6E7121

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

CIVIL ENGINEERING

6CE3-01 / Wind and Seismic Analysis

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 from Part-C.

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

Use of following supporting material is permitted during examination.

(Mentioned in Form No. 205)

1. IS-875 Part 1 & 2   2. IS-875 Part 3 : 2015   3. IS-1893 Part 1 : 2016

PART-A [10×2=20]

(Answer should be given up to 25 words only)

(All questions are compulsory)

Q.1. Explain in brief about various loads that may act on a building or structure.

Q.2. Which types of shapes are preferred for good sesimic performance of building with maximum economy of design and construction and why?

Q.3. What is moment resisting frame system? Where do we use moment resisting frame system?

Q.4. What is peak gust? Explain.

Q.5. How many number of zones are existed in India as per seismic zone map and wind zone map of India ?

Q.6. How design wind pressure is calculated for buildings/structures at any height above mean ground level for any site with basic wind speed V_b? Explain.

Q.7. How Earthquake forces are generated? Explain.

Q.8. What are the various modes of failure of a masonry structure under Earthquake?

Q.9. What do you mean by drift of the structure? Differentiate between overall drift and inter-storey drift.

Q.10. How can we measure earthquake size? Explain.

PART-B [5×4=20]

(Analytical / Problem-solving questions)

(Attempt any 05 questions)

Q.1. What are the various lateral load resisting elements in structure ? Explain in brief.

Q.2. What is centre of mass and centre of rigidity for any structure? What are the effects on structure stability if they do not locate at the same point?

Q.3. What are the various factors that must be considered to get design wind speed for any site? How these factors affect the design wind speed? Explain.

Q.4. Describe the two approaches followed for the prediction of an earthquake size.

Q.5. What are the general principles related to projecting and suspended parts for earthquake resistant design and construction of buildings as per IS-4326 : 2013 ?

Q.6. Define shear wall. What are the functions of shear wall?

Q.7. What do you mean by load flow in buildings? Draw a load flow diagram for framed building with masonry infill.

<div align="center">

PART-C   [3x10=30]

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

Attempt any three questions

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Q.1. A rectangular industrial clad building with pitched roof having plan dimensions 10m×50m and height 5m as shown in the figure below. The building is situated in wind zone V near seacoast on a fairly level topography Walls of building have opening of approx. 7%. The roof is of GC sheeting and the roof angle is 15°. Calculate wind pressure and design forces on walls of building and roof of building. The column and tursses are at 5 m c/c longitudinally, purlins are at 1.4 m c/c and columns at Gable ends are at 5m c/c.
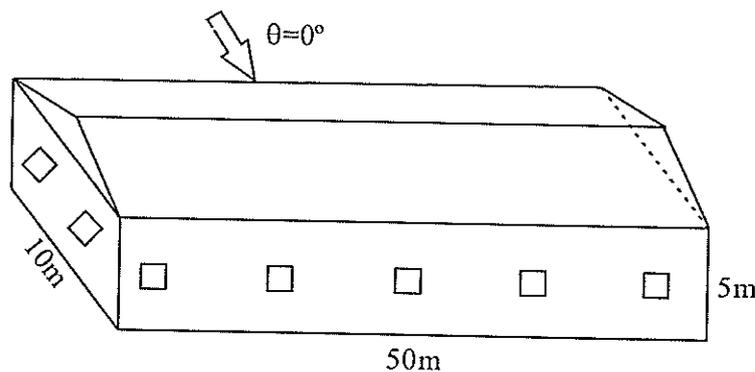
Q.2. A 4 storey RC frame building is shown in fig. below is situated at Delhi. The height between the floors is 3.5m and height of building is 14m. The soil below the foundation is medium hard soil. Assume building is intended to be used as an hospital building. Determine the total base shear as per IS 1893 (Part-1) : 2016 and distribute the base shear along the height of the building.
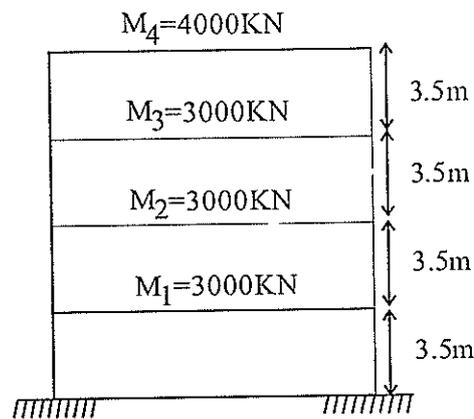
Q.3. What are the general principles for earthquake resistant construction of buildings as per IS-4326 : 2013 ?

Q.4. What are the various lateral and vertical load resisting systems used in buildings ? Explain in brief.

Q.5. Explain the concept of Special confining reinforcement. Explain the various requirements for a column through neat sketch as per IS -13920.

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

Roll No. : ....

6E7122

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

CIVIL ENGINEERING

6CE4-02 Structural Analysis-II

Time : 3 Hours   Maximum Marks : 70

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 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. ....   2. ....

PART-A   [10x2=20]

Answer should be given up to 25 words only.

All questions are compulsory.

1. Write assumptions made in Cantilever method used for lateral loads analysis in multi storey building.

2. In what conditions an I-section may be subjected to unsymmetrical bending ?

3. What is an influence line ? Give examples of structures where the concept of influence line/rolling loads is very useful.

4. Write Muller-Breslau principle.

5. What do you understand by "Lack of Fit" ? What is the effect of Lack of Fit in redundant frames ?

6. Define strain energy. What are the forces that can induce strain energy in a structure ?

7. Write Castigliano's theorems.

8. Differentiate between Perfect frames and Redundant frames.

9. Define the term 'Tension Coefficient'.

10. Differentiate Two-hinged arch and Fixed arch by making neat diagram of both.

<div align="center">PART-B   [5x4=20]</div>

<div align="center">Analytical / Problem solving questions</div>

<div align="center">Attempt any five questions.</div>

1. Prove that maximum bending moment at a section occurs when the section divides the uniformly distributed load in the same ratio as it divides the span when u.d. *l.* shorter than span is rolling on a beam.

2. A pin jointed frame has redundant member BC and it is required to find out the force in the redundant member BC. All members have same area of cross-section and same material. The axial forces in the members 'P' of pin jointed frame under applied load 'W' and by assuming force in redundant member BC as 'R' are given in Table 1.
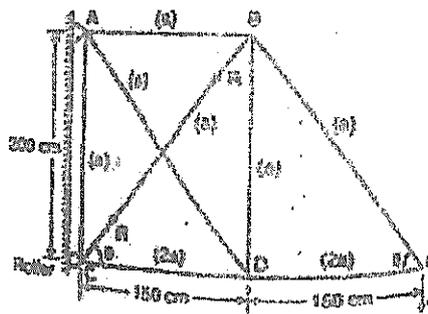

<div align="center">Figure 1</div>

points and write equations for joint D in terms of tension coefficients. (No need to solve). Assume that all joints at base are pin joints.

Figure 3

PART-C [3x10=30]

Descriptive / Analytical / Problem solving / Design questions

Attempt any three questions

1. Draw the influence line diagram for forces in members $U_3 L_3$ and   for the pin jointed truss shown in Figure 4. There are 6 panels of 4 m span each and height of truss is 5 m.
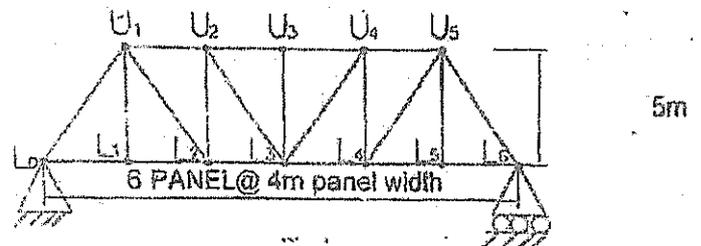

5m

Figure 4

2. Determine the forces in the members using castigliano's energy theorem. The structure is shown in Figure 5. The quantity AE is constant for all the members.
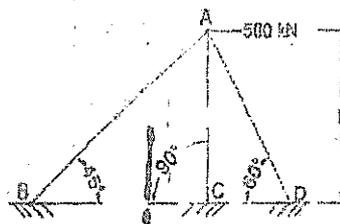

Figure 5

Table 1

Member	Length of Member	Force in Member 'P'
AB	1.5 m	0.75W+0.6 R
AC	2 m	0.8 R
CD	1.5 m	0.6 R-1.5 W
BD	2 m	0.8 R-W
BE	2.5 m	1.25 W
DE	1.5 m	-0.75 W
AD	2.5 m	1.25 W-R
BC	2.5 m	-R

3. Using Castigliano's theorems, determine the deflection at the free 'C' of the bent as shown in Figure 2.
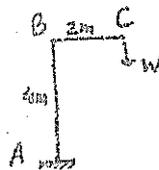

Figure 2 (X, Y)

4. Prove that for a three-hinged parabolic arch of span 'L' and central rise 'r', the equation for parabolic arch is given by :

$$y = 4rx(L-x) / L^2$$

Where, x and y are the Coordinater of any point in the arch.

5. Derive the maximum shear force value at a section subjected to single concentrated load 'W' rolling along a simply supported beam. Also find absolute maximum negative shear force at any section.

6. A structure is subjected to unsymmetrical bending. Derive the generalized expression to find out bending stress 'f' of the form $f = a_1 X + b_1 Y$ at a point in the structure.

7. The feet A, B and C being in same horizontal plane and the apex D being 3.75 m above the plane of Tripod as shown in Figure 3. Find out the coordinates of all the

3. Determine the principal moments of inertia for an unequal angle section shown in Figure 6 of size 90x60x10 mm.
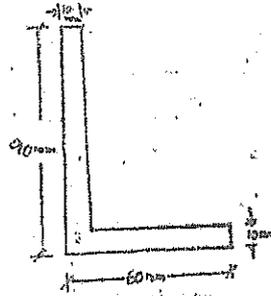

Figure 6

4. A two span two storey indeterminate frame is shown in Figure 7. If the wind loads of 60 kN and 90 kN are acting at A and E respectively, analyse the frame using portal method to calculate horizontal shears, moments at the ends of columns, moments at the ends of beams and shear in beams.
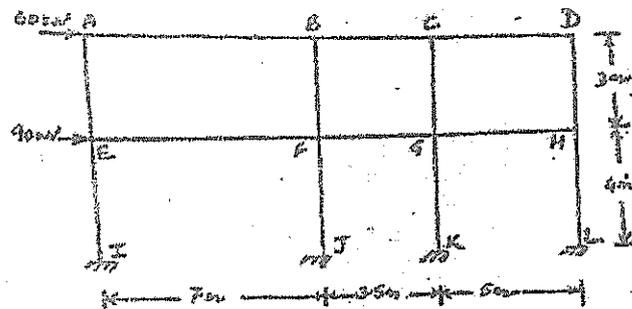
Figure 7

5. A system of loads cross a girder of 40 m span which is simply supported at its ends. The loads and their distances are as follows :

Wheel Loads (kN)	8		8		16		16		14
Distance between centres (m)		1.5		2.5		3		2.5	

Determine : (a) The maximum negative shear force as 10 m from left.

(b) The maximum positive shear force at 10 m from left.

(c) The maximum bending moment at 10 m from left.

XXX

Total No. of Questions : 22

Total No. of Pages : 04

Roll No. : ....

6E7123

6E7123

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

CIVIL ENGINEERING

6CE4-03 Environmental Engineering

Time : 3 Hours

Maximum Marks : 70

Instructions to Candidates :

Attempt all ten questions from Part-A, five questions out of seven questions from Part-B and three questions out of five questions from Part-C. *Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used / calculated must be stated clearly.*
Use of following supporting material is permitted during examination. (Mentioned in Form No. 205)

1. ...NIL..............

2. .....NIL.......

PART-A

[10×2=20]

(Answer should be given up to 25 words only)

All questions are compulsory

Q. 1.   What are the maximum acceptable limits to turbidity, fluorides, nitrates and hardness for public water supply?

Q. 2.   Name two water-borne diseases.

Q. 3. Give values of detention time for plain sedimentation and when coagulants are used.

Q. 4. Define break point chlorination.

Q. 5. Enlist types of distribution networks.

Q. 6. Differentiate between BOD and COD.

Q. 7. List out the constituents of sewage.

Q. 8. Give two examples each of primary and secondary air pollutants.

Q. 9. Calculate the average sound pressure level of four sound pressure levels recorded as 42, 52, 60, and 70 decibels.

Q. 10. What is meant by sewage sickness?

PART-B   [5×4=20]

(Analytical/Problem-solving questions)

Attempt any five questions

Q. 1. What is meant by the term "per capita demand"? Mention and discuss the factors that influence per capita demand.

Q. 2. Enumerate the chemicals which are used for coagulation. Discuss their comparative merits and demerits.

Q. 3. What is meant by 'disinfection' in treating public water supply? What is its importance? What are the chemicals used as disinfectants?

Q. 4. State the functions of a manhole. Describe its components with the help of a neat sketch.

Q. 5. Calculate the value of base 10 rate constant k, if 70% of ultimate BOD is satisfied in 5 days.

Q. 6. What do you understand by secondary treatment of sewage? Enumerate various treatment techniques used for this purpose.

Q. 7. Describe different types of plumes and their behaviour with the help of neat sketches.

PART-C

[3×10=30]

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

Attempt any three questions

Q. 1. Design six slow sand filter beds and show their arrangements in plan, given that :

(i) Population to be served = 50,000 persons

(ii) Quantity of water to be supplied = 200 lpcd

(iii) Rate of filtration = 300 litres per sqm per day

(iv) Length of each bed = 2 times the breadth

Q. 2. Mention any three methods of softening water. Describe 'Zeolite process' of softening water in detail.

Q. 3. Calculate the diameter and discharge of a circular sewer laid at a slope of 1 in 400 when it is running half full, and with a velocity of 1.9 m/s. Assume Manning's n=0.012.

Q. 4. The BOD value of a wastewater sample was measured at 2 and 8 days and found to be 125 mg/l and 225 mg/l respectively. Determine the 5-day value using first-order rate model.

Q. 5. What is sedimentation? Why sedimentation is required in sewage treatment? Under what conditions, chemical-aided sedimentation is preferred to plain sedimentation?
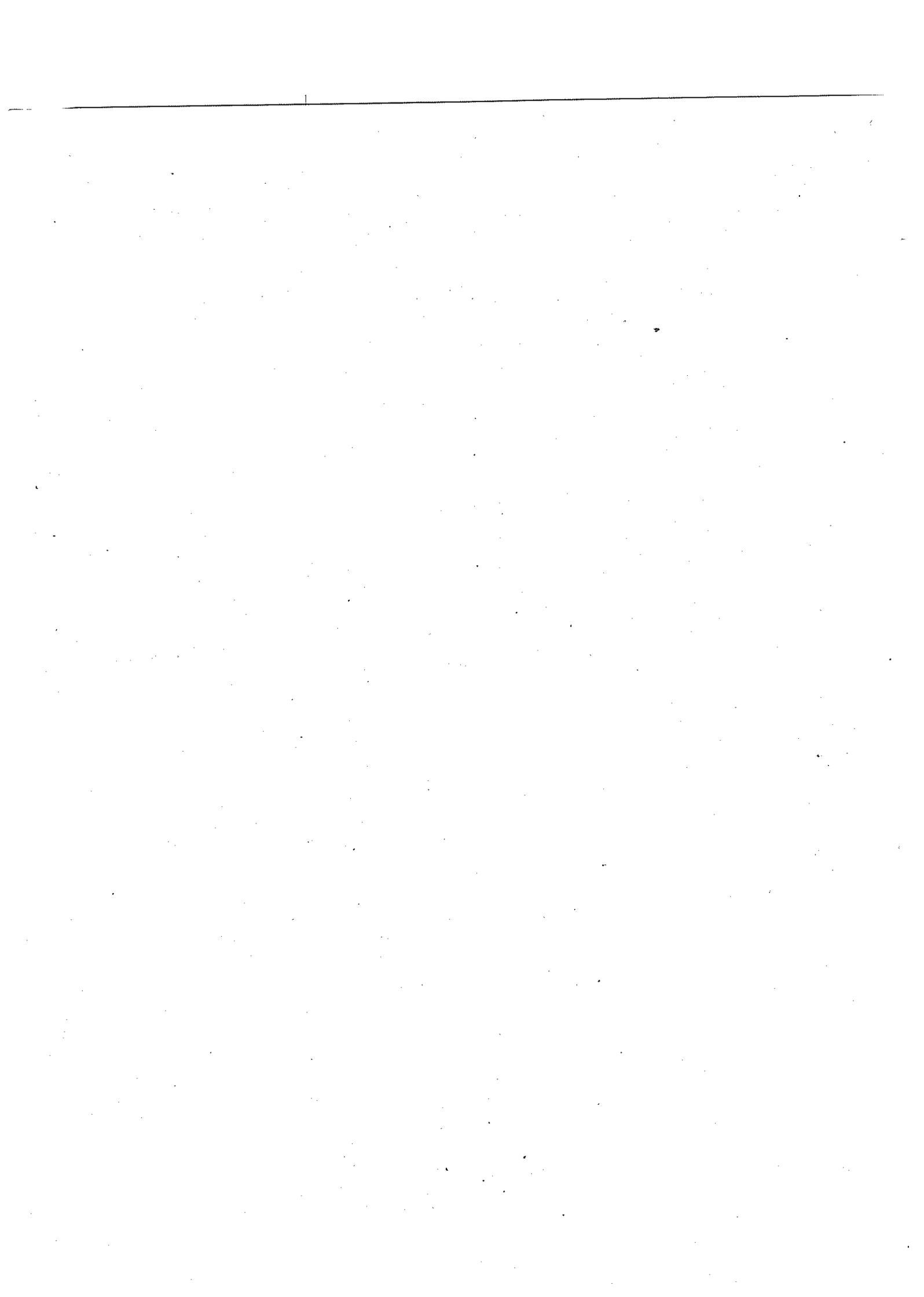
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B.Tech. VI-Sem. (Main/Back) Exam. - 2024

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)

1. IS-800(2007)   2. SP-6 Handbook for Structural Engineers

PART-A   **[2x10=20]**

(Answer should be given up to 25 words only)

All questions are compulsory

Q.1.   Discuss any two advantages of steel as a structural material.

Q.2   Explain the Stiff bearing length.

Q.3.   Discuss the Prying Forces.

Q.4. Differentiate between Static and Kinematic Theorem of Plastic Analysis.

Q.5. Discuss the web buckling in Beam.

Q.6. Explain how column caps are similar to column base plates.

Q.7. Why are the end returns provided in Fillet welds?

Q.8. How does ductility affect the strength of a tension members?

Q.9. Which of the two, buckling or stiffness of compression members is more critical?

Q.10. Differentiate between surge load and drag load as applied to gantry girder carrying cranes.

PART-B [5x4=20]
(Analytical/Problem solving questions)
Attempt any five questions

Q.1. Illustrate with neat diagram the typical components of plate girder with bolted connections.

Q.2 Design stanchion 3.5m long, in a building subjected to a factored load of 550kN, both the ends of the stanchion are effectively restrained in direction and position. Use steel of grade Fe410.

Q.3. A tie member consisting of an ISA 80mm×50mm×8mm(Fe410 grade steel) is welded to a 12mm thick gusset plate at site. Design welds to transmit load equal to the design strength of the member.

Q.4. Explain the serviceability criterion of minimum web thickness in plate girder? Also, discuss the end panel design in plate girder.

Q.5. Discuss the shear lag? Explain the types of failure in tension member.

Q.6. Illustrate the advantages of Pre-engineered buildings and their applications in industries.

Q.7. Draw the neat diagram of truss girder bridge. Also, discuss the components of through type truss girder bridge.

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PART-C   **[3x10=30]**

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

Attempt any three questions

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Q.1. Design a welded plate girder 25m in span and laterally restrained throughout. It has to support a uniform load of 10kN/m throughout the span exclusive of self weigh. Design the web of girder without intermediate transverse stiffness. The steel for the Flange and web plates is of grade Fe 410.

Q.2 Design a gantry girder , without lateral restraint along its span, to be used in a industrial building carrying an overhead travelling crane for the following data -

Crane capacity	=	200kN
Self-weight of the crane girder excluding trolley	=	200kN
Self-weight trolley, electrical motor, hook, etc.	=	40kN
Minimum hook, approach	=	1.2 m
Distance between wheel centres	=	3.5m
Centre to centre distance between gantry rails (i.e. span of the crane)		= 15m
Self-weight of the rail section		= 300N/M
Yield stress of steel		= 250MPa
Span of gantry girder		= 7.5m

(c/c distance between columns)

Q.3. Find out the plastic moment for a given frame of uniform cross section under the applied factored loals as shown in figure :
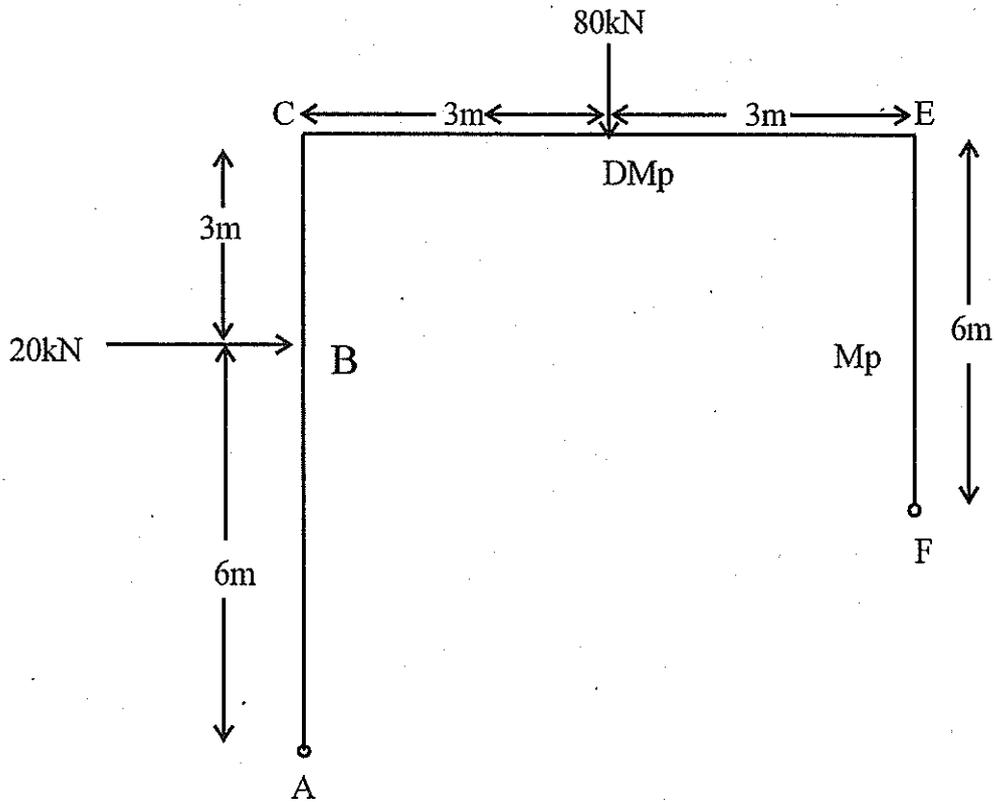
Q.4. A diagonal member of a roof carries an axial tension 450kN, Design the section and its connection with a gusset plate and lug angle. Use $F_x = 250MPa$ and $f_u = 410MPa$

Q.5. Find the shape factor of any two :

(a) Hollow circular tube section

(b) Triangle

(c) Rectangular section

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Roll No. : ....

6E7125

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

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)

1. ....　　　　　　　　　　　　2. ....

PART-A　　　　　　　　　　　　　　[10x2=20]

(Answer should be given up to 25 words only)

All questions are compulsory

Q.1. Distinguish Plinth area v/s Carpet area.

Q.2. What data is required to prepare an estimate?

Q.3. Define task or out-turn.

Q.4. Differentiate BSR v/s CSR.

Q.5. What is the difference between supplementary estimate and extension estimate?

Q.6. Define depreciation.

Q.7. Compare scrap value v/s salvage value.

Q.8. What is meant by year's purchase?

Q.9. Define sinking fund.

Q.10. Compare A and F sanction with Technical sanction.

<center>PART-B [5x4=20]</center>

<center>(Analytical/Problem solving questions)</center>

<center>Attempt any five questions</center>

Q.1. Describe the purpose and importance of estimating.

Q.2. What are the general principles of taking out quantities? Explain the methods of taking out quantites.

Q.3. What do you mean by analysis of rates? Discuss the factors affecting analysis of rates with suitable examples.

Q.4. Carry out a rate analysis for 25 mm thick DPC in cement concrete (1 : 2 : 4), as suming suitable rates of material and labour as per CSR.

Q.5. What do you understand by overhead charges? Describe its types and compare them with some examples.

Q.6. Define valuation and explain its purposes.

Q.7. Calculate the value of year's Purchase for a property if its life is 20 years and the rate of interest in 5%, whereas for the sinking fund, the rate of interest is 4½%.

PART-C   [3x10=30]

(Descriptive/Analytical/Problem Solving/Design questions)

Attempt any three questions

Q.1. Prepare a preliminary estimate of a building having plinth area of 1500 sqm. the plinth area rate may be taken as ₹ 9500/- per m². Add extra for special architectural design @ 1.5%, water supply and sanitary @ 5%, electrical installation @ 14%, other services @ 6%, contingencies @ 3% and supervision charges @ 8% of building cost. Determine the total cost of building project.

Q.2. What are the different types of estimates? Describe each one of them with their uses, merits and demerits in context to each other.

Q.3. Explain the two methods of preparing detailed estimate i.e. centre line method and long-wall short-wall method. What are their advantages and disadvantages.

Q.4. A building is situated in Jaipur on a land plot of 500 sqm. The built up area is 20m × 15m. The building is of 1st class type and is provided with water supply, sanitary and electric fitting. The age of building is 30 years. Find out the value of property.

Q.5. Explain various methods of valuation in detail with their comparison.

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6E7127

B. Tech. VI-Sem. (Main/Back) Examenation, 2024

Civil Engg.

6CE5-12 SOLID AND HAZARDOUS WASTE MANAGEMENT (EL. III)

Time : 3 Hours   Maximum Marks : 70

Instruction to Candidates :

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

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

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

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

PART-A   [2x10=20]

(Answer should be given up to 25 words only)

All questions are compulsory

Q.1.   What is difference between waste and solid waste ?

Q.2. Enlist the sources of solid waste.

Q.3. Name the major components/functional elements of solid waste management.

Q.4. Define field capacity.

Q.5. Name the methods used to estimate waste quantities.

Q.6. What is the difference between size reduction and volume reduction of solid waste ?

Q.7. Define hazardous waste.

Q.8. What is difference between pyrolysis and incineration ?

Q.9. Differentiate between primary and secondary collection systems.

Q.10. What is meant by sanitary landfilling ?

PART-B   [5x4=20]

(Analytical/Problem solving questions)

Attempt any five questions

Q.1. What are the factors affecting waste generation ? Illustrate with suitable examples.

Q.2. Describe the components of waste collection along with the types and characteristics of waste collection containers.

Q.3. Explain the important physical chemical and biological characteristics of solid wastes.

Q.4. What is meant by biomedical waste ? What are the sources and types (classification) of biomedical wastes ?

Q.5. Explain the concept of composting and vermicomposting. Where do we make use of these treatment options ?

Q.6. Discuss the major issues being faced by the local self-government. bodies for managing the municipal solid waste along with their solutions/remedial measures.

Q.7. Explain the concept of waste hierarchy and 3R principle.

PART-C [3x10=30]

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

Attempt any three questions

Q.1. What are the traditional methods of waste collection and disposal ? Explain the negative impacts associated with such practices and need of the modern techniques.

Q.2. Which type of waste collection vehicles are being used during MSWM ? How would you decide upon the collection frequency and collection route ?

Q.3. Describe the methods of waste processing in detail.

Q.4. "Plastic waste and e-waste are the modern world's new wastes creating environmental pollution." Justify this statement with suitable examples on their sources, classification, segregation, management and disposal methods.

Q.5. Compare the thermal treatment v/s biological treatment and disposal of solid waste along with their processes, mechanisms, advantages and disadvantages.

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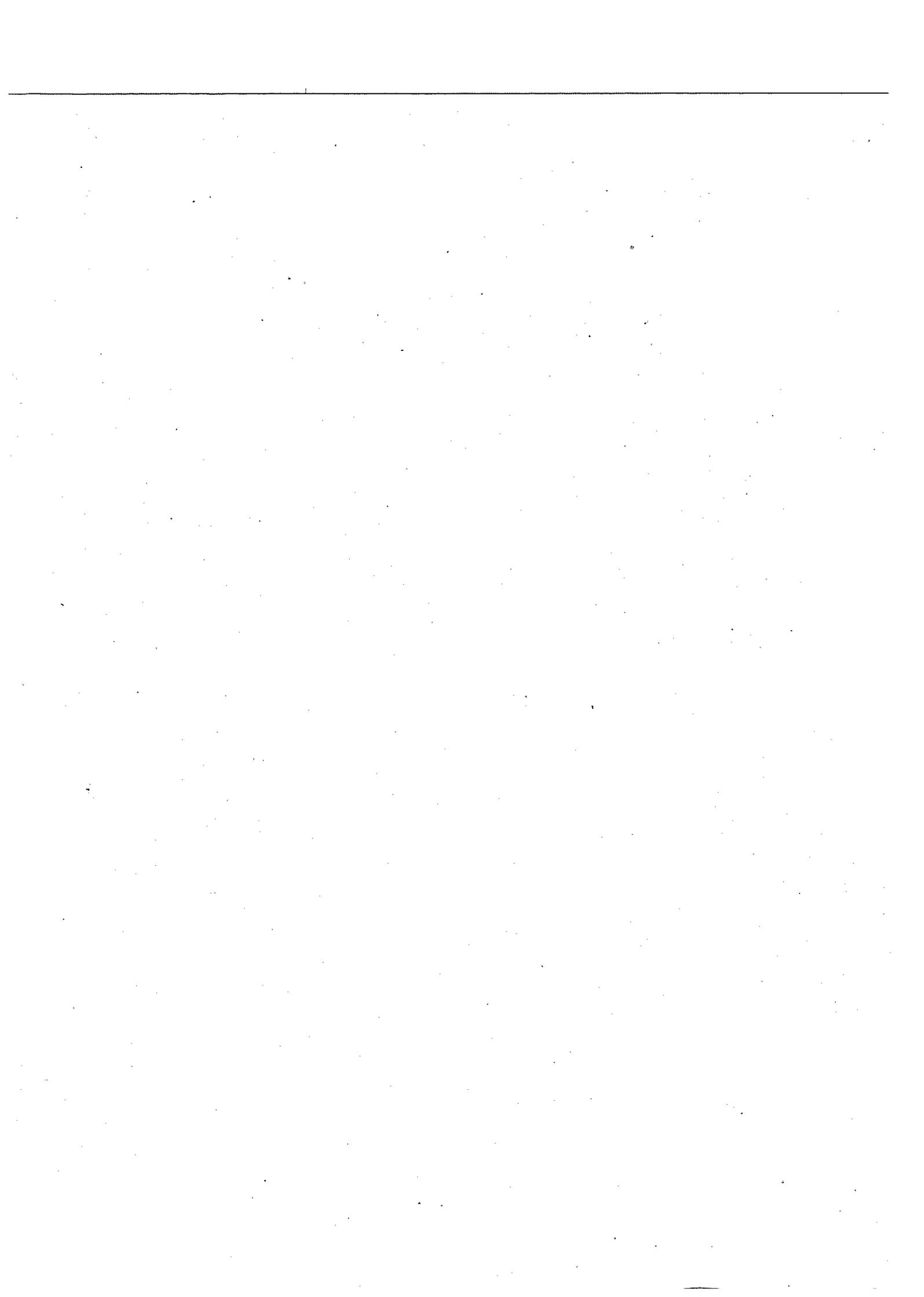
6E7131

6E7131

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

CIVIL ENGG.

6CE5-16 Geographic Information System & Remote Sensing (El.-IV)

Time : 3 Hours   Maximum Marks : 70

Instructions to Candidates :

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

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

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

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

PART-A   [10x2=20]

(Answer should be given up to 25 words only)

All questions are compulsory

Q.1.   What is Parallax? Differentiate between Absolute Parallax and Differential Parallax.   2

Q.2. Explain topographic displacement in brief. 2

Q.3. Define Electromagnetic Radiation and state general properties of EMR. 2

Q.4. What is Remote sensing system and its components? 2

Q.5. Write the name of various platforms used in Remote sensing and their altitude. 2

Q.6. Write the working specification of Multispectral scanners. 2

Q.7. Define resolution and explain spatial resolution. 2

Q.8. What are SPOT satellite and which sensors are used for SPOT satellites? 2

Q.9. What elements are used for visual interpretation of satellite images? 2

Q.10. Define interpretation keys and explain in brief types of interpretation keys. 2

PART-B [5x4=20]

(Analytical/Problem solving questions)

Attempt any five questions

Q.1. Describe urban applications of remote sensing and GIS. 4

Q.2. Explain the terms-Vector and Raster overlay concepts in GIS, also discuss various components of GIS. 4

Q.3. Explain the atmospheric windows and their significance in remote sensing. 4

Q.4. Write notes on the following :

(a) Spectral signature curves 2

(b) Reflectance 2

Q.5. Describe parameters of a sensor and their significance. 4

Q.6. Describe the glometry of Aerial and Terrestrial photographs using appropriate diagrams. 4

Q.7. Explain the distortion and displacement in Aerial photographs. 4

PART-C [3x10=30]

(Descriptive/Analytical/Problem Solving/Design questions)

Attempt any three questions

Q.1. (a) Differentiate between along track and across track scanners.   3

(b) Describe the sensors used in Landsat satellites.   7

Q.2. Write notes on the following :

(a) Difference between GIS, IS and CAD software.   3

(b) Advantages and Disadvantages of Raster data structure and Vector data structure   3

(c) Spatial and non-spatial data   2

(d) Different types of thematic maps   2

Q.3. Explain the orbital characteristics of satellites and also describe thermal scanners.   10

Q.4. Write explanatory notes on the following :

(a) Ground Truth and its significance   3

(b) Data Base Management   3

(c) Methods of image processing   4

Q.5. (a) Describe the requirements and methods of image processing.   5

(b) Advantages of using computers for image interpretation   5

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6E1520

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B.Tech. VI-Sem. (Back) Exam. - 2024

CIVIL ENGINEERING

6CE5-16.3 Geographic Information System and Remote Sensing

Time : 2 Hours   Maximum Marks : 80

Instructions to Candidates :

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

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

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

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

                    PART-A   [5×2=10]

(Answer should be given up to 25 words only)

All questions are compulsory

Q.1.   What is Photogrammetry?

Q.2. List the essential components of an aerial camera.

Q.3. Define Sensor.

Q.4. What do you understand by the term ground truth?

Q.5. Define Geographical Information System.

PART-B [4×10=40]

(Analytical/Problem solving questions)

Attempt any four questions

Q.1. Compare aerial and terrestrial photographs.

Q.2. Differentiate raster and vector.

Q.3. Discuss briefly about atmospheric windows.

Q.4. Explain active and passive remote sensing.

Q.5. Discuss different types of Platforms.

Q.6. Summarize the different elements of image interpretation.

PART-C [2×15=30]

(Descriptive/Analytical/Problem. Solving/ questions)

Attempt any two questions

Q.1. Explain the concept of digital image processing in detail.

Q.2. Elaborate on electromagnetic radiation and electromagnetic spectrum.

Q.3. Discuss any five major applications of GIS in Civil Engineering.

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6E1541

6E1541

B.Tech. VI-Sem. (Back) Exam. June - 2024

CIVIL ENGINEERING

6CE3-01 / Wind and Seismic Analysis

Time : 2 Hours

Maximum Marks : 80

Instructions to Candidates :

Attempt all five questions from Part-A, four questions out of six questions from Part-B and two questions out of three 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 [5×2=10]

(Answer should be given upto 25 words only)

(All questions are compulsory)

Q.1. What type of forces do shear wall resist? Explain.

Q.2. What is load flow concept? How load flows from top to soil in a framed building?

Q.3. Define pressure coefficient in wind load calculations?

Q.4. How many seismic and wind zones are present in Indian map? Write their name in increasing order of severity.

Q.5. What are the Separation section? Why separation section repaired?

PART-B [4×10=40]

(Analytical / Problem solving questions)
(Attempt any 04 questions)

Q.1. What are tube-in-tube type of structures? What type of load they resist? Explain.

Q.2. What are the provisions to minimize torsion and stress concentration for building configuration as per IS-4326 : 2013?

Q.3. Explain the three forms of wind induced motion due to increased amplitude of oscillation i.e. Galloping, Flutter and Ovalling with the increase of wind speed.

Q.4. Describe the step by step procedure for seismic analysis of R.C. buildings by equivalent static method as per IS 1873(Part 1) : 2016.

Q.5. Determine the design horizontal seismic coefficient for an ordinary reinforced concrete moment resisting frame. hospital building with infill panels for a damping of 5%. The building is situated in Kota, Rajasthan. Height of the building is 25m and it is resting on medium soil.

Q.6. A rectangular building having plan dimension 10m × 50 m and height 5m. The building is situated in Kota, Rajasthan on a fairly level topography. The building has a flat roof. Supported on load bearing walls without any opening.

The wind direction is perpendicular to the longer wall of building.

Calculate the design wind pressure on walls. Assume any suitable data if missing.

PART-C [2×15=30]

### (Descriptive / Analytical / Problem solving / Design questions)
(Attempt any 02 questions)

Q.1. Calculate wind pressure and design forces on walls of a rectangular cloud building with pitched roof, having plant dimension 10 m × 50 m height 5 m as shown in fig. The building is situated in Kota in an industrial area on a fairly level topography. Walls of building have opening of 7.5%. The roof is of GC sheeting and the roof α angle is 15°. The columns and trusses are at 5 m c/c, longitudinally purlins are at 1.4 m c/c and columns at Gable ends are at 5 m c/c.
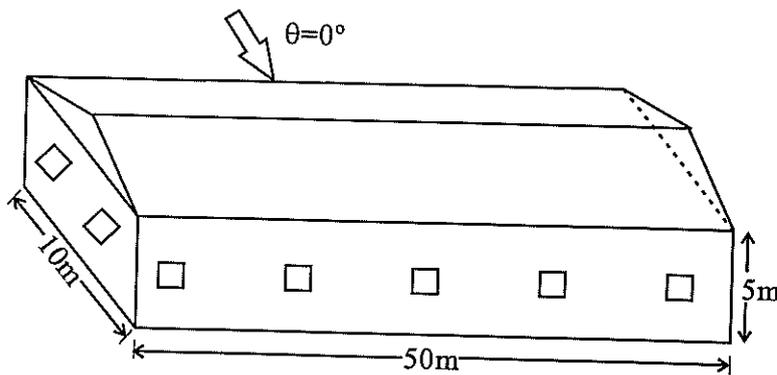
Q.2. Cosider a four-storey reinforced concrete office building shown in figure. The building is located in Bhuj, Gujarat. The soil conditions are medium stiff and the entire building is supported on a raft foundation. The R.C. Frames are infilled with Brick-Masonry. The lumped weight due to dead load is 12 KN/m² on floors and 10 KN/m² on the roof. The floors are to cater for a live load of 4 KN/m² on floors and

1.5 KN/m² on the roof. Determine design seismic load on the structure by equivalent static analysis method as per IS - 1893 - I : 2016.

Plan

Elevation
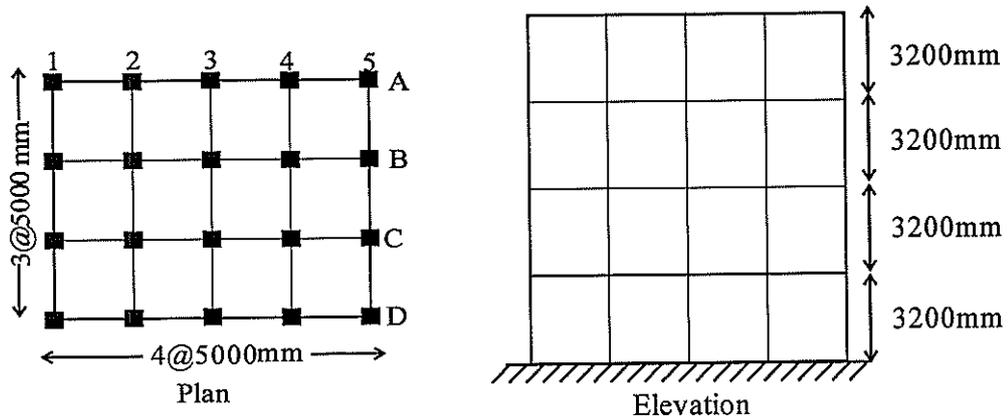
Q.3. What are the general principles, shall be observed in construction of earthquake resistant buildings as per IS - 4326 : 2013?

Instructions to Candidates :

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

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

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

1. IS : 800 (2007)   2. SP 6 : Handbok for structural engineers

PART-A   [10x2=20]

Answer should be given up to 25 words only
All questions are compulsory

Q.1. What definite criteria should be considered when making judgments regarding the selection of the best suitable steel section for a specific structural application? Provide the name of any four.

Q.2.   What is the plastic hinge?

Q.3.   Name any two theorems of plastic analysis.

Q.4.   What are prying forces?

Q.5.   How do the design approaches differ for tension members compared to compression members in steel structures?

Q.6.   Explain the web buckling in beam.

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

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

Q.9.   What is the surge load in gantry and crane truss arrangement?

Q.10. Explain the stiff bearing length in plate girder.

PART-B   [5x8=40]

Analytical/Problem solving questions

Attempt any five questions

Q.1.   Find the shape factor of a hollow circular section and a triangular section.

Q.2.   Draw a neat diagram of bolted gusset base. State the purpose of providing anchor bolts in the column foundations.

Q.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 Fe 410.

Q.4.   Discuss the minimum web thickness as per serviceability criterion in plate girder.

Q.5.   What do you understand by Pre-Engineered Buildings? Discuss the importance of porttal bracing in the truss girder bridge.

Q.6.   Elaborate the difference between battens and lacings with neat diagram.

Q.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 Fe 410.

PART-C   [4x15=60]
Descriptive/Analytical/Problem Solving/Design questions
Attempt any four questions

Q.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 M15 grade concrete pedestal. Use 24 mm diameter bolts of grade 4.6 for making the connections.

Q.2. Design a column to support a factored load of 1050 kN. The column has an effective length of 7.0 m with respect to z-axis and 5.0 m with respect to y-axis. Use steel of grade Fe-410.

Q.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 : 3.5 m

c/c distance between grantry rails : 15 m, c/c distance between columns (span of gantry girder) : 7.5 m

Self-weight of rail section : 300 N/m

Grade of steel Fe 415. Find the suitable trial sections for gantry girder.

Q.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 Fe 410.

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

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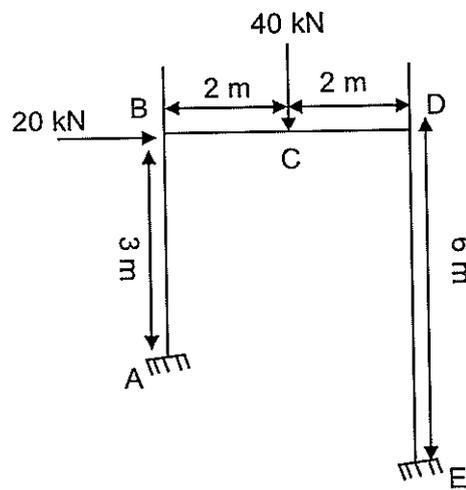
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B.Tech. VI-Sem. (Back) Exam. June, 2024

CIVIL ENGINEERING

6CE5-12, Solid and Hazardous Waste Management

Time : 2 Hours

Maximum Marks : 80

Instructions to Candidates :

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

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

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

1. ....　　　　　2. ....

PART-A　　　　　　　　[5×2=10]

(Answer should be given up to 25 words only)

All questions are compulsory

Q. 1　Define solid waste, E- waste and waste.

Q.2　What are the different waste collection vehicles?

Q.3   Write the name of traditional methods of waste collection and disposal.

Q.4   What is 3 R Principle?

Q.5   What is Vermicomposting?

PART-B   [4x10=40]

(Analytical/Problem solving questions)

Attempt any four questions

Q.1   Briefly explain sanitary land filling and landfill leachate.

Q.2   Discuss the management and disposal method of solid waste.

Q.3   Explain the principle and salient feature of environment law related to waste management.

Q.4.   What are the traditional method of solid waste collection and disposal?

Q.5   Enlighten the process adopted for waste transformation through composting.

Q.6   What type of solid waste need the transfer and why?

PART-C   [2x15=30]

(Descriptive/Analytical/Problem Solving/Design questions)

Attempt any two questions

Q. 1   What are the factors affecting size reduction in waste processing?Discuss in detail.

Q.2   Discuss the physical, chemical and biological characteristics of solid waste.

Q.3   What is pyrolysis and gasification? Explain it.

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