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| Total No. of Questions : 22 | Total No. of Pages : 04 |

Roll No. : ....

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.

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**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.
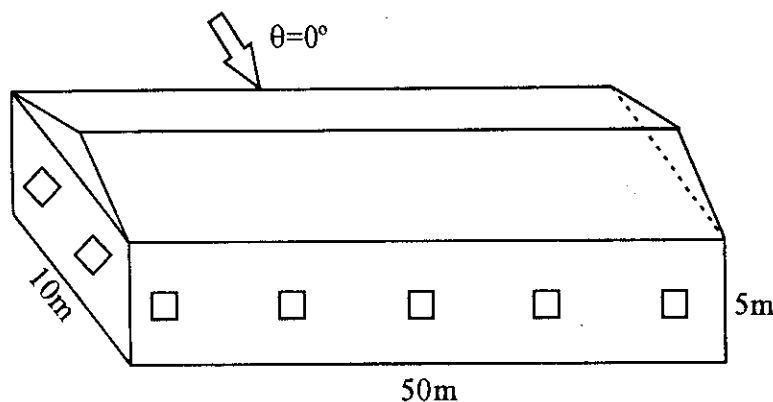
Q.2. A 4 storey RC frame building is shown in fig. below is situated at Delhi. The height between the floors is 3.5m and height of building is 14m. The soil below the foundation is medium hard soil. Assume building is intended to be used as an hospital building. Determine the total base shear as per IS 1893 (Part-1) : 2016 and distribute the base shear along the height of the building.

M_4=4000KN

M_3=3000KN   3.5m

M_2=3000KN   3.5m

M_1=3000KN   3.5m

                                                 3.5m
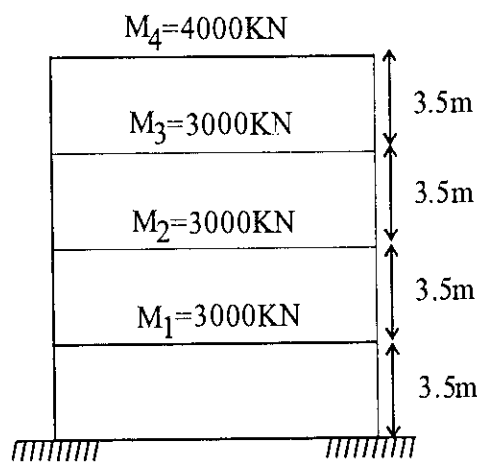
Q.3. What are the general principles for earthquake resistant construction of buildings as per IS-4326 : 2013 ?

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 1S -13920.

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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.

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PART-B
[5x4=20]

Analytical / Problem solving questions

Attempt any five questions.
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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.
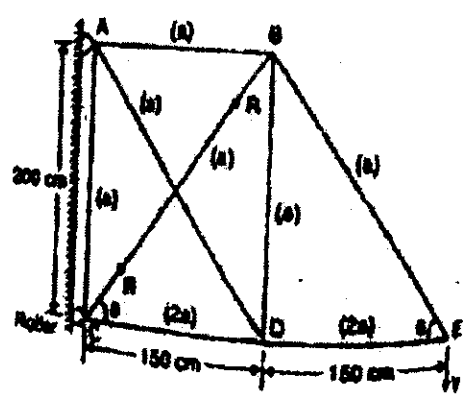

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Figure 1
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Table 1

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

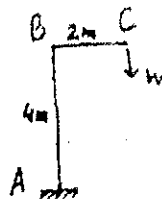3. Using Castigliano's theorems, determine the deflection at the free 'C' of the bent as shown in Figure 2.

Figure 2

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 $f = a_1X + b_1Y$ at a point (X,Y) 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

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.
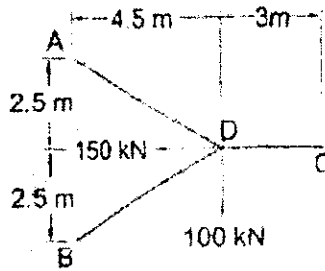

Figure 3

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_3L_3 and U_1L_1 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.
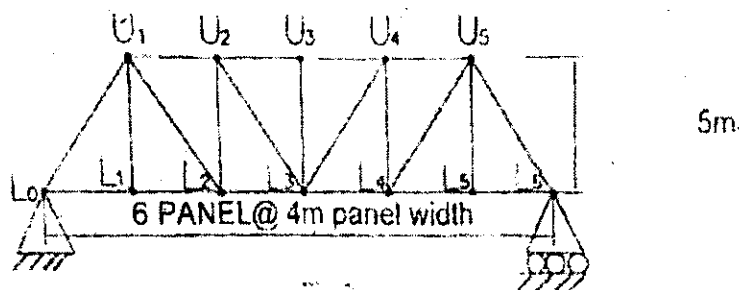

Figure 4

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.
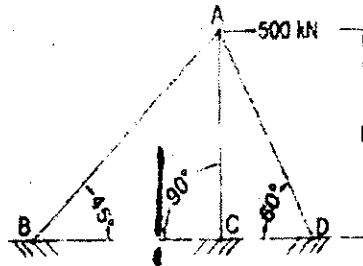

Figure 5

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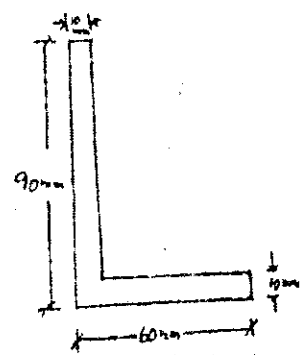

Figure 6

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.
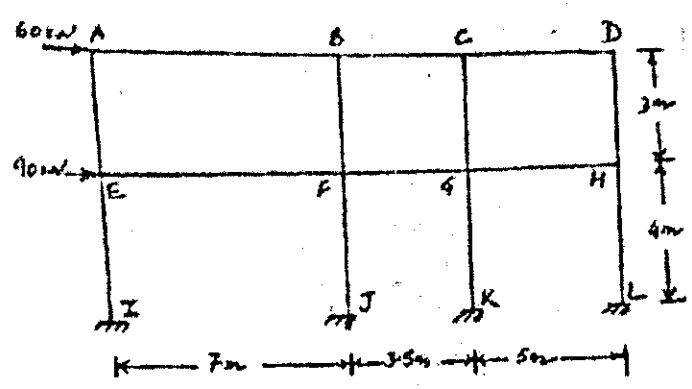
Figure 7

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.

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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.

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PART-C [3×10=30]

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

Attempt any three questions

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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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6E7124

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

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

(Answer should be given up to 25 words only)

All questions are compulsory

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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.

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PART-B   **[5x4=20]**

(Analytical/Problem solving questions)

Attempt any five questions

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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.

PART-C [3x10=30]
(Descriptive/Analytical/Problem-Solving/Design questions)
### Attempt any three questions

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 :
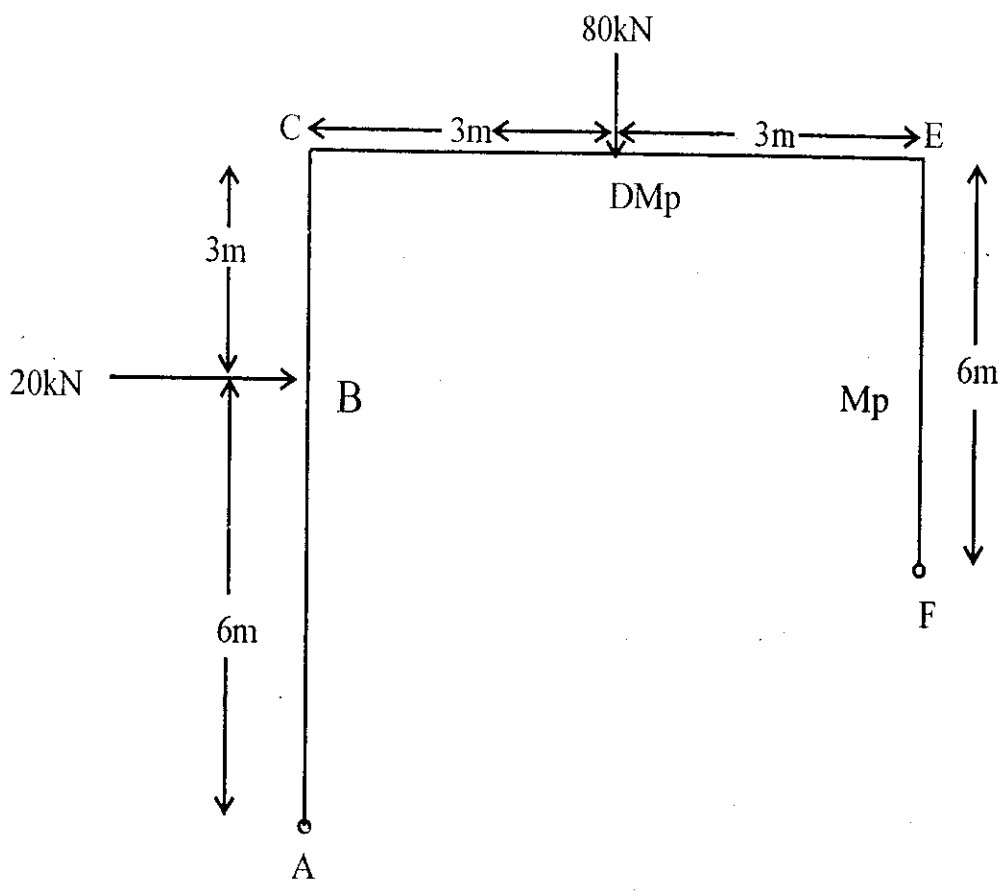
Q.4. A diagonal member of a roof carries an axial tension 450kN, Design the section and its connection with a gusset plate and lug angle. Use $F_x = 250MPa$ and $f_u = 410MPa$

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

   (a)   Hollow circular tube section

   (b)   Triangle

   (c)   Rectangular section

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| Total No. of Questions : 22 | Total No. of Pages : 04 |

6E7125

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.

PART-B [5x4=20]

(Analytical/Problem solving questions)

Attempt any five questions

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

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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...........................

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PART-A   [2x10=20]

(Answer should be given up to 25 words only)

All questions are compulsory

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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.

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PART-C [3x10=30]

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

Attempt any three questions

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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

(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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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. ....

(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.

<div align="center">

PART-C [2×15=30]

(Descriptive / Analytical / Problem solving / Design questions)

(Attempt any 02 questions)

</div>

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.
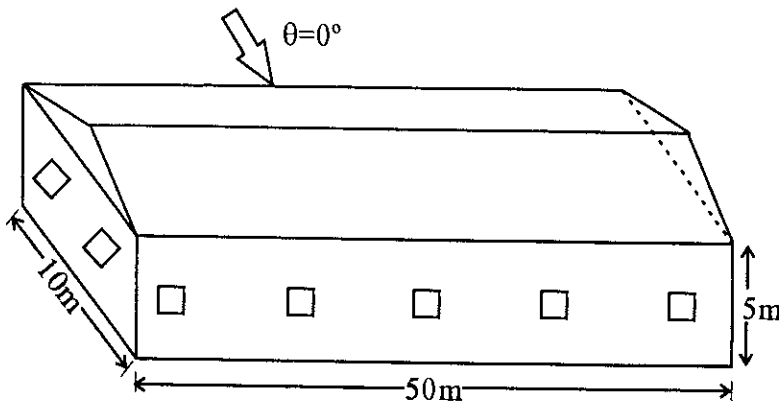
Q.2. Cosider a four-storey reinforced concrete office building shown in figure. The building is located in Bhuj, Gujarat. The soil conditions are medium stiff and the entire building is supported on a raft foundation. The R.C. Frames are infilled with Brick-Masonry. The lumped weight due to dead load 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
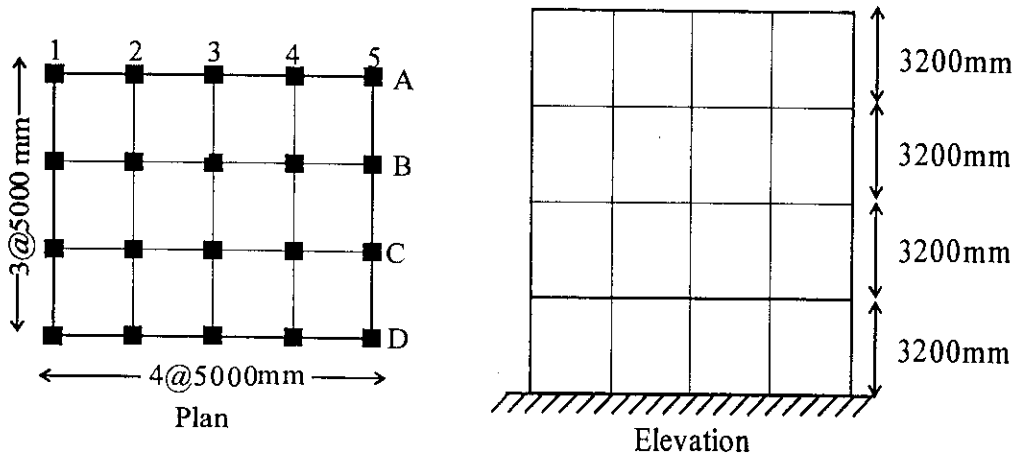
Q.3.   What are the general principles, shall be observed in construction of earthquake resistant buildings as per IS - 4326 : 2013?

6E1542

Roll No. : ....

6E1542

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

Civil Engg.

6CE4-02 STRUCTURAL ANALYSIS - II

Time : 3 Hours   Maximum Marks : 120

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. ....   2. ....

PART-A   [10×2=20]

(Answer should be given up to 25 words only)

All questions are compulsory

Q.1.   State minimum strain energy theorem.

Q.2.   Obtain degree of static indeterminacy for three, two hinged and fixed arches.

Q.3.   State Castigliano's Ist theorem with proper diagram.

Q.4.   State Muller-Breslau Principle.

Q.5. Define unsymmetrical bending with the help of proper diagram.

Q.6. Define shear centre.

Q.7. Write down the assumptions of portal and cantilever method.

Q.8. What is space truss? Illustrate with a diagram.

Q.9. What do you understand by the term lack of fit in a structure?

Q.10. Show different types of arches with proper diagram and label its different parts.

PART-B   [5x8=40]

(Analytical/Problem-solving questions)

Attempt any five questions

Q.1. A pair of shear leg has length of each leg as 5 m and the distance between their feet is 4 m. The line joining the feet of the legs is 7 m from the foot of the guy rope. If the length of the guy rope is 10 m, find the thrust in each leg and the pull in the guy rope when a load of 100 kN is suspended from the head.

Q.2. A beam of rectangular section 80 mm wide and 120 mm deep is subjected to a bending moment of 12 kN-m. The trace of the plane of loading is inclined at 45° to Y-Y axis of the section. Locate the neutral axis of the section and calculate the maximum bending stress in the section.

Q.3. A symmetrical parabolic arch with a central hinge, of rise r and span L is supported at its ends on pins at the same level. What is the value of the horizontal thrust when a load W which is uniformly distributed horizontally covers the whole span? Also, show that with this loading there is no bending moment at any point in the arch rib.

Q.4. A uniformly distributed live load of 60 kN per metre run of length 5 m moves on a girder of span 16 m. Find the maximum positive and negative shear force at a section 6 m from the left end.

Q.5. Prove Castigliano's Ist theorem.

Q.6. A continuous beam of two equal spans L is uniformly loaded over its entire length. Find the magnitude R of the middle reaction by using Castigliano's theorem.

Q.7. Determine the principal moments of inertia for an unequal angle section (60 x 40 x 6) mm.
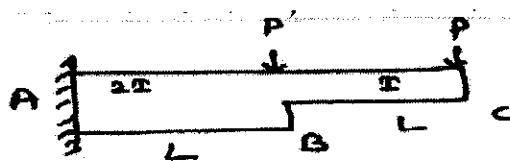
PART-C [4x15=60]

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

Attempt any four questions

Q.1. Analyse the building frame, subjected to horizontal forces, as shown in fig. using cantilever method.

Q.2. Determine the deflection and rotation at the free end for the beam given in figure with the help of unit load method. Take $E = 210 \times 10^3$ N/mm^2, $I = 2 \times 10^8$ mm^4.

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

Q.4. A parabolic arch hinged at the springing and crown has a span of 20 m. The central rise of the arch is 4 m. It is loaded with a UDL of intensity 2 kN/m on the left 8 m length. Calculate :

(a)   the direction and magnitude of reactions at the hinges.

(b)   the bending moment, normal thrust and shear at 4m from the left end.

(c)   maximum positive and negative bending moments.

Q.5.   A (60 x 60 x 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 UDL of such magnitude as to produce the maximum BM of 0.12 kN-m, determine the maximum deflection of the beam. Take $E = 2 \times 10^5$ N/mm^2.

Total No. of Questions : 22	Total No. of Pages : 04

Roll No. : ....

6E1543

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

CIVIL ENGINEERING

6CE4-03 / Environmental Engineering

Time : 3 Hours	Maximum Marks : 120

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

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

All questions are compulsory

Q.1. What are the sources of water ?

Q.2. Name different types of water demands.

Q.3. Write down Hazen-William's formula and its use in environment engineering.

Q.4. Differentiate between sedimentation and flocculation.

Q.5. What is meant by BOD?

Q.6. Define Hydraulic mean depth.

Q.7. What is self-purification of streams?

Q.8. What are the major causes of air pollution?

Q.9. What is difference between sound and noise?

Q.10. Write down the air quality standard for PM_{10} as per CPCB standards.

PART-B

(Analytical / Problem Solving Questions)

(Attempt any five Questions)   [5×8=40]

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

Q.2. What are the different materials, which are commonly used for water supply pipes? Discuss their comparative merits and demerits.

Q.3. Name the different types of pumps used generally in water supply scheme. What are the factors on which their selection depends? What points should be considered in deciding the location of the pumping stations.

Q.4. The maximum daily demand at a water filter plant is estimated as 12 million litres per day. Assume a detention period of 6 hours and the velocity of flow as 20 cm per minute. Design a rectangular sedimentation tank for the raw supply.

Q.5. Why a circular section is more commonly used in the construction of sewers? What are the advantages of the egg-shaped section, and under what conditions of flow, does it become more useful?

Q.6. Determine ultimate BOD for a sewage having 5-day BOD at 20°C as 180 ppm. Assume the base 10 rate constant K =0.1 per day.

Q.7. Explain various operational problems commonly encountered in activated sludge process.

PART-C

(Descriptive/Analytical/Problem Solving/ Design Question)

(Attempt any four questions)   [4×15=60]

Q.1. Determine the sizge of a circular sewer for a discharge of 800 litres per second running half full. Assume s=0.0001 and n = 0.015.

Q.2. What do you understand by oxygen-sag curve? Draw a neat sketch of it and explain the zones of pollution in a stream or river.

Q.3. Explain the composition and properties of air. What are the different types of air pollutants? Discuss the control measures adopted for air pollution.

Q.4. State the factors you would take into consideration and the procedure you would follow in designing a distribution system for the water supply of a city.

Q.5. What is meant by "Disinfection" in treating public water supply? What is its importance? What are the chemicals which are used as disinfectants and what are their comparative merits and demerits?

-----X-----

	Total No. of Questions : 14	Total No. of Pages : 04

6E1545

Roll No. : ....

6E1545

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

Civil Engineering

6CE4-05 Estimating and Costing

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 do you mean by Contingency Charges?

Q.2   Define Plinth Area.

Q.3   What do you understand by Overhead expenses?

Q.4   What is the difference between scrap value and salvage value?

Q.5   Define Sinking Fund.

PART-B   [4×10=40]

(Analytical/Problem solving questions)

Attempt any four questions

Q.1   Explain the purpose and importance of estimates.

Q.2   What are the methods of taking out quantities? Describe the principles of taking out quantities.

Q.3   Define Analysis of Rates. What are the factors affecting analysis of rates? Give suitable examples.

Q.4.   Perform analysis of rates for RCC (1:2:4) in beams, slabs etc. with 20 mm down to 6 mm stone aggregates (excluding centering and shuttering).

Q.5   Discuss the important factors which affect cost of works. Give some suitable examples in support of your answer.

Q.6   Define Valuation. What are the purposes and principles of valuation?

PART-C   [2×15=30]

(Descriptive/Analytical/Problem Solving/Design question)

Attempt any two questions

Q. 1   What are the different types of estimates used in civil engineering works? Explain them in detail with their usage, merits and demerits.

Q. 2 Describe the centre line and long wall-short wall methods of preparing estimates with a suitable example of your choice. What are their advantages and disadvantages?

Q. 3 A building in a city is let out @ Rs. 7500/- per month. The total outgoings of the property are estimated to be 15% of the gross income. Calculate the capitalized value of the property if present rate of interest is 6% and life is 50 years.

----- X -----

6E1547

6E1547

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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