must be shown wherever necessary. Any data you feel missing suitably be assumed and states 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 question are compulsory.****(10×2=20)**

1. Define aspect ratio of a building.
2. What are the effects of asymmetry in building forms during Earthquake?
3. What is shear wall and its functions?
4. What are the various loads that may acts on a building? Explain.
5. What is load flow concept? Define.
6. What do you mean by pressure coefficient at a point? How it is calculated? Explain.
7. What do you mean by seismic waves? Write name of different types of seismic waves.
8. Define epicenter and epicentral distance.
9. Write some common causes of damage and collapse of buildings during earthquake.
10. Explain strong column weak beam analogy of framed structure.

Part - B**(Analytical/Problem solving questions)****Attempt any five questions:****(5×4=20)**

1. Write a note on different lateral load resisting systems.
2. What do you mean by Torsional irregularity? Explain in brief.

3. Write a short notes on following
 - a) Strength and stiffness
 - b) Symmetry and Asymmetry buildings
4. Write down the steps to obtain design wind pressure at any height above mean ground level as per IS-875 (part 3).
5. What do you mean by a soft storey/weak storey? Write down the effects of soft/weak storey.
6. Write construction practices required to ensure earthquake resistant masonry buildings.
7. Write short notes on the following (any two)
 - a) Plate tectonic theory
 - b) Seismic waves
 - c) Measurements of earthquakes.
 - d) Effect of earthquake.

Part - C

(Descriptive/Analytical/Problem solving/Design Questions))

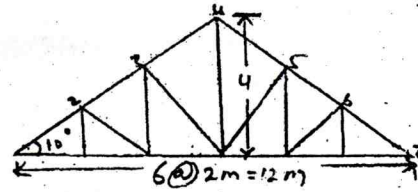
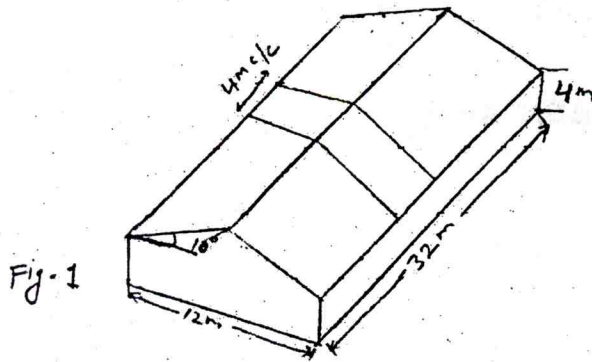
Attempt any three questions.

(3×10=30)

1. What is equivalent loading on supporting beams for a rectangular slab? Calculate equivalent loading(u.d.l) for bending moment and shear for load transferred to long beam.
2. What are the different configurations of buildings? Explain any two.
3. A rectangular industrial building of size 32m×12m has a pitched roof as shown in fig. 1. Trusses used in it are of the type shown in fig 2. Evaluate the wind loads to be considered at upper nodes of the central most truss to design the same for wind load when wind blows perpendicular to the ridge. All other relevant data are as detailed below.

Building: Length = 32 m, width = 12 m, Eaves height = 4 m, roof slope = 10° , Design life = 50 years , permeability = 4 %.

Terrain & Wind : category = 2, Topography = flat Basic wind speed = 50 m/sec., wind direction = Perpendicular to ridge , spacing = 4 m c/c



4. A 10 - storey OMRF building has plan dimensions as shown in fig. 3 below. The storey height is 3.0m. The DL per unit area of the floors consisting of the floor slab, finishes etc is 4 KN/m^2 . Weight of the partitions on the floor can be assumed to be 2 KN/m^2 . The intensity of line load on each floor is 3 KN/m^2 and on the roof is 1.5 KN/m^2 . The soil below the foundation is hard the building is located in Delhi. Determine the seismic forces and shears at different floor levels.

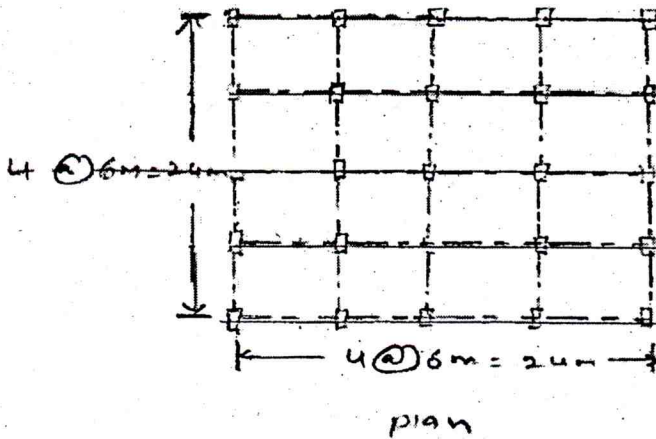


Fig-3

5. Explain the concept of special confining reinforcement. What are requirement for a column as per IS - 13920.

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6E1541

6E1541

B.Tech. VI sem. (Back) Examination, July - 2023

Civil Engineering

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. (Mentioned in form No. 205).

Part - A

(Answer should be given up to 25 words only)

All questions are compulsory (5×2=10)

1. Explain the concept of live loads and dead loads in structural design. How these loads impact the design considerations and structural integrity of a building?
2. Differentiate between wind forces and seismic forces. Discuss their characteristics, effects on structures, and any design considerations specific to each force.
3. What are the types of construction generally adopted in building?
4. Describe the concept of load flow in a framed structure. Illustrate your explanation with a neat sketch, demonstrating how loads are transferred through the structural members in a typical framed building.
5. Explain various types of tube structure.

Part - B

(Analytical/Problem solving questions)

Attempt any four questions (4×10=40)

1. While designing a residential structure, what types of loads should be considered and why? Explain briefly, referring to the relevant I.S. codes, their specifications, and standard values.

2. How does architectural features impact buildings during earthquakes? Why symmetrical buildings exhibit better performance during earthquake?
3. Provide a concise overview of shear walls, including their types. What is the role of shear walls in a building? Additionally, discuss the advantages of incorporating shear walls in multistory structures.
4. Write down the codal provision for masonry units, mortar, masonry wall and opening in walls as per I.S Code 4326:1993?
5. Explain various method adopted in seismic analysis.
6. Discuss types of failure observed in masonry and framed structure.

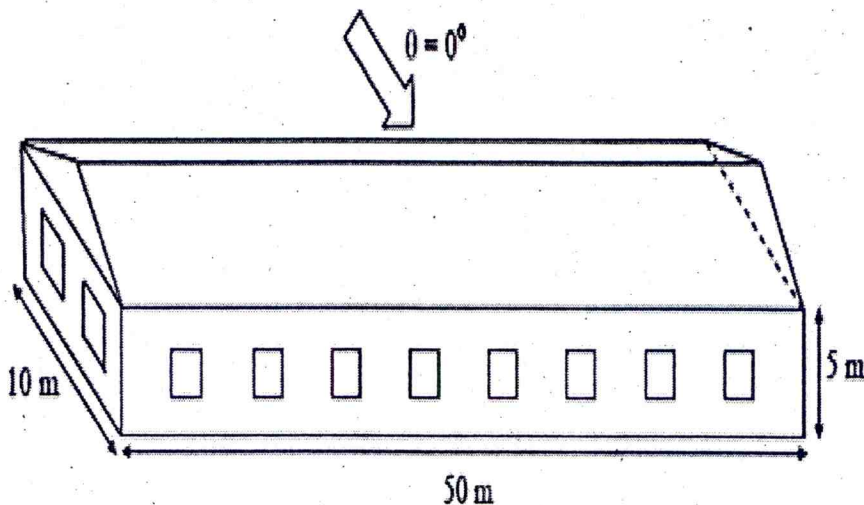
Part - C

(Descriptive/Analytical/Problem Solving/Design Questions)

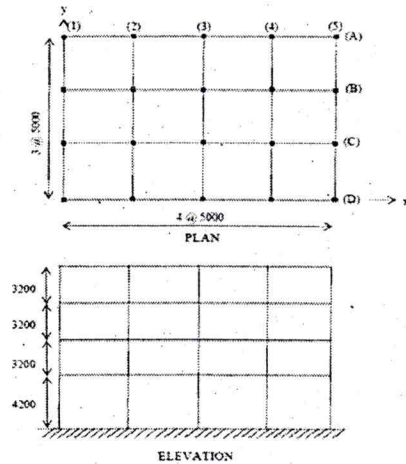
Attempt any **two** questions

(2×15=30)

1. Calculate the wind pressures and design walls and roof of rectangular clad building with pitched roof having plane dimensions 10m×50m and height 5m. as shown in fig. The building is situated in Jaipur in an industrial area 500 m inside open land on a fairly level topography. Walls of building has 20 opening of 1.5m×1.5m size. The roof is of GC sheeting and roof angle is 15° . Calculate also the local wind pressure on roof and wall cladding. The column and trusses are 5m c/c longitudinally, purlins are at 1.4 m c/c and column at gable ends are at 5m c/c.



2. A four - storey reinforced concrete office building shown in Fig. The building is located in Udaipur. The soil conditions are medium stiff and the entire building is supported on a raft foundation. The R.C. frames are in filled with brick - masonry. The lumped weight due to dead loads is 15 kN/m^2 on floors and 12 kN/m^2 on the roof. The floors are to cater for a live load of 5 kN/m^2 on floors and 2 kN/m^2 on the roof. Determine design seismic load on the structure as per IS Code.



3. What is the importance of ductile detailing in R.C. structure? Explain ductile detailing of columns and frame members with axial load (P) and moment (M) requirements.

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6E7122

6E7122

B.Tech. VI - Sem. (Main) Examination, July- 2023
Civil Engineering
6CE4-02 Structural Analysis - II

Time : 3 Hours

Maximum Marks : 70

Instructions to Candidates:

Attempt all Ten questions from Part A, Five questions out of Seven questions from Part B and Three questions out of Five questions from Part C.

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

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

PART - A

(Answer should be given up to 25 words only)

All questions are compulsory.

(10×2=20)

1. Define strain energy.
2. What is Eddy's theorem?
3. What are the different types of arches based on support conditions?
4. State Castigliano's first and second theorem.
5. What is the principal moment of inertia?
6. Define the influence line diagram.
7. Write a short note on the 'Unit Load method'.
8. State Muller Breslau's principle.
9. Define the tension coefficient.
10. Define shear center.

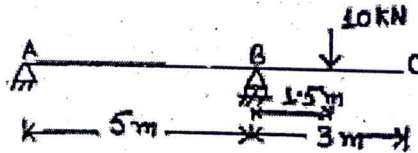
PART - B

(Analytical/Problem solving questions)

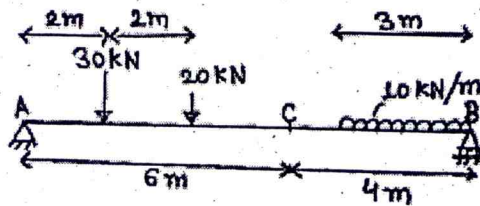
Attempt any Five questions.

(5×4=20)

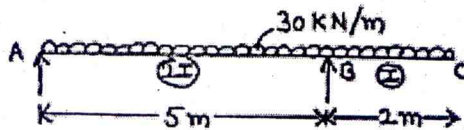
1. Find the slope at the support A of the beam shown in the figure below using Castigliano's theorem.



2. Determine (a) support reactions; (b) shear force and bending moment at section 'C', using the influence line diagram for the beam shown in the figure below.

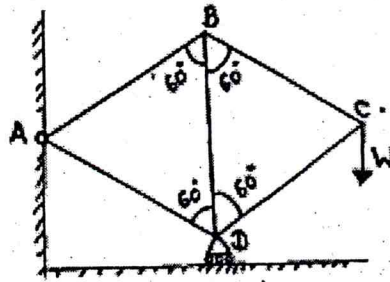


3. A UDL of 5 kN/m and 15 m long runs over a 10 m long bridge. Draw influence line diagrams and calculate the maximum shear force and bending moment at a section at 6 m from left-hand support.
4. Determine deflection at the free end of the overhanging beam shown in the figure below using the unit load method. The moment of inertia of the span AB is two times that of span BC.



5. A beam of rectangular section 100 mm × 150 mm is subjected to a bending moment of 35 kN-m. The trace of the plane of loading is inclined at 45° to the Y-Y axis of the section. Locate the neutral axis of the section and calculate the maximum bending stress induced in the section.
6. A three-hinged parabolic arch has a span of 20 m with a 4 m central rise. It carries a concentrated load of 40 kN at 15 m from the left end and a uniformly distributed load of 25 kN/m over the left half portion. Determine (a) bending moment; (b) normal thrust and (c) radial shear at section 5 m from left support.

7. A frame ABCD consists of two equilateral triangles as shown in the figure below. The frame is hinged at A and supported on rollers at D. Find vertical deflection at C due to a load 'W' applied vertically at C. All the members are of length 'L' and area 'a'.



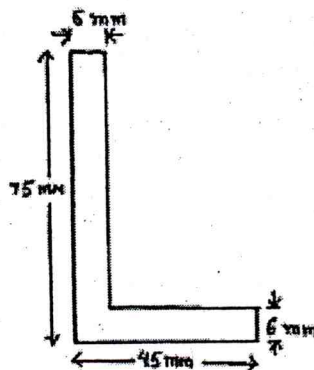
PART - C

(Descriptive/Analytical/Problem Solving/Design questions)

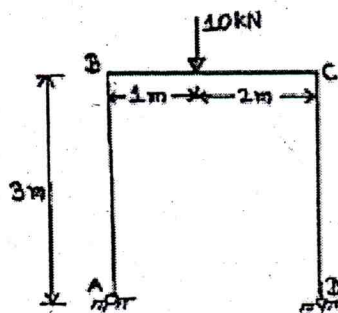
Attempt any Three questions.

(3×10=30)

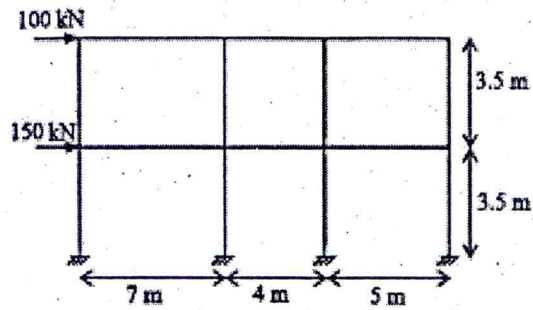
1. Determine the position of the neutral axis and principal moment of inertia of an unequal section 70 × 45 × 6 shown in the figure below.



2. A portal frame ABCD is hinged at A and D, and has rigid joints at B and C. The frame is loaded as shown in the figure below. Using the least energy theorem, analyse the frame and plot the bending moment diagram.



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3. Analyse the frame shown in the figure below using the portal method and determine (a) horizontal shear in columns; (b) bending moments at the beam and column ends; (c) shear in beams; and (d) axial forces in columns.



4. Four point loads 12 kN, 20 kN, 20 kN, 15 kN have center-to-center spacing of 2 m between consecutive loads. These loads traverse a girder of 25 m span from left to right with 15 kN load leading. Find the maximum shear force and bending moment at 10 m from the left end.
5. Explain with figures the difference in structural behavior of a beam and an arch of the same span. Also, derive the expression to calculate horizontal thrust in a two-hinged parabolic arch subjected to general loading.

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6E1542**6E1542****B.Tech. VI Sem. (Back) Examination, July- 2023****Civil Engineering****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 question out of seven from Part B and four questions out of five from Part C.

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

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

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

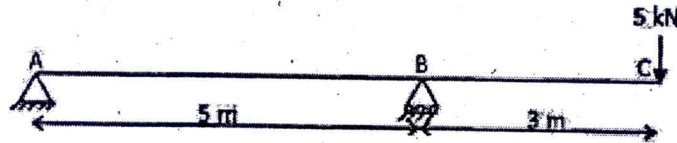
1. Define the Influence line diagram.
2. State Muller Breslau's principle.
3. Define Castigliano's theorem of minimum strain energy.
4. Define the Tension coefficient.
5. What is Eddy's theorem for an arch?
6. What do you mean by unsymmetrical bending?
7. Define Shear Center.
8. Define Principal axes.
9. What are the uses of influence line diagrams in structural analysis?
10. Write assumptions of the cantilever method of frame analysis.

PART - B
(Analytical/Problem solving questions)

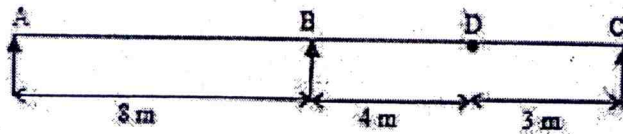
Attempt any Five questions.

(5×8=40)

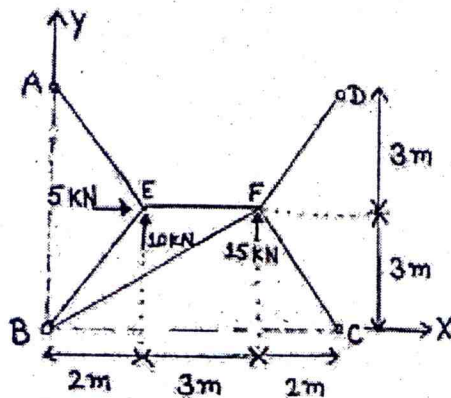
1. A UDL of 8 kN/m and 6m long runs over a 20 m long bridge. Draw influence line diagrams and calculate the maximum shear force and bending moment at a section at 8m from left-hand support.
2. Find vertical deflection at point 'C' of the overhanging beam shown in the figure given below, using Castigliano's theorem.



3. Using Muller Breslau's principle, draw influence lines for reactions at supports A, B, and C for the beam shown in the figure below. Show values of ordinates at points A, B, C, and D. Note that an internal hinge is provided at D.

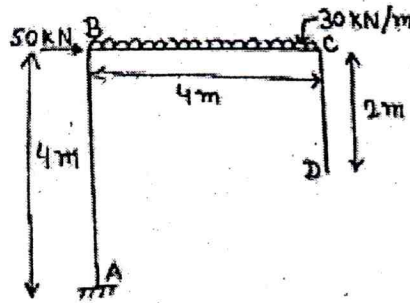


4. A space frame shown below is supported through ball joints at A, B, C, and D in a horizontal plane. The member EF is horizontal and is at a height of 3 m above the base. The loads at the joints E and F act in the horizontal plane. Find the forces in all the frame members using the tension coefficient method.



5. A parabolic three-hinged arch has a span of 20 m. The central rise of the arch is 4 m; it is loaded with a UDL of intensity 3 kN/m on the left 8 m length. Calculate (a) direction and magnitude of reactions at hinges; (b) normal thrust and radial shear at 4 m from left support.

6. Determine vertical deflection at the free end 'D' of the cantilever frame shown in the figure below. Take flexural rigidity $(E.I) = 12000 \text{ N-mm}^2$.



7. A beam of rectangular section $80 \text{ mm} \times 120 \text{ mm}$ is subjected to a bending moment of 15 kN-m . The trace of the plane of loading is inclined at 45° to the Y-Y axis of the section. Locate the neutral axis of the section and calculate the maximum bending stress induced in the section.

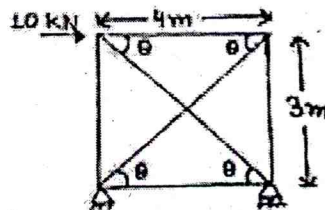
PART - C

(Descriptive/Analytical/Problem Solving/Design questions)

Attempt any Four questions.

($4 \times 15 = 60$)

- Four point loads 10 kN, 20 kN, 20 kN, 15 kN have centre to centre spacing of 2m between consecutive loads. These loads traverse a girder of 30 m span from left to right with 15 kN load leading. Find the maximum shear force and bending moment at 10 m from the left end.
- Find axial forces in all the members of the frame shown below. Area of all members are the same.



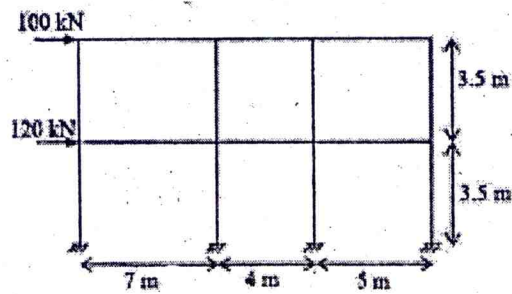
- Show that the horizontal thrust developed in a parabolic arch of span 'L' and rise 'h' subjected to concentrated load 'W' at a distance 'a' from springing is given by:

$$H = [5 W a (L - a) (L^2 + La - a^2)] / (8 h L^3)$$

4. Determine the location of shear center of the section shown below:



5. Analyse the frame shown in the figure below using portal method and determine (a) horizontal shear in columns; (b) bending moments at the beam and column ends; (c) shear in beams; and (d) axial forces in columns.



6E7123	Roll No. _____	[Total No. of Pages : 2]
<div style="border: 1px solid black; display: inline-block; padding: 2px 10px; margin: 5px 0;">6E7123</div> <p>B.Tech. VI Sem. (Main) Examination, July - 2023 Civil Engineering 6CE4-03 Environmental Engineering</p>		

Time : 3 Hours

Maximum Marks : 70

Instructions to Candidates:

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

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

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

PART - A

(Answer should be given up to 25 words only)

All questions are **compulsory**.

(10×2=20)

1. Draw a flow diagram of water treatment plant.
2. Write the difference between alum and iron salts when used as coagulant.
3. Enlist the factors affecting rate of water demand.
4. What do you mean by distribution reservoir.
5. State maximum permissible limit of total dissolved solids, turbidity, hardness and fluoride for drinking water as per Indian standards.
6. Explain composition of air?
7. Enlist the zone of pollution in the river stream?
8. Differentiate between rapid sand and slow sand filter.
9. Discuss breakpoint chlorination.
10. Enlist the noise standards specified by Indian Government during day and night time for residential and silence zone.

PART - B

(Analytical/Problem solving questions)

(5×4=20)

Attempt any Five questions.

1. Derive the expression of settling velocity in sedimentation tank.
2. Design a sedimentation tank for a water supply project of a city having population of 75000. The per capita demand is 150/day. Peak demand is 1.5 times of average demand. Velocity of flow is 0.3 m/sec and detention time is 5 hours.
3. What are various sources of noise pollution.
4. Predict the population for the year 2030, 2040 and 2045 through geometric increase method using following data.

Year	1980	1990	2000	2010
Population (Lakhs)	138	145	167	187

5. Enlist different type of valves used in distribution system? Explain any two valves in detail with neat diagram.
6. Explain activated sludge process in detail.
7. What do you mean by aeration. How and why is it done?

PART - C

(Descriptive/Analytical/Problem Solving/Design questions)

Attempt any Three questions.

(3×10=30)

1. a. BOD₅ of wastewater is 200 mg/L at 20°C. Determine BOD₁₀ if the test is run at 16°C. K = 0.23/day. (5)
b. Calculate the velocity of flow and corresponding discharge in a sewer of circular section having diameter equal to 1 m and laid at 1 in 500. The sewer runs at 0.6 depth. Use manning's formula. Take N = 0.012. (5)
2. Write a note on :
 - a. Hardy cross method.
 - b. Population equivalent.
 - c. COD/TOC ratio.
 - d. Reflux valve.
3. Drinking water after analysis found to have following ions. Calculate (a) total hardness (b) alkalinity (c) carbonate and (d) non - carbonate hardness.

Ions	Na ⁺	Ca ²⁺	Mg ²⁺	Cl ⁻	CO ₃ ²⁻	SO ₄ ²⁻
Concentration (mg/L)	40	100	50	40	20	10

4. a. What do you mean by noise pollution. Explain in detail the harmful effects of noise pollutions. (5)
b. What are the various mitigation measures that should be adopted indoor and outdoor to reduce noise pollution. (5)
5. Explain ambient air quality standards along with various air pollutants and their sources?

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[Total No. of Pages : 2]

6E1543**6E1543****B.Tech. VI sem. (Back) Examination, July - 2023****Civil Engg.****6CE4-03 Environmental 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 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. What are the various factors affecting "per capita demand"?
2. Discuss the requirements of a good distribution system.
3. Sketch the layout and general outline of various units in a water treatment plant.
4. Explain self - cleansing velocity in sewers.
5. Define following terms :
 - a. Biological oxygen demand.
 - b. Chemical oxygen demand.
6. Differentiate between separate sewer and combined sewer.
7. Enlist different suspended and attached growth systems.
8. Define Sewage farming.
9. What are the harmful effects of these sources on human health unnatural sources of air pollution?
10. Discuss sources of noise and their noise levels.

Part - B

(Analytical/Problem solving questions)

Attempt any **Five** questions

(5×8=40)

1. Discuss different type of pipe networks in water supply system.
2. Design a continuous flow rectangular sedimentation tank for a population of 20,000 persons with an average per capita demand of 120 litres per day. Assume detention period of 6 hours.
3. Explain the difference between slow sand and rapid sand filter. Also explain the working of rapid sand filter with a neat sketch.
4. The BOD of a sewage incubated for one day at 30°C has been found to be 100 mg/l. What will be the 5 - day 20°C BOD. Assume $K = 0.12$ (Base 10) at 20°C.
5. What is self - purification property of a river stream? Explain various zones of pollution in a river stream.
6. Discuss the sources and health effects of particulate matter (PM) in ambient air.
7. Define noise and explain how it should be regarded as an environmental pollutant.

Part - C

(Descriptive/Analytical/Problem Solving/Design questions)

Attempt any **Four** questions

(4×15=60)

1. a. Explain in detail about the population forecasting methods. (7)
b. The population for a certain town is given below. Find out the population in the year 2020 and 2030 by geometrical increase method.

Year	1970	1980	1990	2000	2010
Population	80,000	1,20,000	1,70,000	2,20,000	2,70,000

 (8)
2. a. What are the requirements of a good disinfectant. Describe break point chlorination along with graphical representation. (7)
b. Discuss different types of chlorination. (8)
3. a. Discuss the quality parameters used to assess sewage characteristics and their significance in wastewater treatment. (7)
b. Calculate the velocity of flow and corresponding discharge in a sewer of circular section having diameter equal to 1 m, laid at a gradient of 1 in 500. The sewer runs at 0.6 depth. Use manning's formula taking $N = 0.012$. (8)
4. a. Discuss the composition and properties of air pollutants. What are air quality standards and why are they important? (7)
b. Describe your suggestions for efficient pollution - control techniques for metropolitan areas. (8)
5. a. Discuss the effectiveness of different noise control methods, such as sound barriers, ear protection devices, and zoning regulations. (7)
b. Develop a noise control plan for a construction site considering the various noise sources and suitable mitigation measures. (8)

6E7124	Roll No. _____	[Total No. of Pages : 3]
	6E7124	
	B.Tech. VI Sem. (Main) Examination, July - 2023 Civil Engineering 6CE4-04 Design of Steel Structures	

Time : 3 Hours

Maximum Marks : 70.

Instructions to Candidates:

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

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

Use of following supporting material is permitted during examination. (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 plastic Hinge?
3. What is prying forces?
4. Write any two advantages of bolted connection.
5. How does ductility affect the strength of a tension member?
6. Why are plastic or compact sections preferred for compression member?
7. Name any four element of Gantry girder.
8. Explain the web crippling in beam.
9. What is stiff bearing length?
10. What is the purpose of providing anchor bolts in the column foundations.

PART - B

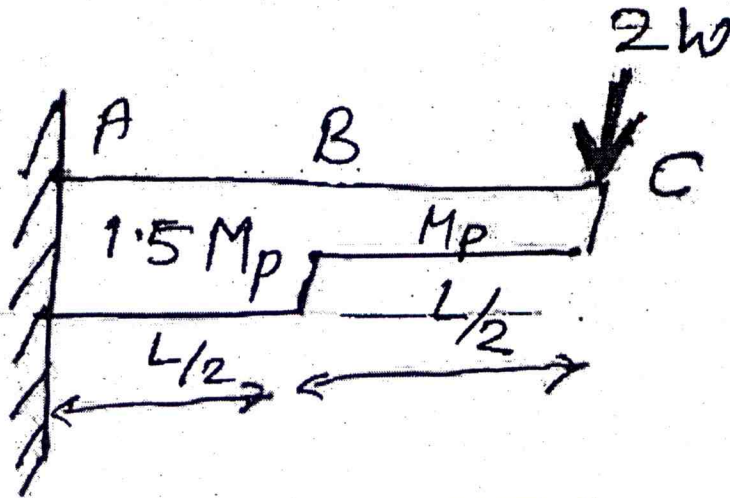
(Analytical/Problem solving questions)

Attempt any five questions.

(5×4=20)

1. Explain the elements of a plate girder with bolted connections. Draw a neat diagram of bolted plate girder.
2. Explain the arrangement of gantry girder and crane girder with the neat diagram.

3. What is shear lag?
4. Draw a neat diagram and explain the difference between lacing and Bottons.
5. Draw a neat diagram of welded gusseted base plates.
6. Differentiate between the bending and Buckling of a beam.
7. Find out the collapse load for the cantilever shown in fig.



PART - C

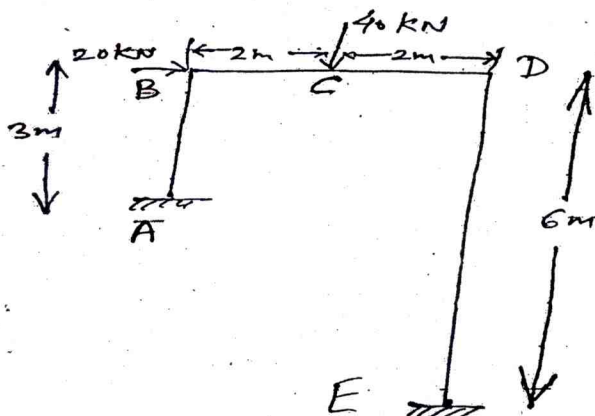
(Descriptive/Analytical/Problem solving/Design questions)

Attempt any three questions.

(3×10=30)

1. A tie member consisting of an ISA 80 mm × 50 mm × 8 mm (Fe 410 grade steel) is welded to a 12 mm thick gusset plate at site. Design welds to transmit load equal to the design strength of the member.
2. Design a stanchion 3.5 m long, in a buildings subjected to a factored load of 550 kN. Both the ends of the stanchion are effectively restrained in the direction and position. Use Fe 410 steel.
3. Determine the design bending strength of ISLB 350 @ 486 N/m considering the beam to be laterally un supported. The design shear force V is less than the design shear strength. The unsupported length of the beam is 3.0 m. Assume steel of grade Fe 410.
4. Design a welded plate girder 24 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 stiffness. The steel for the flange and web plates is of grade Fe 410.

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



6E1544	Roll No. _____	[Total No. of Pages : 2]
<div style="border: 1px solid black; display: inline-block; padding: 5px; margin: 5px 0;">6E1544</div> <p>B.Tech. VI sem. (Back) Examination, July - 2023 Civil Engg. 6CE4-04 Design of Steel Structures</p>		

Time : 3 Hours

Maximum Marks : 120

Min. Passing Marks : 42

Instructions to Candidates:

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

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

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

Part - A

(Answer should be given up to 25 words only)

All questions are compulsory

(10×2=20)

1. What is the significance of plastic analysis?
2. Define plastic hinge.
3. Write two advantages of steel as a structural member.
4. What are the types of buckling?
5. What do you mean by laterally unsupported beam?
6. Write difference between slab base and gusseted base.
7. Name any four components of gantry and crane truss arrangement.
8. Explain web crippling.
9. What are prying forces?
10. Name any two theorems of plastic analysis.

Part - B

(Analytical/Problem solving questions)

Attempt any **five** questions

(5×8=40)

1. Find shape factor of channel section of height 300 mm and width 90 mm. Flange thickness 13.6 mm and web thickness of 7.6 mm.

2. What is shear lag? Explain the types of failure in tension member.
3. Design a connection to joint two plates of 200×100 mm of grade Fe410 to mobilize full plate tensile strength using shop fillet welds, if a lap joint is used.
4. Explain Pre engineered Buildings, characteristics and their applications.
5. Explain the typical arrangement of gantry girder and crane girder with diagram.
6. What are the general rules specified by IS:800 for laced and battened columns?
7. Write down the design steps to be followed for gusted base plate.

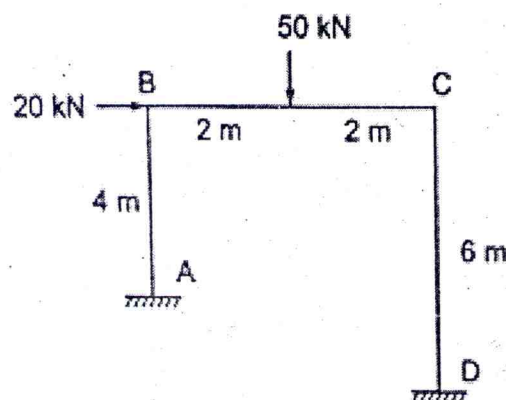
Part - C

(Descriptive/Analytical/Problem Solving/Design questions)

Attempt any **Four** questions

($4 \times 15 = 60$)

1. Design a laterally supported simply supported beam of 4m span, loaded for a concentrated load of 400 kN at mid span. The load is transferred through base plates of 200 mm length to the supports. Design a check for deflection using ISMB 400 section which is available.
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 60 kN hand operated crane is provided in a building and has the following data :
Centre to centre distance of gantry beam (width of building) = 15 m
Longitudinal spacing of columns (span of gantry) = 7.5 m.
Weight of crane = 50 kN.
Wheel spacing = 3m.
Weight of crab = 10 kN.
Minimum hook approach = 1m.
Yield stress of steel = 250 MPa.
Design a simply supported gantry girder assuming lateral support to it.
4. Design a welded plate girder 25m 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 plate is of grade Fe410.
5. Determine plastic moment capacity of given frame :



Roll No. _____

[Total No. of Pages : 3]

6E7125**6E7125****B.Tech. VI-Sem. (Main) Examination, July - 2023****Civil Engineering****6CE4-05 Estimating and Costing****Time : 3 Hours****Maximum Marks : 70****Instructions to Candidates:**

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

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

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

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

1. Define Estimating.
2. What do you understand by bill of quantities?
3. Define gross income.
4. Define valuation.
5. What are the types of estimate?
6. Define lead.
7. What is specification?
8. What is arbitration?
9. What is the purpose of valuations?
10. Define the Year's purchase.

PART - B

(Analytical/Problem solving questions)

Attempt any **Five** questions.

(5×4=20)

1. Explain the term :
 - a. Salvage value,
 - b. Work charge establishment,
 - c. Overhead charges,
 - d. Obsolescence.
2. Analyse the rate of work of "first class brickwork in super - structure with cement mortar 1:6.
3. Define year's purchase. An old building has been purchased by a person at a cost of Rs. 30,000/- excluding the cost of the land. Calculate the amount of annual sinking fund at 4% interest assuming the future life of the building as 20 years and the scrap value of the building as 10% of the cost of purchase.
4. What are the factors to be considered for the preparation of Detailed estimate.
5. What is 'C.S.R.'? What information does it goes?
6. Discuss various factors affecting the rate analysis in detail.
7. Describe work charged establishment in detail.

PART - C

(Descriptive/Analytical/Problem Solving/Design questions)

Attempt any **Three** questions.

(3×10=30)

1. Evaluate the detailed estimate (as shown in figure -1) for two room building by long wall and short wall method **or** center line method for the following :
 - a. Earthwork in foundation.
 - b. PCC in foundation.
 - c. First class brick work up to plinth level.

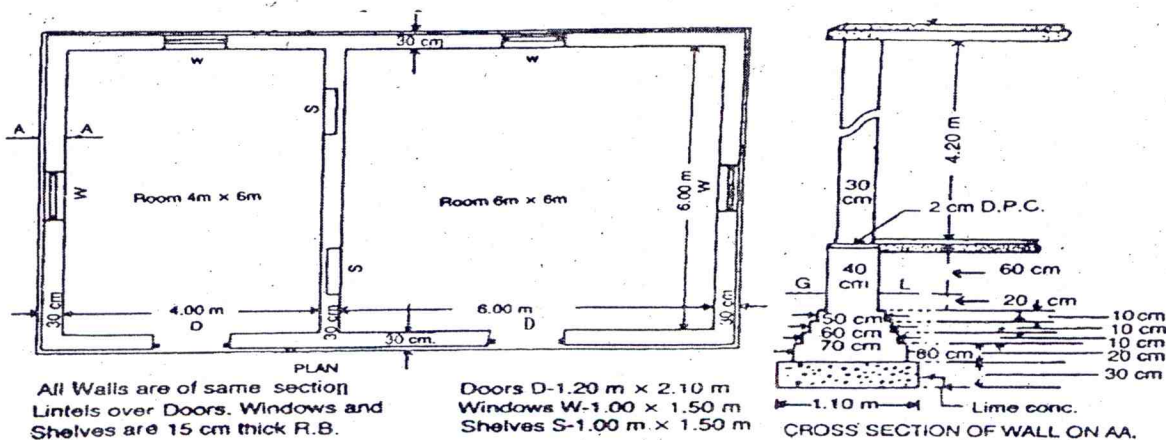


Figure - 1

2. Differentiate the following :
- Book value and Assessed value,
 - Free hold and lease hold properties.
3. Differentiate the following :
- Distress value and salvage value,
 - Security deposit and Bank Guarantor.
4. Define the following :
- Measurements sheet and abstract sheet,
 - Scrap value,
 - Revised and supplementary estimates,
 - Cubical content rate,
 - Plinth area rate.
5. Reduced level (RL) of ground along the central line of a proposed road from chainage 10 to chainage 20 are given below. The formation level at the 10th chainage is 107 and road is in downward gradient of 1 in 150 up to the chainage 14 and then gradient changes to 1 in 100 downward. Formation width of road 10m and side slopes of banking are 2:1 (Horizontal : Vertical). Length of chain is 30 m. Prepare an estimate of earthwork at the rate of 275 rupees per m³.

Chainage	10	11	12	13	14	15	16	17	18	19	20
R. L. of ground	105.00	105.60	105.44	105.90	105.42	104.30	105.00	104.10	104.62	104.00	103.3
R. L. of Formation	107.00	-----Down gradient 1 in 150-----				-----Down gradient 1 in 100-----					

Roll No. _____

[Total No. of Pages : 3]

6E1545**6E1545****B.Tech. VI - Sem. (Back) Examination, July- 2023****Civil Engineering****6CE4-05 : Estimating and Costing****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. Write down the objective of estimating.
2. Explain depreciation and sinking fund.
3. Describe various types of estimates.
4. What are the various factors involved in the rate of item.
5. Explain general procedure of the measurement of work.

PART - B

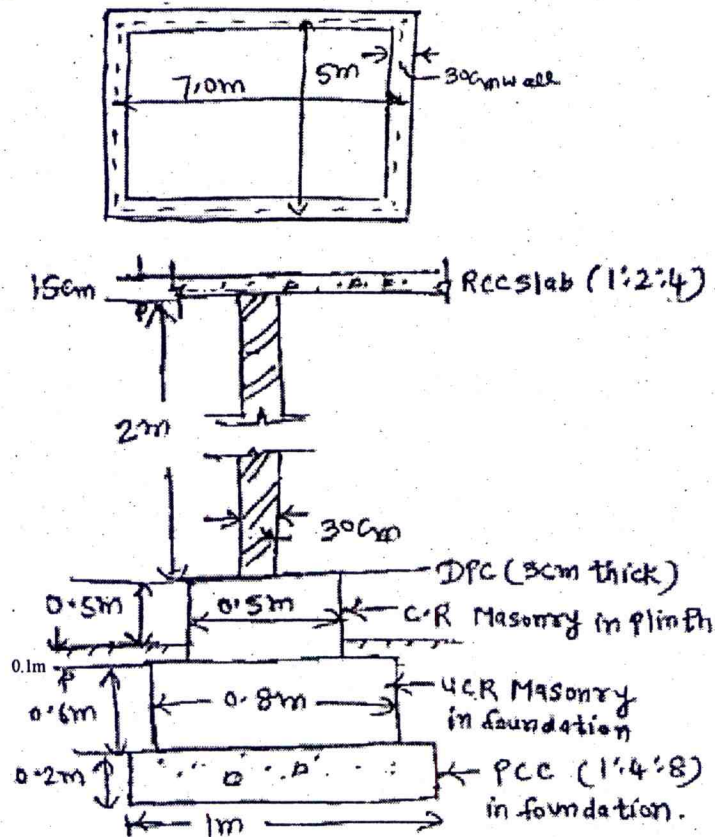
(Analytical/Problem solving questions).

Attempt any Four questions.

(4×10=40)

1. Explain various items of works in the order of their execution.

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2. Prepare in estimate of one room block as shown in fig by centre line method for the following items.



- i) Excavation for foundation
 - ii) PCC (1:4:8) in foundation
 - iii) UCR Masonry in Foundation C.M (1:6)
 - iv) C.R Masonry in plinth in C.M (1:6)
 - v) DPC at plinth level
 - vi) Brick work in super structure in C.M (1:6)
 - vii) RCC slab 15 cm thick
3. Explain in details the mode of measurement of the following items of work:
- a) Columns
 - b) Beams
 - c) Slab
 - d) Stair case step
 - e) Oil painting to wood work.
4. Explain the meaning of following terms:
- i) Plinth area
 - ii) Floor Area
 - iii) Carpet area
 - iv) F.S.I

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5. What is meant by Analysis of Rates. What is the purpose of Rate analysis. Explain the various factors on which rate of an item depend.
 6. Work out cement quantity in bags, required for following items of works.
 - i) Cement concrete (1:2:4) mix -10m^3
 - ii) UCR masonry in C.M (1:5) $- 10\text{m}^3$

PART - C

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

Attempt any Two questions.

(2×15=30)

1. A room of internal dimensions $2.6\text{m} \times 3.0\text{m}$ has four windows each of size $1.0\text{m} \times 1.5\text{m}$ and three doors each of size $1.2\text{m} \times 2.10\text{m}$ and one built in almirah of size $1.1\text{m} \times 1.6$. The ceiling is at a height of 3.1m . For purpose of jamb/reveals 25% of window areas are allowed. What is the area of colour washing on the walls.
 2. Explain different types of specifications indicating the purpose of each.
 3. A concrete mixer was purchased for Rs. 50,000/- Assume salvage value of Rs. 5000/- after five years calculate book value for each year by calculating depreciation by
 - a) Straight line method
 - b) Constant percentage method
 - c) Sinking fund method.
-

6E7127	Roll No. _____	[Total No. of Pages : 2]
	6E7127	
	B.Tech. VI - Sem. (Main) Examination, July - 2023 Civil Engineering 6CE5-12 Solid and Hazardous Waste Management (El.-III)	

Time : 3 Hours

Maximum Marks : 70

Instructions to Candidates:

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

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

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

PART - A

(Answer should be given up to 25 words only)

All questions are compulsory.

(10×2=20)

1. What is solid waste?
2. What are the sources of solid waste?
3. Define a transfer station.
4. What is 3R principle?
5. Define hazardous waste.
6. What is composting?
7. What do you mean by a sanitary land filling?
8. How does waste processing help in waste Minimization and management?
9. Define pyrolysis and incineration.
10. What are the components of municipal solid waste?

PART - B

(Analytical/Problem solving questions)

Attempt any five questions.

(5×4=20)

1. Give classification of solid waste and the factors affecting waste generation.
2. Describe the components of waste collection. Which type of containers are used for waste collection?

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3. Explain the major characteristics of solid wastes and Their significance.
 4. What do you mean by waste processing? Discuss the factors affecting size reduction and volume reduction.
 5. Describe the sources and types/classification of hazardous wastes.
 6. What is biogas? Explain the working mechanism of a biogas plant. How does it assist in solid waste management?
 7. What are the latest technologies and methods used for solid waste management as compared to the traditional methods of waste disposal? Compare them with their merits and demerits.

PART - C

(Descriptive/Analytical/Problem solving/Design questions)

Attempt any three questions.

(3×10=30)

1. Explain the functional elements of solid waste management with the help of a flowchart.
 2. Describe the types of waste collection vehicles along with their advantages and disadvantages.
 3. What are the sources of bio-medical wastes? Explain their classification, segregation and disposal methods.
 4. What is meant by biological treatment of solid waste? What methods are being used for this purpose? Explain any one method in detail.
 5. Write a summary note on latest advancements in rules related to solid waste management, hazardous waste, plastic waste and e-waste management in India.
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6E1547	Roll No. _____	[Total No. of Pages : 2]
6E1547		
B.Tech. VI-Sem. (Back) Examination, July - 2023		
Civil Engineering		
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. State the objective of the Solid Waste management course.
2. Define solid waste and provide an example.
3. Name two sources of solid waste.
4. What are the components of waste collection?
5. Explain one traditional method of waste disposal.

PART - B

(Analytical/Problem solving questions)

Attempt any **four** questions.

(4×10=40)

1. Discuss three factors that can affect waste generation in urban areas.
2. Describe the terms biomedical waste and e-waste. Also compare the treatment methods of biomedical waste and e-waste.
3. Describe the classification and disposal methods for hazardous waste.
4. Explain the concept of waste minimization and discuss the waste hierarchy and the 3 R principle.
5. Analyze the impact of improper management of electronic waste (e-waste) on the environment and public health.
6. Propose a waste collection route for a residential area, considering factors such as population density, waste generation rate, and efficiency.

PART - C

(Descriptive/Analytical/Problem Solving/Design Question)

Attempt any two questions.

(2×15=30)

1. Discuss the latest advances and regulations in plastic waste management, focusing on recycling technologies and initiatives.
 2. Compare and contrast different treatment methods for solid waste, such as composting, incineration, and landfilling, considering their environmental implications and efficiency.
 3. Evaluate the challenges and best practices in the management of hazardous waste, including collection, segregation, treatment, and disposal methods.
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6E7131	Roll No. _____	[Total No. of Pages : 2]
	<div style="border: 1px solid black; display: inline-block; padding: 2px 10px; margin: 5px 0;">6E7131</div> <p style="text-align: center; margin: 0;"> B.Tech. VI - Sem. (Main) Examination, July - 2023 Civil Engineering 6CE5-16 Geographic Information System and Remote Sensing (El.-IV) </p>	

Time : 3 Hours

Maximum Marks : 70

Instructions to Candidates:

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

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

Part - A

(Answer should be given up to 25 words only)

All questions are compulsory.

(10×2=20)

1. Define sensor.
2. What is perspective center.
3. What is Pixels.
4. Describe how to care of Aerial Photographs.
5. Write the range of intensity of Digital Number (DN).
6. Define various Geographic reference data.
7. Define Swath.
8. Differentiate Active and Passive Remote Sensing.
9. Name various Components require for an image processing System.
10. Differentiate Remote Sensing and G.I.S.

Part - B

(Analytical/Problem solving questions)

Attempt any five questions.

(5×4=20)

1. Draw a diagram showing Electromagnetic Spectrum with name of regions of different frequency.

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2. Describe various types of platforms used in Remote sensing.
 3. Differentiate vector and Raster data.
 4. Discuss about Atmospheric Windows.
 5. Explain orbital parameters of a satellite.
 6. Describe about different types of platforms.
 7. Write short note on Scattering.

Part - C

(Descriptive/Analytical/Problem solving/Design Questions)

Attempt any three questions.

(3×10=30)

1. Explain the concept of Digital image processing.
 2. Discuss the application of GIS in Urban Planning.
 3. Describe comparison between a map and an aerial photograph.
 4. Discuss the various application of Remote sensing.
 5. Discuss the application of G.I.S. on Agriculture.
-

6E1520

Total No. of Questions:

Total No. of Pages:

Roll No. _____

B.Tech. VI Sem(Back) Exam 2023**Civil Engg.****6CE5-16 Geographic Information System & Remote Sensing****6E1520****Time: 2 Hours****Maximum Marks: 80****Min. Passing Marks: 28**

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)

1. _____

2. _____

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

1. Define Geographical Information System
2. Differentiate between active and passive remote sensing?
3. What do you understand by spectral reflectance ?
4. Enlist the elements of aerial photo interpretation.
5. List areas of application of Remote Sensing and GIS.

5 x 2 = 10**Part B Analytical/****Any four questions**

1. Describe flight planning for an aerial survey mission. What is importance of aerial photography over conventional survey?
2. Explain Following :
 - I. Digitization
 - II. Global Positioning System (GPS)
 - III. Band rationing
 - IV. Contract stretching
3. Explain electromagnetic spectrum with a neat sketch..
4. Explain spatial, spectral, radiometric and temporal resolutions in remote sensing.
5. What do you understand by digital image processing? What are the advantages associated with multirate and multiband images?
6. Write Short notes on-
 - I. GIS data input and editing
 - II. Roster and Vector data representation.

4 x 10 =40

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

1. Explain various types of aerial photographs? List various fields of application of aerial photography.
2. Explain physics of an ideal remote sensing system & its components with a neat sketch.
3. What do you understand by Image classification? Explain the basic steps involved in supervised classification.

2 x 15 = 30