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17CV52

Fifth Semester B.E. Degree Examination, Dec.2019/Jan.2020 Analysis of Indeterminate Structures

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 Analyse the beam completely by slope deflection method relative to support A support B sinks by 1mm and support C rises by 0.5 mm. Take $EI = 30000 \text{ kN-m}^2$. Refer Fig.Q1. Draw BMD, SFD and Elastic curve.

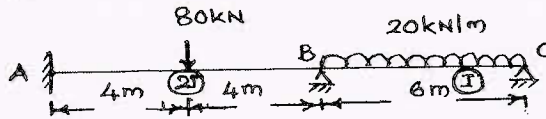


Fig.Q1

(20 Marks)

OR

- 2 Analyse the given frame by slope deflection method. Draw SFD, BMD and elastic curve. Refer Fig.Q2.

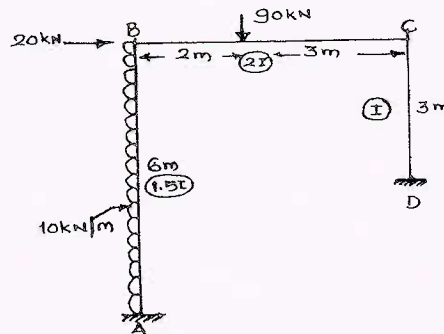


Fig.Q2

(20 Marks)

Module-2

- 3 Analyse the beam shown in Fig.Q3 by moment distribution method. Draw BMD, SFD and elastic curve.

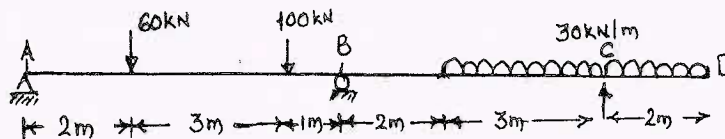


Fig.Q3

(20 Marks)

OR

- 4 Analyse the frame by moment distribution method. Draw BMD, SFD and elastic curve. Refer Fig.Q4.

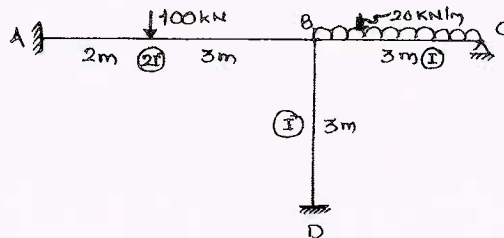


Fig.Q4

(20 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.

Module-3

- 5 Analyse the three span continuous beam shown in Fig.Q5 by using Kani's method. Draw BMD, SFD and elastic curve.

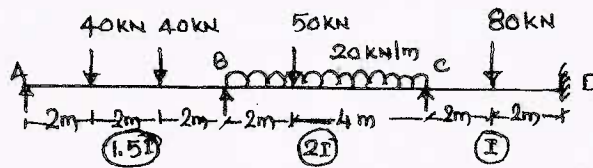


Fig.Q5

(20 Marks)

OR

- 6 Analyse the portal frames shown in Fig.Q6 by using Kani's method. Draw BMD, SFD and elastic curve.

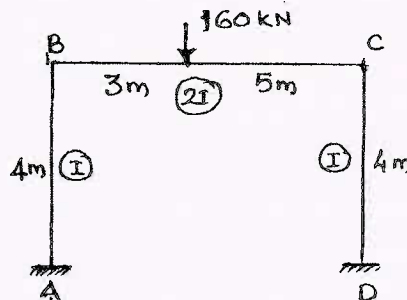


Fig.Q6

(20 Marks)

Module-4

- 7 Analyse the continuous beam shown in Fig.Q7 by flexibility method using system approach. Support B sinks by 5 mm sketch BMD, SFD and elastic curve. Take $EI = 15 \times 10^3 \text{ kN-m}^2$.

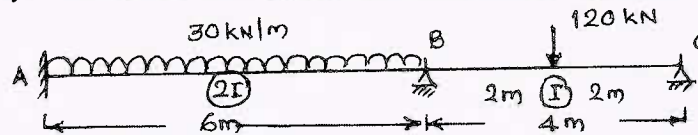


Fig.Q7

(20 Marks)

OR

- 8 Analyse the pin jointed plane truss shown in Fig.Q8 by using flexibility matrix method. Assume $\frac{L}{AE}$ for each member = 0.025 mm/kN. Tabulate the member forces.

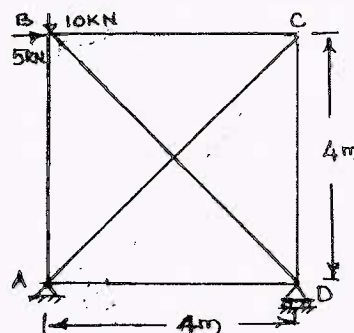


Fig.Q8

(20 Marks)

Module-5

- 9 Analyse the frame shown in Fig.Q9 by stiffness matrix method and draw BMD, SFD and Elastic curve. Assume EI is constant throughout.

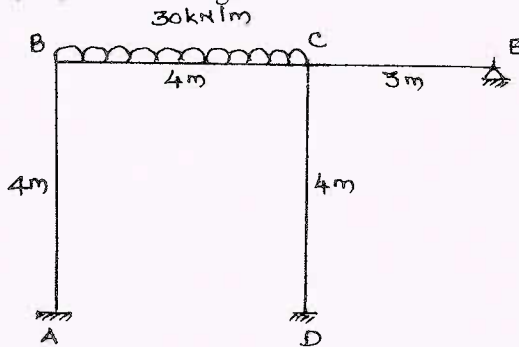


Fig.Q9

(20 Marks)

OR

- 10 Analyse the continuous beam shown in Fig.Q10 by using stiffness matrix method.

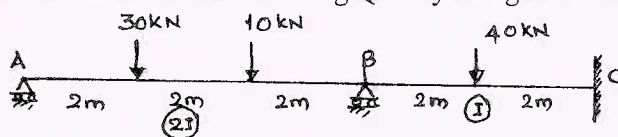


Fig.Q10

(20 Marks)

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Fifth Semester B.E. Degree Examination, Dec.2019/Jan.2020

Applied Geotechnical Engineering

Time: 3 hrs.

Max. Marks: 100

- Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. Use of IS:6403 permitted.*

Module-1

- 1 a. What are the objectives of soil exploration? (06 Marks)
b. With a neat sketch, explain seismic refraction method of soil exploration. (08 Marks)
c. What is the necessity of dewatering? Explain electro-Osmosis method of dewatering. (06 Marks)

OR

- 2 a. Define the following terms with reference to a sampling tube with a neat sketch:
i) Inside clearance
ii) Outside clearance
iii) Area ratio
iv) Recovery ratio. (08 Marks)
b. What is stabilization of bore holes? Explain any one method. (06 Marks)
c. List and explain types of soil samples. (06 Marks)

Module-2

- 3 a. Derive the equation for vertical stress below the centre of a circular area with uniform load intensity 'q'. (08 Marks)
b. Define Isobar. Construct an Isobar for a vertical stress of 40kN/m^2 , when ground surface is subjected to a concentrated load of 1000kN . (08 Marks)
c. Estimate the immediate settlement of a footing of size $2\text{m} \times 3\text{m}$ resting at a depth of 2m in a sandy soil whose compression modulus is 10N/mm^2 and the footing is expected to transmit a unit pressure of 160kN/m^2 . Assume $\mu = 0.28$ and $I_f = 1.06$. (04 Marks)

OR

- 4 a. Explain the construction and use of Newmark's chart. (08 Marks)
b. Explain contact pressure distribution in soils. (06 Marks)
c. A square footing $1.2\text{m} \times 1.2\text{m}$ rests on a saturated clay layer 4m deep. The soil properties are $W_L = 30\%$, $\gamma_{\text{sat}} = 17.8\text{kN/m}^3$, $w = 28\%$ and $G = 2.68$. Determine primary consolidation settlement if the footing carries a load of 300kN . (06 Marks)

Module-3

- 5 a. Define with neat sketches at rest, active and passive earth pressures. (06 Marks)
b. Explain Culmann's graphical method of finding out the active earth pressure. (06 Marks)
c. A retaining wall retains a cohesionless backfill with a height of 7.5m . The top 3m of the backfill has unit weight of 18kN/Nm^3 and $\phi = 30^\circ$. Lower 4.5m of the backfill has unit weight of 24kN/m^3 and $\phi = 20^\circ$. Obtain pressure distribution diagram and determine the total active pressure and its point of application. (08 Marks)

OR

- 6 a. Explain Fellenius method of obtaining centre of critical slip surface in the case of stability analysis of $C-\phi$ soil. (08 Marks)
- b. Explain the causes for slope failure and also list the type of slope failures. (06 Marks)
- c. A 5m deep canal has side slopes of 1:1. The properties of soil are $C_u = 20 \text{ kN/m}^2$, $\phi_u = 10^\circ$, $e = 0.80$ and $G = 2.8$. If Taylor's stability number is 0.108, determine the factor of safety with respect to cohesion when the canal runs full. Also find the factor of safety in case of sudden draw down, if the Taylor's stability number for this condition is 0.137. (06 Marks)

Module-4

- 7 a. Define: Ultimate bearing capacity, net ultimate bearing capacity and safe bearing capacity. (06 Marks)
- b. Explain plate load test with a neat sketch. (08 Marks)
- c. A foundation 2.0m square is installed 1.2m below ground level in sandy soil having unit weight of 19.2 kN/m^3 above water table and submerged unit weight of 10.1 kN/m^3 . If $C = 0$, and $\phi = 30^\circ$, find ultimate bearing capacity when
- Water table is well below the base of the foundation,
 - Water table rises to foundation level,
 - Water table rises to ground level.
- Take $N_q = 22$ and $N_r = 20$. (06 Marks)

OR

- 8 a. Distinguish between general shear failure and local shear failure. (06 Marks)
- b. Explain with a neat sketch the effect of ground water table and eccentricity on bearing capacity. (08 Marks)
- c. How do you conduct SPT? What are the corrections applied to observed 'N' values? (06 Marks)

Module-5

- 9 a. Explain classification of piles based on function. (06 Marks)
- b. Explain negative skin friction in pile foundation. (06 Marks)
- c. Design a square pile group to carry 400kN of load in clay with an unconfined compressive strength of 60 kN/m^2 . The piles are 30cms diameter and 6m long. Adhesion factor may be taken as 0.6. (08 Marks)

OR

- 10 Write short notes on any four of the following:
- Pile load test
 - Under reamed piles
 - Settlement of piles
 - Efficiency of pile group
 - Group capacity of piles. (20 Marks)

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GBCS SCHEME

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17CV/CT551

Fifth Semester B.E. Degree Examination, Dec.2019/Jan.2020

Air Pollution and Control

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Classify the Air Pollution sources adding with examples. (10 Marks)
b. Describe the general mechanisms by which Air pollution effects the materials. (10 Marks)

OR

- 2 a. List out the types of Inversions and explain them. (10 Marks)
b. Elaborate Photochemical Smog adding, with chemical reactions. (10 Marks)

Module-2

- 3 a. With the aid of graphical representation, explain different types of stability conditions of atmosphere. (10 Marks)
b. Determine the plume rise and the effective height of the stack for the following data :
i) Physical stack height : 250m
ii) Inside diameter of stack at exit : 1m
iii) Wind velocity : 3m/sec
iv) Air temperature : 25⁰C
v) Barometric pressure : 1000 millibars.
vi) Stack gas exit velocity : 10 m/sec
vii) Stack gas exit temperature : 150⁰C. (10 Marks)

OR

- 4 a. A factory uses 1.5 million litres of fuel oil per month. The exhaust gases from the factory contain the following quantities of pollutants per million litres per year.
i) Particulate matter : 4t/year ii) SO₂ : 20t/year iii) NO_x : 5t/year
iv) HC , CO and others : 3t/year.
Determine the safe height of the chimney required for the safe dispersion of the pollutants. (10 Marks)
b. Write a note on measurement of the meteorological variables. (10 Marks)

Module-3

- 5 a. Explain the principles of sampling the gaseous air pollutants. (10 Marks)
b. Give step by step flow chart for the analysis of SO_x and NO_x. (10 Marks)

OR

- 6 a. With the aid of neat sketch, explain High Volume Air Sampler. (10 Marks)
b. Justify the necessity of isokinetic sampling in case of stack sampling. (10 Marks)

Module-4

- 7 a. Give the advantages and disadvantages of Wet Scrubbers. (10 Marks)
b. Explain the construction and working of settling chambers. (10 Marks)

OR

- 8 a. Elaborate the operating problems that are encountered while normal operation of fabric filters. (10 Marks)
- b. A cement plant was emitting flue gas at the rate of $20000\text{m}^3/\text{hr}$. Assuming inlet gas velocity of 2m/s , design a tubular ESP with 0.20m diameter with 7 cylinders to achieve the efficiency of i) 90% and ii) 95%. (10 Marks)

Module-5

- 9 a. Write a note on Noise Pollution causes, effects and control. (10 Marks)
- b. Give the salient features of Environmental Protection Act, 1986. (10 Marks)

OR

- 10 a. Illustrate the case of Bhopal Gas Tragedy and its effects. (10 Marks)
- b. Distinguish between Montreal Protocol and Kyoto Protocol. (10 Marks)

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CBCS SCHEME

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17CV553

Fifth Semester B.E. Degree Examination, Dec.2019/Jan.2020

Masonry Structures

Time: 3 hrs.

Max. Marks: 100

*Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. Use of IS1905-1987 is permitted.*

Module-1

- 1 a. List the various ingredients of good brick earth. Explain their characteristics on the brick quality. (10 Marks)
- b. What are the various engineering properties of masonry that needs to be evaluated to be called as a good masonry unit? Indicating the codal limits for the same, explain any one test in detail. (10 Marks)

OR

- 2 a. What are the various factors that affect the strength of masonry? Explain them. (10 Marks)
- b. "Masonry tends to undergo cracking due to various reasons". List them. Sketch the pattern of cracks observed in it. (10 Marks)

Module-2

- 3 a. Define effective height of walls as per IS1905-1987. Indicate its values for different cases with sketches. (10 Marks)
- b. Explain the classification of masonry walls with the help of flowchart. Briefly explain any of them with sketch. (10 Marks)

OR

- 4 a. A solid wall of thickness 150 mm is constructed with solid concrete blocks of unit strength 5 MPa and "M₂" type mortar. The floor to floor height is 3.2m. The load is acting axially on the wall. Determine:
(i) Effective thickness, effective height
(ii) Slenderness ratio
(iii) Stress modification factor and permissible stress in masonry (10 Marks)
- b. What is slenderness ratio with respect to masonry walls? How does it have an impact on strength of masonry? Indicate the limits specified in IS1905-1987 for masonry walls, columns. (10 Marks)

Module-3

- 5 Design an interior wall cross wall of a 2-storeyed load bearing masonry building to carry 125 mm thick RCC slab with 3.2 m ceiling height. The wall is stiffened and it supports a 2.8 m wide slab. Given the following details:
LL on roof = 1.5 kN/m²
LL on floor = 2 kN/m²
Weight of 100 mm thick WPC = 2 kN/m²
Weight of floor finish = 1 kN/m²
Note, the masonry unit strength available is 10 MPa concrete blocks of 150 mm size. (20 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.

OR

- 6 Design an interior wall of a single storeyed workshop of height 5.4 m supporting a RCC roof. The bottom of wall rests over a foundation block. Take the roof load = 45 kN/m. Provide pier of suitable size as per codal provisions. The spacing between pier can be taken as 3.6 m c/c. (20 Marks)

Module-4

- 7 Design an interior cavity wall of a three storeyed building ceiling height of each storey being 3m. The wall is stiffened by intersecting walls 200 mm thick at 3.6 m c/c. Take loading from roof = 16 kN/m and loading from floor = 12.5 kN/m. [Refer Fig.Q7]

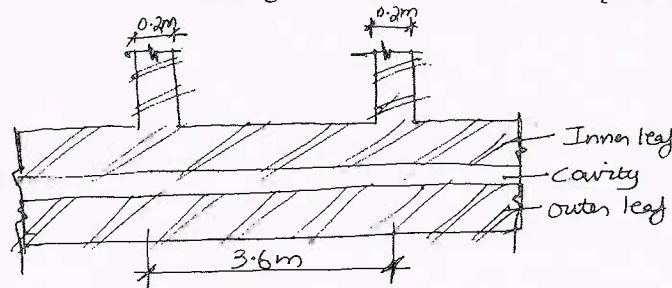


Fig.Q7

(20 Marks)

OR

- 8 Design an external wall of a single storeyed building, the inner leaf of which supports an eccentric load of 7 kN/m at an eccentricity of 25 mm. The wall is an unstiffened one which supports a concrete roof at the top and rests over a foundation block. Height of wall is 4m. [Refer Fig.Q8]

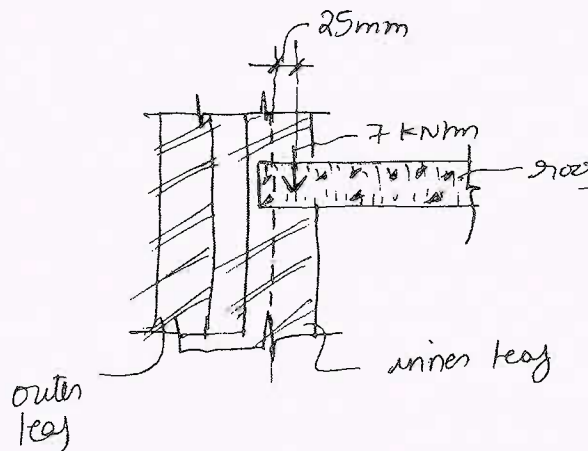


Fig.Q8

(20 Marks)

Module-5

- 9 Design an exterior wall of a single storey warehouse of 3.5m height. The loading on the wall consists of vertical loading of 25 kN/m from roof and wind pressure of 860 kN/m². The wall is tied with metal anchor at floor and roof levels. (20 Marks)

OR

- 10 a. What are the different modes of failure in masonry infilled RC frames? Explain them with sketch. (12 Marks)
 b. What are the various F.O.S stability checks that have to be checked during design of masonry retaining walls? Indicate their limits. (08 Marks)

2 of 2

CBCS SCHEME

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17CV561

Fifth Semester B.E. Degree Examination, Dec.2019/Jan.2020

Traffic Engineering

Time: 3 hrs.

Max. Marks: 100

Note: Answer FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Define traffic engineering and explain its scope. (10 Marks)
b. Explain the different resistances to be considered in vehicle movement. (10 Marks)

OR

- 2 a. In detail explain the road user characteristics. (10 Marks)
b. A vehicle of mass 1800 kg has to accelerate at 2 m/sec^2 from a speed of 12 KMPH to 22 KMPH in the first gear. The gradient is +1.2% and the co-efficient of rolling resistance is 0.025. The frontal area and co-efficient of air resistance are 2.38 m^2 and 0.37 respectively. Determine the engine horse power required. (10 Marks)

Module-2

- 3 a. List the objectives and uses of,
(i) Origin and destination studies. (10 Marks)
(ii) Parking studies. (10 Marks)
b. Discuss the various traffic studies and what are the objects of carrying out traffic volume studies? (10 Marks)

OR

- 4 a. Write the objectives of accident studies, also mention the various causes of accidents. (10 Marks)
b. A vehicle of weight 2.0 tonnes skids through a distance equal to 40 m before colliding with another parked vehicle of weight 1.0 tonne, after equal to 12 m before stopping. Compare the initial speed of the moving vehicle. Assume co-efficient of friction as 0.5. (10 Marks)

Module-3

- 5 a. Explain the following with examples.
(i) Regulatory signs. (10 Marks)
(ii) Warning signs. (10 Marks)
(iii) Informatory signs. (10 Marks)
b. Briefly explain at grade and grade separated inter section. (10 Marks)

OR

- 6 a. List the advantages and disadvantages of traffic signals. (10 Marks)
b. The average normal flow on cross roads 'A' and 'B' during design period are 400 PCU and 250 PCU per hour. The saturation flows are 1250 PCU and 1000 PCU per hour respectively. The all red time required for pedestrian crossing is 12 seconds. Design a two phase signal by Webster's method. (10 Marks)

Module-4

- 7 a. Explain various design factors of road lighting. (10 Marks)
b. Discuss the effect of air pollutants. (10 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, $42+8 = 50$, will be treated as malpractice.

OR

- 8 a. Explain the measures to control the traffic noise. (10 Marks)
b. Write short notes on road safety audit. (10 Marks)

Module-5

- 9 a. Explain (i) TSM (Traffic System Management) (10 Marks)
(ii) TDM (Traffic Demand Management) (10 Marks)
b. What are the applications of ITs?

OR

- 10 a. Enumerate the basic principles of traffic regulation. (10 Marks)
b. Explain the factors determining skid resistance. (10 Marks)

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Fifth Semester B.E. Degree Examination, Dec.2019/Jan.2020

Remote Sensing and GIS

Time: 3 hrs.

Max. Marks: 100

Note: Answer FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. With a neat sketch, explain the process of remote sensing. (10 Marks)
b. Briefly explain how energy interactions with earth features, i.e. soil and vegetation occurs in remote sensing. (10 Marks)

OR

- 2 a. What is visual interpretation technique? List and explain in brief the elements of visual interpretation techniques. (10 Marks)
b. With neat sketch, explain the electromagnetic spectrum with its wavelengths. (10 Marks)

Module-2

- 3 a. Briefly explain IRS and Landsat satellites with their series and characteristics. (10 Marks)
b. Define resolution and explain the types of resolutions. (10 Marks)

OR

- 4 a. What are the types of errors in remote sensing? Explain them briefly. (10 Marks)
b. Explain in detail the image enhancements and image filtering techniques used in remote sensing. (10 Marks)

Module-3

- 5 a. What are the components of GIS? Explain in brief the various components. (10 Marks)
b. Explain the process of joining spatial and attribute data in GIS. (10 Marks)

OR

- 6 a. With figure, explain the UTM zones used in GIS. (10 Marks)
b. What are map projections? Explain the various map projection methods in brief. (10 Marks)

Module-4

- 7 a. Explain briefly the representation of various features in raster data structures. (10 Marks)
b. Explain the comparison of raster data and vector data models with traditional advantages and disadvantages. (10 Marks)

OR

- 8 a. List and explain the different types of raster data models. (10 Marks)
b. Define topology and explain its importance in GIS with advantages and disadvantages. (10 Marks)

Module-5

- 9 a. Briefly explain the importance of integration of remote sensing and GIS. (10 Marks)
b. Explain the application of remote sensing in traffic management. (10 Marks)

OR

- 10 a. What are the applications of remote sensing in land use / land cover analysis? Briefly explain. (10 Marks)
b. Explain the application of remote sensing and GIS in environmental and urban planning. (10 Marks)

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Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
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15CV51

Fifth Semester B.E. Degree Examination, Dec.2019/Jan.2020

Design of RC Structural Elements

Time: 3 hrs.

Max. Marks: 80

Note:1. Answer any FIVE full questions, choosing ONE full question from each module.

2. Assume any missing data suitably

3. IS 456 : 2000 and SP -16 are allowed.

Module-1

- 1 a. Explain the following with sketch.
(i) Characteristics load (ii) Characteristics strength (iii) Partial safety factors. (06 Marks)
b. Enumerate various limit states to be considered in design and explain briefly. (04 Marks)
c. With neat sketch of stress – strain Diagram write the assumptions made in limit state designing. (06 Marks)

OR

- 2 a. What is Stress block? Derive expression for stress block parameters. (06 Marks)
b. Explain briefly about balanced, under reinforced and over reinforced sections with strain Diagram. (04 Marks)
c. Explain: i) Short term deflection ii) long-term deflection iii) Slenderness limits for beam lateral stability. (06 Marks)

Module-2

- 3 a. Differentiate between singly reinforced and doubly reinforced beams, and list the situation in which doubly reinforced section are used. (04 Marks)
b. A rectangular Reinforced concrete beam of size 300mm × 550mm is simply supported over an effective span of 7mtr, is reinforced with 4 bars of 20mm diameter. Determine maximum super imposed UDL which can be carried by beam apart from its self weight, and also find area of tension steel to be modified to make section an balanced section. Use M20 grade concert and Fe 415 steel. Assume effective cover for tension steel 50mm. Density of RCC 25kN/m³. (12 Marks)

OR

- 4 a. Write the expressions for moment resisting capacity of flanged sections for various cases of Neutral axis depth with respect to Depth of Flange. (06 Marks)
b. A rectangular beam is 250mm wide and 500mm deep, is reinforced with 3 bars of 20mm dia bars in compression zone. Determine the area of tension reinforcement needed to make the section fully effective. Also find the moment of resistance of section. Assume M20 Grade concrete and Fe 415 steel, cover for reinforcement is 50mm. (10 Marks)

Module-3

- 5 a. Brief about codal provisions made in providing longitudinal and lateral reinforcement in beams. (04 Marks)
b. A simply supported rectangular beam is supported on 300mm wide walls, over a clear span of 6mtrs. Design the beam by using M25 grade concrete and Fe 415 Grade steel. Superimposed load on beam is 15kN/m and breadth of beam is 230mm. (12 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

OR

- 6 a. What is Torsion? Write expression for equivalent bending moment and equivalent shear force for members subjected to torsion. (03 Marks)
- b. A T-beam slab floor has 125mm thick slab forming a part of T-beam. The end bearing are 450mm wide. Clear span is 8m. Spacing of T-beam is 3.5m clear. Live load on floor is 3kN/m^2 Design an intermediate beam. Use M20 Grade concrete and Fe 415 steel. (13 Marks)

Module-4

- 7 a. What is Development length? Write expression for Development length of MS and HYSD bars. (04 Marks)
- b. Design a cantilever balcony slab having projection of 1.25mtr from beam face. Consider live load on slab 3kN/m^2 and floor finish 1kN/m^2 . Use M20 grade concrete and Fe 415 steel. Calculate the development length of main steel to be embedded. (12 Marks)

OR

- 8 a. Differentiate between one way and two way slab, and mention codal provisions for steel reinforcement in slabs. (03 Marks)
- b. Design two way slab for a room of size $4\text{m} \times 5\text{m}$. The slab is simply supported over 300mm thick wall. Live load and floor finish on slab is 4kN/m^2 and 1kN/m^2 respectively. Corners are held Down. Use M20 Grade concrete and Fe 415 Grade steel. (13 Marks)

Module-5

- 9 a. What are the codal provision to design longitudinal and lateral reinforcement for columns. (06 Marks)
- b. A RC column of size $300\text{mm} \times 400\text{mm}$ is 5 mtrs long is effectively held and restrained against rotation at both ends subjected to an ultimate load of 1100kN and ultimate moment of 150kN-m about major axis. Design column by using SP -16 for 2 side and 4 side reinforcement arrangement. Use M25 Grade concrete and Fe415 steel. (10 Marks)

OR

- 10 Design a RC Footing for column size $400\text{mm} \times 400\text{mm}$, which carries a maximum load of 800kN. SBC of soil is 200kN/m^2 , If one side of footing is to be restricted to 1.50 mtr. Use M20 grade concrete and Fe 415 Grade steel. (16 Marks)

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15CV52

Fifth Semester B.E. Degree Examination, Dec.2019/Jan.2020 Analysis of Indeterminate Structures

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 Analyse the continuous beam shown in Fig Q1 by slope deflection method. Draw bending moment diagram and shear force diagram.

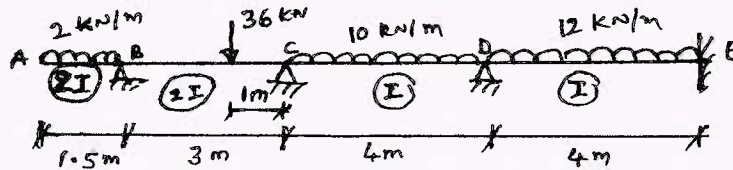


Fig Q1

(16 Marks)

OR

- 2 Analyse the portal frame shown in Fig Q2 by slope deflection method. Draw bending moment diagram.

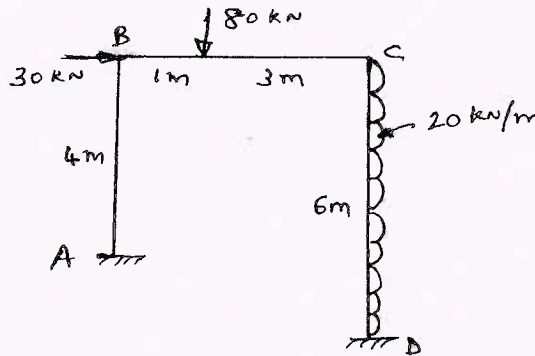


Fig Q2

(16 Marks)

Module-2

- 3 Analyse the continuous beam shown in Fig Q3 by moment distribution method. Draw bending moment diagram and shear force diagram. Support at B sinks by 10mm.

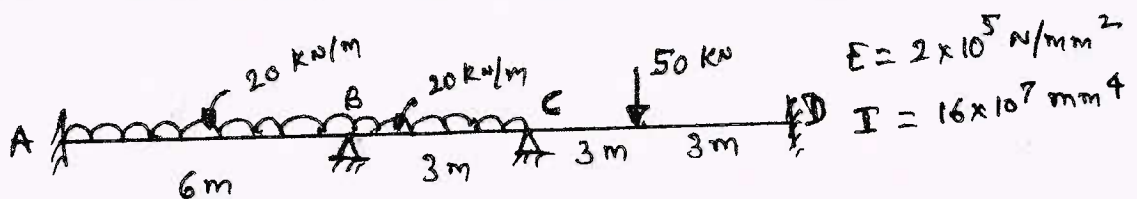


Fig Q3

(16 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

OR

- 4 Analyse the frame shown in Fig Q4 by moment distribution method. Draw bending moment diagram.

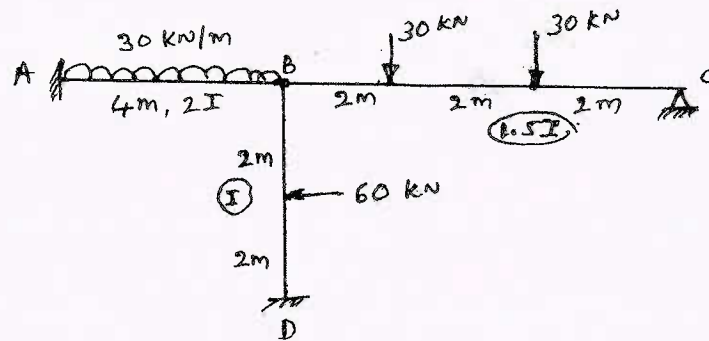


Fig Q4

(16 Marks)

Module-3

- 5 Analyse the continuous beam shown in Fig Q5 by rotation contribution method. Draw bending moment diagram and shear force diagram.

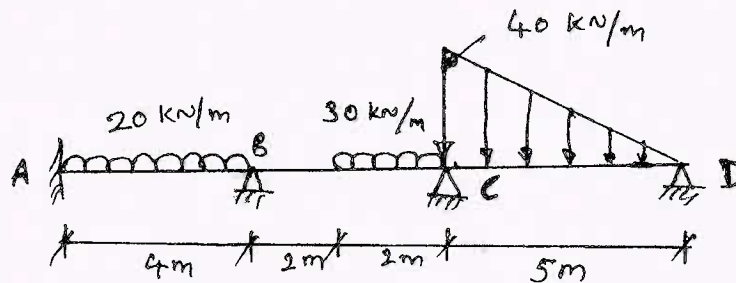


Fig Q5

(16 Marks)

OR

- 6 Analyse the frame shown in Fig Q6 by Kani's method. Draw bending moment diagram. Use axis of symmetry approach.

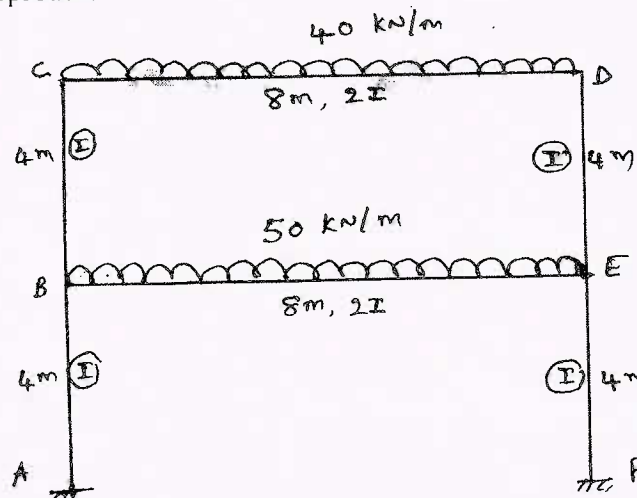


Fig Q6

(16 Marks)

Module-4

- 7 Analyse the continuous beam shown in Fig Q7 by flexibility matrix method. Draw BMD and SFD.

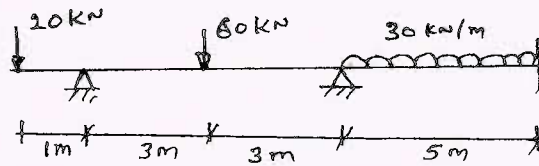


Fig Q7

(16 Marks)

OR

- 8 Analyse the pin jointed plane shown in Fig Q8 by flexibility matrix method to compute axial forces in the members. Assume $\frac{L}{AE}$ for each member is 0.025mm/kN.

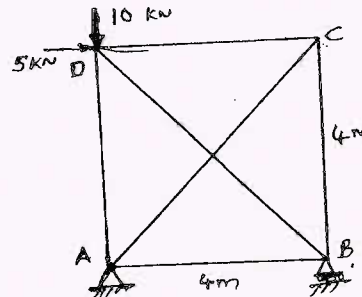


Fig Q8

(16 Marks)

Module-5

- 9 Analyse the continuous beam shown Fig Q9 by stiffness matrix method. Draw SFD and BMD.

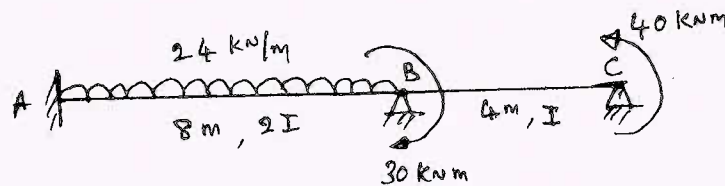


Fig Q9

(16 Marks)

OR

- 10 Analyse the portal frame shown in Fig Q10 by stiffness matrix method. Draw bending moment diagram.

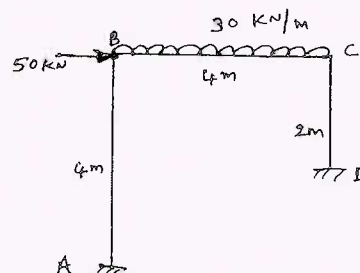


Fig Q10

(16 Marks)

** 3 of 3 **

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Fifth Semester B.E. Degree Examination, Dec.2019/Jan.2020

Applied Geotechnical Engineering

Time: 3 hrs.

Max. Marks: 80

- Note:** 1. Answer FIVE full questions, choosing one full question from each module.
 2. Missing data may be assumed suitably.
 3. Use of IS:6403 is permitted.

Module-1

- 1 a. List and explain various objectives of subsurface exploration. (03 Marks)
 b. What is Borehole Log? With an example, state the details of exploration to be enclosed in Borehole log. (04 Marks)
 c. Explain with neat diagram, any three methods of dewatering. (09 Marks)

OR

- 2 a. What are the objectives of Dewatering? Explain. (03 Marks)
 b. The inner diameters of a sampling tube and that of a cutting edge are 70 mm and 68 mm respectively, their outer diameters are 72 mm and 74 mm respectively. Determine the inner clearance, outside clearance and area ratio of the sampler. (04 Marks)
 c. What are the Geophysical methods of subsoil exploration? Explain in detail seismic refraction method. (09 Marks)

Module-2

- 3 a. What are the assumptions made in Boussinesq's analysis to determine the stresses in soil? (03 Marks)
 b. A concentrated load of 22.5 kN acts on the surface of a homogenous soil mass of large extent. Find the stress intensity at a depth of 15 m and
 (i) Directly under the load.
 (ii) At a horizontal distance of 7.5 m.
 Use Boussinesq's analysis. (06 Marks)
 c. Explain the stress distribution on a vertical plane due to point load from Boussinesq's theory. (07 Marks)

OR

- 4 a. What is Newmarks's chart? Explain with neat diagram, the construction of Newmarks chart with influence value of 0.005q. (08 Marks)
 b. Explain contact pressure diagram in different soils for different types of footings. (04 Marks)
 c. A soft, normally consolidated clay layer is 18 m thick. The natural water content is 45%. The saturated unit weight is 18 kN/m³, the grain specific gravity is 2.70 and the liquid limit is 63%. The vertical stress increment at the centre of the layer due to foundation load is 9 kN/m². The ground water is in level at the surface of clay layer. Determine the settlement of foundation. (04 Marks)

Module-3

- 5 a. Differentiate between active earth pressure and passive earth pressure on a retaining wall. (04 Marks)
 b. Explain different types of finite slope failures. (04 Marks)
 c. A gravity retaining wall retains 12 m of a back fill. $r = 17.7 \text{ kN/m}^3$, $\phi = 25^\circ$ with a uniform horizontal surface. Assume that wall interface to be vertical, determine the magnitude and point of application of total active earth pressure. If the water table is at a height of 6 m, how do the magnitude and point of application of total active earth pressure change. Submerged unit weight of soil = 10 kN/m³. (08 Marks)

1 of 2

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
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OR

- 6 a. List the assumptions made in Rankine's theory to determine lateral earth pressure in soils. (04 Marks)
- b. A Canal is to be excavated through a soil with $C = 15 \text{ KN/m}^2$, $\phi = 20^\circ$, $e = 0.9$ and $G = 2.67$. The side slopes is 1 in 1. The depth of canal is 6 m. Determine the FOS, with respect to cohesion when canal runs full. What will be the FOS, if the canal is rapidly emptied? Taylor's stability numbers are 0.06 and 0.114 respectively with respect to two cases. (06 Marks)
- c. How do you locate the centre of critical slip circle using Fellenius method? (06 Marks)

Module-4

- 7 a. Explain in detail how bearing capacity of soil is determined using BIS method (IS6403). (08 Marks)
- b. How do you consider the effect of water table on determination bearing capacity of soil. (04 Marks)
- c. Compute the ultimate load that an eccentrically loaded square footing of width 2.1 m with an eccentricity of 0.35 m can take at a depth of 0.5 m in a soil with $\gamma = 18 \text{ KN/m}^3$, $C = 9 \text{ KN/m}^2$, $N_c = 82$, $N_q = 35$, $N_r = 42$. (04 Marks)

OR

- 8 a. Proportion a rectangular combined footing for uniform pressure under dead load, plus reduced live load, using the following data:
Allowable soil pressure, 150 KN/m^2 for dead load + reduced live load.

225 KN/m^2 for dead load + live load

Column loads	Column A	Column B
Dead load (DL)	540 KN	690 KN
Live load (LL)	400 KN	810 KN

Distance C/C of columns = 5.4 m

Projection of footing beyond column A = 0.5 m. Draw the diagram. (12 Marks)

- b. List the assumptions made in Terzaghi's analysis to find bearing capacity of soils. (04 Marks)

Module-5

- 9 a. With neat diagrams, explain the classification of piles based on different criteria. (10 Marks)
- b. What is negative skin friction? How it is estimated in different types of soils. (06 Marks)

OR

- 10 a. Explain the static formula to find pile load carrying capacity. (10 Marks)
- b. A 16 pile group has to be arranged in the form of a square in a soft clay with uniform spacing. Neglecting end bearing, determine the optimum value of spacing of the piles in terms of pile diameter. Assuming a shear mobilization factor 0.6. (06 Marks)

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GBCS SCHEME

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15CV/CT551

Fifth Semester B.E. Degree Examination, Dec.2019/Jan.2020

Air Pollution and Control

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Define Air Pollution. Discuss the various sources of air pollutants. (08 Marks)
b. Explain the causes and effects of inversion of atmosphere. (08 Marks)

OR

- 2 a. Explain the classification and properties of air pollution. (08 Marks)
b. What are the factors affecting the photo – chemical reactions? With the necessary reactions, explain the basic theory of formation of photo – chemical smog. (08 Marks)

Module-2

- 3 a. With a neat sketch, explain the wind speed recorder and wind direction recorder devices used in measuring meteorological variables. (08 Marks)
b. Obtain an expression for particulate concentration at any co-ordinate and distance by Gaussian plume dispersion model. (08 Marks)

OR

- 4 a. With a neat sketch, explain the effective stack height. How do you calculate the effective stack height? (08 Marks)
b. Define Wind rose. With a neat sketch, explain how a wind rose is plotted. (08 Marks)

Module-3

- 5 a. What is meant by Air sampling? Explain non – isokinetic , isokinetic sampling and sampling train. (08 Marks)
b. Explain the colourimetric method and chromatographic method of analysis of atmospheric samplers. (08 Marks)

OR

- 6 a. What are the various analytical methods used for monitoring air pollution? (08 Marks)
b. How do you measure the oxides of sulfur and oxides of Nitrogen present in the ambient atmosphere using the high volume sampler and absorption solution? (08 Marks)

Module-4

- 7 a. List the different particulate control devices. Explain the principle , construction and working of an electrostatic precipitator, with a neat sketch. (08 Marks)
b. A thermal power plant installed an ESP with 5000m^2 of collector plate area. The ESP is 95% efficient in treating $200\text{m}^3/\text{s}$ of flue gas. Estimate how large the plate area should be to achieve 98 – 99% efficiencies for the ESP. (08 Marks)

OR

1 of 2

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, $42+8 = 50$, will be treated as malpractice.

- 8 a. With a neat sketch, explain the operation of fabric filter. (08 Marks)
- b. In a fabric filter, a bag house is to be designed to handle effluent gas flowing with the velocity of $600\text{m}^3/\text{min}$. The filtering velocity is $4\text{m}/\text{min}$. Each bag is 0.2m in diameter and 40m high. The bag house is to be square in cross section, with 0.30m spacing between bags and 0.20m clearance from the walls. Calculate
- i) The number of bags required and ii) The width of the bag house. (08 Marks)

Module-5

- 9 a. Define Equivalent Sound Level (α_{eq}). Discuss the general control methods of noise pollution due to heavy vehicular traffic. (08 Marks)
- b. Give the constituents of clean and dry atmospheric air quality. Also discuss the salient features of Air Pollution (prevention) Act 1981. (08 Marks)

OR

- 10 a. Define Noise. Write the units of noise and explain the intensity of noise. (08 Marks)
- b. What are the various approaches to minimize exhaust emission? Explain. (08 Marks)

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CBCS SCHEME

USN

2 V D 1 6 C V 0 3 2

15CV553

Fifth Semester B.E. Degree Examination, Dec.2019/Jan.2020 Masonry Structures

Time: 3 hrs.

Max. Marks: 80

- Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. Use of IS 1905:1980 is permitted.
3. Assume missing data, if any, suitably.*

Module-1

- 1 a. List the qualities of good bricks. (04 Marks)
b. What are the desirable properties of mortar for use in masonry construction? (04 Marks)
c. Explain briefly the causes for cracks in masonry along with remedial measures. (08 Marks)

OR

- 2 a. List any four empirical formulae used to predict the strength of masonry. (04 Marks)
b. Name the factors which affect compression strength of masonry. (04 Marks)
c. Derive an expression for brick prism under compression by elastic theory. (08 Marks)

Module-2

- 3 a. With neat sketches, list the different types of walls. (06 Marks)
b. Write a short note on permissible compressive stress in masonry. (04 Marks)
c. An interior solid wall of a two storey building is 100 mm thick with a ceiling height of 3m, it is constructed with bricks of 7.5 N/mm^2 and M_1 type mortar. The wall is fully restrained at top and bottom. Calculate permissible compressive stress. (06 Marks)

OR

- 4 a. Write notes on:
(i) Stress reduction factor
(ii) Shape modification factor
(iii) Eccentricity in masonry wall (06 Marks)
b. Briefly explain load dispersion and arching action in lintels. (04 Marks)
c. An interior cavity wall of a two storey building has 100 mm thick leaves with a ceiling height 3m supported with piers at a spacing of 3600 mm c/c with width 200 mm. It is constructed with bricks of 10 N/mm^2 and H_1 type mortar, the wall is fully restrained at top and partially restrained at bottom. Calculate permissible compressive stress. (06 Marks)

Module-3

- 5 a. Explain the design criteria of masonry wall subjected to axial load. (06 Marks)
b. Design an interior cross wall of two stories building with 100 mm thick RCC slab and 3m ceiling height. The wall is unstiffend and it is supported by 2.65 m wide slab on either side. Take live load on the roof as 1.5 kN/m^2 and live load on floor as 2 kN/m^2 assume floor finish 0.2 kN/m^2 and thickness of lime terrace as 80 mm. Consider thickness of wall as 100 mm. (10 Marks)

1 of 2

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OR

- 6 Design an interior solid wall of a two storied building with ceiling height 3m and the wall is supported by piers of thickness 400 mm and width 200 mm. center to center distance between piers is 3500 mm. Take thickness of RCC slab as 120 mm and thickness of lime terrace as 80 mm. Assume live load on roof as 1.5 kN/m^2 and live load on floor as 2.5 kN/m^2 . Consider wall thickness as 200 mm. (16 Marks)

Module-4

- 7 a. Explain the design criteria of walls subjected to eccentric loads. (06 Marks)
 b. Design a solid wall of a workshop building with 200 mm thickness and 5m height the wall carries a truss with intensity 20 kN at 4m center to center. Assume roof load as 10 kN/m. (10 Marks)

OR

- 8 Design an interior cavity wall of a 3 storied building to carry eccentric load due to unequal spans of roof and floor as 4m and 3m on either side of wall. The height of each storey is 3m assume intensity of load from roof as 6 kN/m^2 and from floor as 4 kN/m^2 . Take overall thickness of wall as 250 mm with 50 mm cavity in between. (16 Marks)

Module-5

- 9 Design a shear wall under seismic load having length 4.5 m and height 3m to resist horizontal earthquake force in its plane. Assume the seismic load to be distributed evenly along length and height of wall. The earthquake acceleration is 0.1g, the wall is tied at top and bottom with a metal anchors. Assume wall thickness as 200 mm. (16 Marks)

OR

- 10 a. Write short notes on:
 (i) Reinforced brick masonry
 (ii) Design criteria of masonry retaining wall (08 Marks)
 b. With neat sketches explain the modes of failures in In-filled frames. (08 Marks)

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Fifth Semester B.E. Degree Examination, Dec.2019/Jan.2020 Traffic Engineering

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Mention various factors that affect road user characteristics. Briefly explain any two. (08 Marks)
 b. Explain with sketch PIEV theory in analyzing driver's reaction time. (08 Marks)

OR

- 2 a. Briefly discuss Urban Traffic problems in India. (08 Marks)
 b. Explain the concept of sustainable urban transport and integrated land use. (08 Marks)

Module-2

- 3 a. The spot speed studies were carried out at a certain stretch of a highway. Determine:
 (i) The upper and lower speed limit values for mixed traffic.
 (ii) Speed to check geometric design elements.

Speed range in kmph	No. of vehicles observed	Speed range kmph	No. of vehicles deserved
0 to 10	12	50 to 60	255
10 to 20	18	60 to 70	119
20 to 30	68	70 to 80	43
30 to 40	89	80 to 90	33
40 to 50	204	90 to 100	9

- b. With a help of Desire line diagram, explain the concept of origin and destination survey. (08 Marks)

OR

- 4 a. Discuss the various types of parking, their advantages and disadvantages. (08 Marks)
 b. Explain in brief level of service concept and factors affecting LOS. (08 Marks)

Module-3

- 5 a. Design a Rotary Intersection for the traffic flow in an urban section. At the intersection of two highways in the design year are given below:

Approach	Left turning			Straight ahead			Right turning		
	Cars	Commercial	Scooter	Cars	Commercial	Scooter	Cars	Commercial	Scooter
N	200	50	100	250	100	150	150	50	80
E	180	60	80	220	50	120	200	40	120
S	250	80	100	150	50	90	160	70	90
W	220	50	120	180	60	100	250	60	100

Consider PCU values for cars 1. Commercial vehicles 2.8 and for scooters 0.75, entry width 10 m, length of weaving section 55 m. (10 Marks)

- b. List different types of grade-separated intersections and explain any one of them. (06 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
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OR

- 6 a. The 15 minute-traffic counts on cross roads 1 and 2 during peak hour are observed as 178 and 142 vehicles per lane respectively approaching the intersection in the direction of heavier traffic flow. If the amber times required are 3 and 2 seconds respectively for two loads based on approach speeds, design the signal timings by trial cycle method. Assume an average time headway of 2.5 seconds during green phase. (10 Marks)
- b. Explain the following with examples:
(i) Regulatory signs
(ii) Warning signs
(iii) Informatory signs (06 Marks)

Module-4

- 7 a. What are the objectives and causes of Road Accidents? (08 Marks)
b. Explain with neat sketch lighting layouts. (08 Marks)

OR

- 8 a. Explain vehicular traffic and environmental hazards. (08 Marks)
b. How integration of public transportation will increase safety of commuters? (08 Marks)

Module-5

- 9 a. List different Travel Demand Management techniques adopted to reduce traffic flows specially during peak hours. (08 Marks)
b. Discuss the advantages and disadvantages of one way streets. (08 Marks)

OR

- 10 a. Discuss the applications of I.T.S in traffic management. (08 Marks)
b. Explain road safety education and enforcement. (08 Marks)

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15CV62

Sixth Semester B.E. Degree Examination, Dec.2019/Jan.2020 Design of Steel Structural Elements

Time: 3 hrs.

Max. Marks: 80

*Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. Use of IS800-2007 and steel tables are allowed.*

Module-1

- 1 a. Explain the advantages and disadvantages of steel structure. (08 Marks)
- b. Distinguish between Working stress design and Limit state design of steel structure. (08 Marks)

OR

- 2 a. Calculate the "Shape factor" for the Triangular section. (06 Marks)
- b. Analyse the continuous beam "ABC" subjected to working loads show in Fig.Q2(b) and determine the plastic moment. Use load factor is 1.5. (10 Marks)

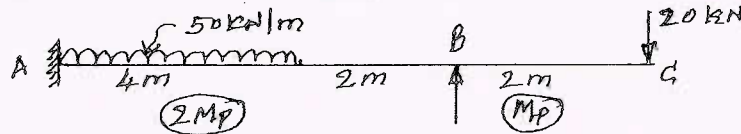


Fig.Q2(b)

Module-2

- 3 a. Explain with neat sketches of various 'Mode of failure' of bolts connection? (06 Marks)
- b. Determine the "bolt value" for a bolt M16 and property class 4.6. Used to connect lap joint as shown in Fig.Q3(b). Take ultimate Tensile Strength of plate 410 MPa. (10 Marks)

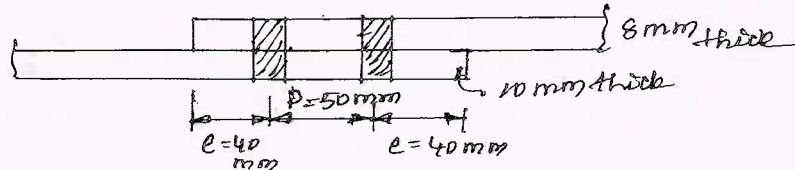


Fig.Q3(b)

OR

- 4 a. What are the advantages and disadvantages of welded connection? (06 Marks)
- b. Determine the bracket load that can resisted by the bracket shown in Fig.Q4(b) by fillet weld of size 8mm. (10 Marks)

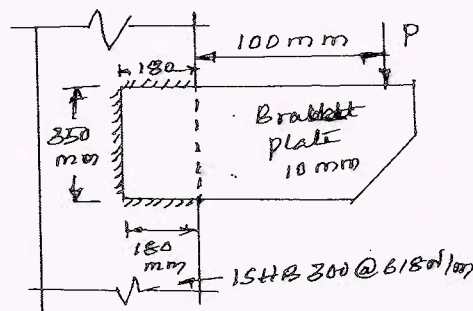


Fig.Q4(b)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
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Module-3

- 5 a. Explain the behavior of compression member. (06 Marks)
 b. Determine the compressive strength of a strut of ISA 150×75×8 mm connected to a gusset plate when (i) with one bolt (ii) with more than two bolts (iii) Welded. Assume angle is axially loaded. Take length of the member is 3m. (10 Marks)

OR

- 6 Design a column section using double channels back to back to carry a factored load of 2000 kN. The height of the column is 5m with the column is hinged at both ends. Also design the column with lacing with bolted connection. (16 Marks)

Module-4

- 7 a. What is Lug Angle/ Explain in brief with a neat diagram. (04 Marks)
 b. Determine the tensile strength of a plate 160mm × 10mm connected with bolts of M18 in two lines. (12 Marks)

OR

- 8 Compression member ISHB 300@ 63 kg/m is carrying a load of 800 kN. Take M20 grade of concrete and 150 kN/m² SBC of soil. Design slab base and concrete base using welded or bolted connection. (16 Marks)

Module-5

- 9 a. What are the factors, which affects lateral stability? (04 Marks)
 b. Determine the design bending strength of a beam ISMB 300@ 434 N/m. Assume that the factored shear force is less than the design shear strength. Use Fe-410 grade of steel. (12 Marks)

OR

- 10 Design a suitable beam for a roof of dimension 7.5m × 12m consists of 100mm thick R.C. slab supported on steel beams spaced at 3m centre to centre. The floor finishing may be taken as 1 kN/m² and live load is 4 kN/m². The self weight of beam is assumed as 1 kN/m². Take limiting deflection as span/250. (16 Marks)

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Sixth Semester B.E. Degree Examination, Dec.2019/Jan.2020

Highway Engineering

Time: 3 hrs.

Max. Marks: 80

- Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. Assume any missing data suitably.*

Module-1

- 1 a. Explain the various characteristics of Road Transport. (04 Marks)
 b. What are the objectives of IRC and Central Road Research Institute [CRRI] (08 Marks)
 c. What are the advantages and disadvantages of airways? (04 Marks)

OR

- 2 a. Explain the saturation system of Road Planning. (04 Marks)
 b. Write a short note on KSHIP and its projects. (04 Marks)
 c. Four new road links A, B, C & D are to be constructed during a 5 year plan period. Suggest the order of priority for phasing the road construction programme based on maximum utility approach. Assume utility units of 0.5, 1.0, 2.0 and 4.0 for the population ranges and 2, 2 and 5 units per 1000 tonnes of agricultural, raw material and industrial products from the following data:

Road link	Length km	No. of villages with Pop ⁿ range				Productivity served		
		<500	501–1000	1001–2000	>2000	Agricultural	Raw materials	Industrial Product
A	75	30	15	10	3	8000	3000	1000
B	35	20	08	06	3	5000	1000	1600
C	40	15	06	05	5	6000	2000	3200
D	50	40	04	03	2	3000	7000	500

(08 Marks)

Module-2

- 3 a. What are the main objectives of preliminary survey and steps followed in the preliminary survey by conventional method [Name the steps]. (06 Marks)
 b. Briefly explain the map study is the alignment of a highway project. (04 Marks)
 c. Define camber. Discuss the factors on which the amount of camber to be provided depends. Specify, the recommended ranges of camber for different types of pavement surfaces. (06 Marks)

OR

- 4 a. Explain the PIEV theory with a neat diagram. (06 Marks)
 b. Calculate the minimum sight distance required to avoid a head on collision of two cars approaching from the opposite directions at 90 and 60 kmph. Assume a reaction time of 2.5 seconds, coefficient of friction 0.7 and brake efficiency of 50% in either case. (06 Marks)
 c. Explain briefly the steps of superelevation design. (04 Marks)

important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42.18 = 50, will be treated as malpractice.

Module-3

- 5 a. Distinguish between Bitumen and Tar. (04 Marks)
 b. Explain the various properties of Road aggregates. (06 Marks)
 c. Define the modulus of subgrade reaction. With the sketch explain the plate load test for determining the k value. (06 Marks)

OR

- 6 a. Explain ESWL. How is it determined for dual wheel assembly? (04 Marks)
 b. Explain the steps involved in the design of slab thickness of rigid pavement as per IRC 58:2002. (06 Marks)
 c. The properties of the subgrade soil are given below:
 Passing 75 micron IS sieve = 80%
 Liquid limit = 58%
 Plasticity index = 25%
 Classify the soil by HRB system with group index value. (06 Marks)

Module-4

- 7 a. Write down the construction steps for wet mix macadam base course. (06 Marks)
 b. Explain in detail the requirements specifications of materials and the construction steps / methods for Bituminous Concrete [BC] layer. (06 Marks)
 c. Briefly explain the Rothfuch's method of proportioning of materials. (04 Marks)

OR

- 8 a. Explain in brief the construction of cement concrete pavements. (08 Marks)
 b. Explain in brief the specifications of materials for WBM pavement. (08 Marks)

Module-5

- 9 a. What are the requirements of highway drainage system? (04 Marks)
 b. Explain briefly the design of filter material used in subsurface drains. (08 Marks)
 c. Explain the cross drainage structures in brief. (04 Marks)

OR

- 10 a. Explain in brief any three methods of economic evaluation of highway projects. (06 Marks)
 b. Explain in brief the various factors affecting the vehicle operation cost. (06 Marks)
 c. Explain BOOT with respect to highway financing. (04 Marks)

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Sixth Semester B.E. Degree Examination, Dec.2019/Jan.2020 Water Supply and Treatment Engineering

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Explain the need and importance of protected water supply to a community. (05 Marks)
- b. Explain briefly different types of water demand. (05 Marks)
- c. Briefly explain :
 - (i) Factors affecting per capita demand of water.
 - (ii) Factors affecting design period (06 Marks)

OR

- 2 a. List different methods of populations forecasting. Explain briefly any two methods. (08 Marks)
- b. The population census of a city is as shown in the following table. Estimate the expected population of the city by 2041 using arithmetical increase method and geometrical increase method.

Year	1971	1981	1991	2001	2011
Population in lakhs	1.50	1.85	2.18	2.50	2.85

(08 Marks)

Module-2

- 3 a. What are the objectives of water treatment? Draw a flow chart of conventional water treatment plant and indicate various units. (08 Marks)
- b. Classify various sources of water and explain briefly their suitability with respect to quantity and quality for a town. (08 Marks)

OR

- 4 a. What is sampling of water? Discuss the objectives of sampling and preservative techniques. (06 Marks)
- b. Explain briefly physical, chemical and bacteriological water quality characteristics. (06 Marks)
- c. Give the maximum permissible limits as per the BIS for the following water quality parameters:

(i) Total hardness	(ii) Fluoride	(iii) Nitrate	(iv) Iron.
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 (04 Marks)

Module-3

- 5 a. What is Sedimentation process? With the help of sketch of an ideal settling tank, show that the efficiency of the settling tank is independent of its depth. (05 Marks)
- b. Design a set of here circular settling tanks to handle 6 million litres of water per day. Take detention time as 4 hours and side water depth as 3m. Check for the design and sketch the designed tank. (06 Marks)
- c. What is coagulation of water? Estimate the quantity of alum required per month at a treatment plant to treat 10 MLD of water with alum dosage of 20 mg/l. (05 Marks)

OR

- 6 a. Briefly explain the mechanism of filtration. (04 Marks)
- b. With the help of a sketch explain the working of a rapid sand filter. (06 Marks)

1 of 2

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

- c. Design a set of Ten slow sand filter units to treat water for a town of 2 lakh population with assured water supply of 135 lpcd and maximum daily water is 1.5 times the average demand. The rate of filtration is 200 litres per square metre per hour (06 Marks)

Module-4

- 7 a. What are the objectives of water softening? Give a comparison of Lime - Soda process with Zeolite process of water softening. (05 Marks)
- b. A river was proposed as the raw water source for a near by town. Chemical analysis of the water indicates the constitutes as given below. If the hardness of water supplied to the residents is to be limited to 160 mg/ℓ, determine the need of softening if any.
- | | |
|---|----------------------------|
| Zn = 4 mg/ℓ | Na ⁺ = 18 mg/ℓ |
| Cl ⁻ = 68 mg/ℓ | Mg ²⁺ = 16 mg/ℓ |
| SO ₄ ²⁻ = 20 mg/ℓ | Ca ²⁺ = 60 mg/ℓ |
| Turbidity = 45 mg/ℓ | Alkalinity = 45 mg/ℓ |
- Given equivalent weight of Ca²⁺ = 20; Mg²⁺ = 12.2 and CaCO₃ = 50. (05 Marks)
- c. Estimate the quantity of Zeolite required to soften 2 MLD of water with hardness 360 mg/ℓ which should be reduced to 60 mg/ℓ. The interval between successive regeneration is 4 hours and the capacity of exchanger is 24000 grams/cu.m. (06 Marks)

OR

- 8 a. What is disinfection of water? What are the requirements of a good disinfectant? (04 Marks)
- b. A college hostel having 500 students used well water for drinking. The rate of water supply is 120 lpcd. The water is to be disinfected using bleaching powder containing 25% chlorine available. Determine the monthly requirement of the bleaching powder with the following data:
- (i) Chlorine demand of well water = 1.2 mg/ℓ
- (ii) residual Chlorine expected = 0.2 mg/ℓ (06 Marks)
- c. Write a note on : (i) Fluoridation (ii) De-fluoridation (06 Marks)

Module-5

- 9 a. What are intake works? What are the factors to be considered for selection of site intake structures? (05 Marks)
- b. Write a note on : (i) Pumps and their types (ii) Pipe materials and pipe appurtenances (06 Marks)
- c. A town with prospective population of 80,000 is to be supplied with water from a river 5 km away and 25m below the level of the town. Design the economical section of the rising main and pumping unit where power is available. Take water supply rate as 150 lpcd and $f = 0.01$. Assume other relevant details if required. Given pumping hours = 12/day. (05 Marks)

OR

- 10 a. Explain the various methods of water distribution system. (05 Marks)
- b. For the water supply of a small rural town with the population of 10,000 with the rate of water supply as 100 lpcd. It is proposed to construct a distributing reservoir. The pattern of draw off is as under.
- | | | | |
|---------------|-------|-----|----------------|
| 5 am to 10 am | | 75% | of days supply |
| 10 am to 4 pm | | 10% | - " - |
| 4 pm to 9 pm | | 13% | - " - |
| 9 pm to 5 am | | 2% | - " - |
- The pumping is to be done for 8 hrs per day (8 am to 4 pm). Determine the storage capacity of the reservoir. (06 Marks)
- c. Write a note on different types of water distribution reservoir. (05 Marks)

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CBCS SCHEME

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15CV661

Sixth Semester B.E. Degree Examination, Dec.2019/Jan.2020

Water Resources Management

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Explain Hydrologic cycle, with a neat sketch. (08 Marks)
b. Explain briefly Indian Water Resources. (08 Marks)

OR

- 2 a. What is meant by Water scarcity? Discuss reasons for water scarcity problems. (08 Marks)
b. Explain different types of aquifers. Also explain the different water bearing formations. (08 Marks)

Module-2

- 3 a. State the necessity of Water Resources Planning and Management. (08 Marks)
b. Explain system components used in Water Resource Planning. (08 Marks)

OR

- 4 a. Discuss Planning and Management aspects. (08 Marks)
b. Explain approaches used in Water Resource Planning. (04 Marks)
c. Explain Post Planning and Management Issues. (04 Marks)

Module-3

- 5 a. Define IWRM. Mention Dublin principles of IWRM. (08 Marks)
b. Explain process of Implementation of IWRM. (08 Marks)

OR

- 6 a. Explain Legislative and Organizational Frame work in IWRM. (08 Marks)
b. Discuss types and forms of Private Sector involvement in IWRM. (08 Marks)

Module-4

- 7 a. What is meant by Water Governance? State the need of Water Governance. (08 Marks)
b. Mention the necessity of National Water Law. (08 Marks)

OR

- 8 a. Explain salient features of National Water Policy 2012. (08 Marks)
b. Explain Irrigation Management Transfer policies and activities. (08 Marks)

Module-5

- 9 a. Explain briefly any two Rain water Harvesting Techniques. (08 Marks)
b. Explain Micro – Catchments Rain water Harvesting. (08 Marks)

OR

- 10 a. Explain design steps for percolation Tank in RWH. (08 Marks)
b. List and explain the factors influencing Yield from a catchment. (08 Marks)

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Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

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Fifth Semester B.E. Degree Examination, Aug./Sept.2020 Design of RC Structural Elements

Time: 3 hrs.

Max. Marks: 100

- Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. Use of IS456:2000 and SP-16 is permitted.
3. Assume missing data if any suitably.*

Module-1

- 1 a. Explain the philosophy and principles of limit state design method. (08 Marks)
b. What is stress block? Derive from fundamentals the expression for area of stress block $0.36f_{ck}$ and depth of center of compressive force from the extreme fiber in compression $0.42x_u$. (12 Marks)

OR

- 2 a. Explain the following:
i) Characteristic load
ii) Characteristic strength
iii) Partial safety factor. (06 Marks)
b. A rectangular section 200×450 mm is reinforced with 3 number 16mm diameter bars at an effective depth 420mm. The beam has 2 hanger bars of 12mm diameter. With effective span 5m. The beam support a load of 10kN/m. Calculate short term deflection and long term deflection using M₂₀ grade concrete and Fe415 grade steel. (14 Marks)

Module-2

- 3 a. Define singly and doubly reinforced beams. List the situations when they are adopted. (06 Marks)
b. A rectangular section of effective size 230mm \times 500mm is used as simply supported beam for an effective span of 6.3m. What is the maximum total udl allowed on the beam if maximum percentage of steel is provided on tension side. Use M₂₅ grade concrete and Fe415 steel. Take effective cover = 50mm. (14 Marks)

OR

- 4 a. A rectangular section of size 250mm \times 500mm is reinforced with 4 number 16mm diameter bars. With an effective cover 50mm and effective span 6m. Using M20 grade concrete and Fe415 steel calculate moment of resistance and central concentrated load that can be carried by beam in addition to its self weight. (12 Marks)
b. An isolated T-beam, simply supported over a span of 6m has following dimensions: Width of flange 750mm, thickness of flange 125mm, overall depth 400mm, width of web 260mm, effective cover to tensile reinforcement 40mm. The beam is reinforced with 4 bars of 20mm diameter. Determine the moment of resistance if Fe415 bars are used. Take $\sigma_{cbc} = 5\text{N/mm}^2$ and $m = 19$. (08 Marks)

Module-3

- 5 A simply supported RC beam supports a service load of 8kN/m over an clear span 3m. Support width is 200mm. Using M20 grade concrete and Fe415 steel. Design the beam for flexure and shear. Sketch the reinforcement details. (20 Marks)

1 of 2

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and/or equations written, eg, 42+8 = 50, will be treated as malpractice.

OR

- 6 A cantilever beam of span 4m carries a factored load 40kN/m. Take width of beam as 230mm. Design the beam for flexure and shear. Sketch the reinforcement details. Use M₂₀ grade concrete and Fe415 steel. (20 Marks)

Module-4

- 7 Design a cantilever Portico slab projecting 1.5m from the beam supporting a live load of 3kN/m². Adopt M₂₀ grade concrete and Fe415 steel. Sketch the reinforcement details. (20 Marks)

OR

- 8 Design a dog legged stair case of a private building hall measuring 2.2m × 4.7m. Width of landing is 1.1m. The distance between floor to floor is 3.3m. Take rise = 150mm and thread = 270mm, weight of floor finish = 1kN/m². Adopt M₂₀ grade concrete and Fe415 steel take live load = 3kN/m². Assume wall thickness of 230mm which supports the stairs at the end of outer edges of landing slabs. Sketch the reinforcement details. (20 Marks)

Module-5

- 9 Design an RCC column 400mm × 400mm to carry on ultimate load of 1000kN at an eccentricity of 160mm. Using M₂₅ grade concrete and Fe415 steel. Sketch the reinforcement details. (20 Marks)

OR

- 10 A square column of 400mm sides carries a load of 900kN. Design the footing for an SBC of soil 100kN/m². Show the check for one way shear, two way shear and bond strength. Adopt M₂₀ grade concrete and Fe415 grade steel. Sketch the reinforcement details. (20 Marks)

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Fifth Semester B.E. Degree Examination, Aug./Sept.2020 Analysis of Indeterminate Structures

Time: 3 hrs.

Max. Marks: 100

- Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. Assume missing data suitably.*

Module-1

- 1 Analyze the continuous beam shown in Fig.Q.1 by slope deflection method BMD, SFD and elastic curve. (20 Marks)

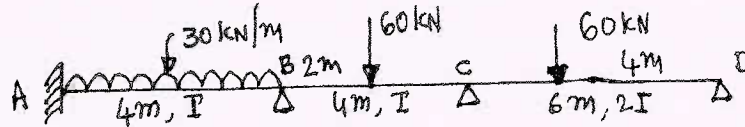


Fig.Q.1

OR

- 2 Analyze the Frame shown in Fig.Q.2 by slope deflection method. Draw BMD and elastic curve. (20 Marks)

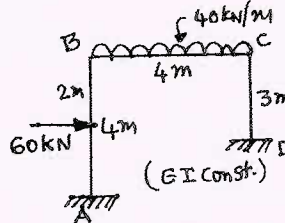


Fig.Q.2

Module-2

- 3 Analyze the continuous beam shown in Fig.Q.3. Using moment distribution method. Draw BMD, SFD and EC if support A yields by 0.002 radians in clockwise direction, support B sinks by 30mm and support 'C' sink by 20mm. Take $EI = 480\text{kN}\cdot\text{m}^2$. (20 Marks)

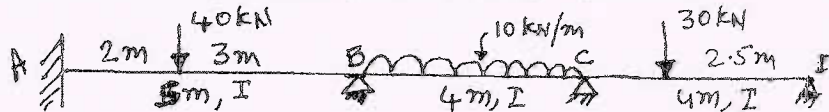


Fig.Q.3

OR

- 4 Analyze the frame shown in Fig.Q.4 by MD method and draw BMD and EC. (20 Marks)

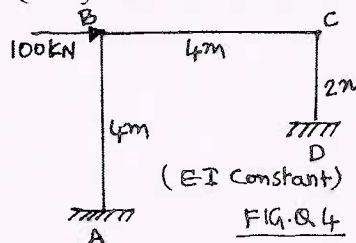


Fig.Q.4

Module-3

- 5 Analyze the frame shown in Fig.Q.5 using Kani's method. Draw BMD and EC. (20 Marks)

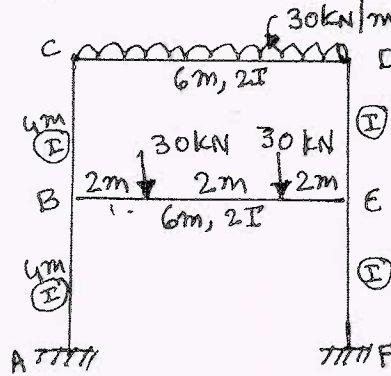


Fig.Q.5

OR

- 6 Analyze the frame shown in Fig.Q.6 by using Kani's method. Draw BMD. (20 Marks)

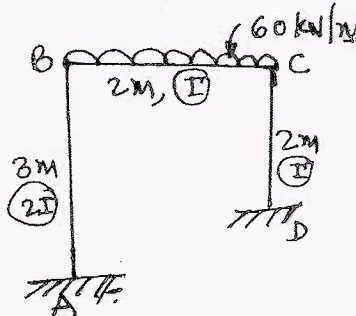


Fig.Q.6

Module-4

- 7 Analyze the continuous beam shown in Fig.Q.7 using flexibility matrix method. Draw BMD and SFD. (20 Marks)

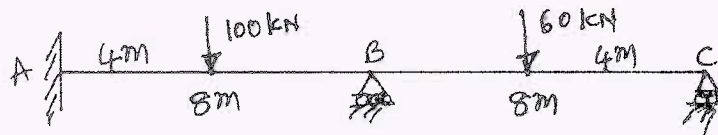


Fig.Q.7

OR

- 8 Analyze the frame shown in Fig.Q.8 by using flexibility matrix method. Draw BMD. (20 Marks)

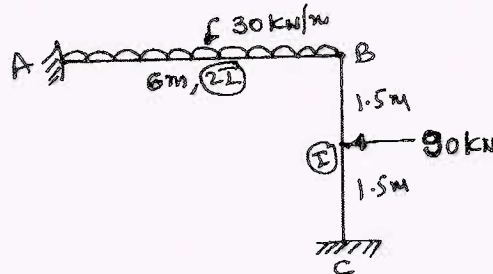


Fig.Q.8

Module-5

- 9 Analyze the truss shown in Fig.Q.9 using stiffness matrix method. It cross sectional areas of vertical member 300mm^2 and inclined members area 200mm^2 . Take $E = 2 \times 10^5 \text{N/mm}^2$.

(20 Marks)

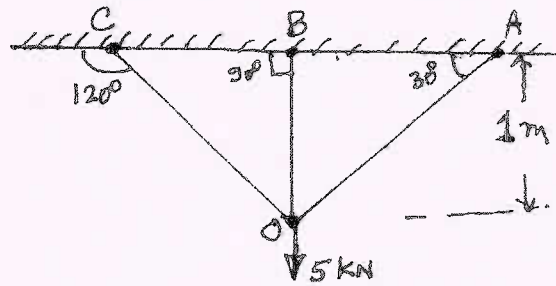


Fig.Q.9

OR

- 10 Analyze the Portal frame shown in Fig.Q.10 by using stiffness method. Draw BMD and EC.

(20 Marks)

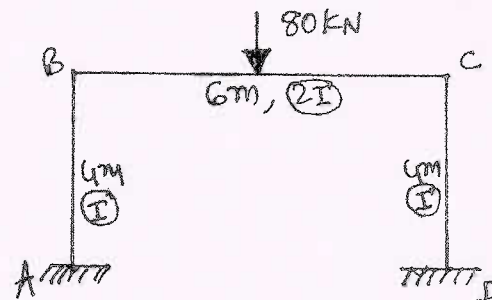


Fig.Q.10

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Fifth Semester B.E. Degree Examination, Aug./Sept.2020 Applied Geotechnical Engineering

Time: 3 hrs.

Max. Marks: 100

Note : 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. Use of IS 6403 is permitted.

Module-1

- 1 a. Discuss the necessity of sub soil exploration. Mention the stages involved in it. (06 Marks)
b. Explain the method of Seismic Refraction method. (08 Marks)
c. The field N value in a deposit of fully submerged fine sand was 40 at a depth of 6m. The average saturated unit weight of the soil is 19kN/m^3 . Calculate the corrected N value by applying corrections. (06 Marks)

OR

- 2 a. With the help of a neat sketch of soil sampler, define Area ratio, Inside clearance and outside clearance. State its permissible values for undisturbed sample. (08 Marks)
b. What are the methods available for dewatering? Explain anyone method. (07 Marks)
c. A soil sample was pushed into the soil for a depth of 600mm and length of the sample obtained was 590mm. What is Recovery ratio? What is the state of the sample? How can this be avoided? (05 Marks)

Module-2

- 3 a. Distinguish between Boussinesq's and Westergaard's theory of stress distribution. (06 Marks)
b. Explain the construction and use of Newmark's chart for determining stress distribution. (08 Marks)
c. A water tank is supported by a ring foundation having outer diameter of 10m and inner diameter of 7.5m. The ring foundation transmits uniform load intensity of 160 kN/m^2 . Compute the vertical stress induced at a depth of 4m, below the centre of ring foundation. Using i) Boussinesq's analysis ii) Westergaard's analysis. Take $\mu = 0$. (06 Marks)

OR

- 4 a. What are settlements? Explain the components of settlement and their determination. (08 Marks)
b. Write a note on Pressure bulb. (04 Marks)
c. A soft normally consolidated clay layer is 20m thick. The natural water content is 45%. The saturated unit weight is 20kN/m^3 . The grain specific gravity is 2.70 and liquid limit is 60%. The vertical stress increment at the centre of clay layer due to foundation load is 10kpa. The ground water level is at the surface of clay layer. Determine the settlement of foundation if the initial effective stress at the centre of the soil is 100kPa. Assume unit weight of water is 10kN/m^3 . (08 Marks)

Module-3

- 5 a. Differentiate between Rankine's and Coulomb's earth pressure theory. (06 Marks)
b. Describe Rebhan's graphical method for active earth pressure calculation. (06 Marks)
c. A retaining wall of 5.4m high, retains sand. In the loose state the sand has void ratio of 0.63 and $\phi = 27^\circ$, while in the dense state, the corresponding values of void ratio and ϕ are 0.36 and 45° respectively. Compare the values of active and passive earth pressure in both the states of soil. Assume $G = 2.64$, $\gamma_w = 10\text{kN/m}^3$. (08 Marks)

1 of 2

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and/or equations written eg, $42+8 = 50$, will be treated as malpractice.

OR

- 6 a. Explain the causes for a slope failure and list the modes of finite slope failure. (06 Marks)
 b. With the help of sketch, explain Swedish slip circle method of stability analysis for cohesive soil. (06 Marks)
 c. A new canal is excavated to a depth of 5m below ground level, through a soil having the characteristics $C = 14\text{kN/m}^2$; $\phi = 15^\circ$; $e = 0.8$ and $G = 2.70$. The slope of banks is 1:1. Calculate the factor of safety with respect to cohesion when canal runs full. If the canal suddenly emptied completely what will be the factor of safety. Take $S_n = 0.083$ for submerged case ; $S_n = 0.122$ for Drawdown case. (08 Marks)

Module-4

- 7 a. Define the terms : i) Ultimate bearing capacity ii) Safe bearing capacity
 iii) Net ultimate bearing capacity iv) Allowable bearing capacity. (08 Marks)
 b. A footing 3m square carries a gross pressure of 350kN/m^2 at a depth of 1.2m in sand, saturated unit weight of sand is 20kN/m^3 and unit weight above the water table is 17kN/m^3 . The effective angle of friction is 30° and the bearing capacity factors for $\phi' = 30^\circ$ are $N_q = 22$, $N_\gamma = 20$. Determine the factor of safety with respect to shear failure for the following cases i) Water table is 5m below the ground level.
 ii) Water table is 1.2m below the ground level. (12 Marks)

OR

- 8 a. With the help of neat sketch, differentiate General shear failure and Local shear failure , Punching shear failure. (08 Marks)
 b. A strip footing 2m wide carries a load intensity of 400kN/m^2 at a depth of 1.2m in sand. The saturated unit weight of sand is 19.5kN/m^3 and unit weight above water table is 16.8kN/m^3 . The share strength parameters are $C = 0$; $\phi = 35^\circ$. Determine the factors of safety with respect to shear failure for the following cases of location of Ground water table.
 i) Water table is 4m below ground level ii) Water table is 1.2m below ground level
 iii) Water table is 2.5m below ground level. For $\phi = 35^\circ$ consider $N_q = 41.4$; $N_\gamma = 42.4$. (12 Marks)

Module-5

- 9 a. What is Pile foundation? Explain the types of Pile foundation. (10 Marks)
 b. A square group of 9 piles was driven into soft clay extending to a large depth. The diameter and length of piles were 30cm and 9m respectively. If the unconfined compression strength of the clay is 90kN/m^2 and the pile spacing is 90cm centre to centre, what is the capacity of the group? Assume a factor of safety of 2.5 and adhesion factor of 0.75. (10 Marks)

OR

- 10 a. Which are the methods of finding load carrying capacity of pile? Explain any one method. (08 Marks)
 b. Write a note on Negative skin friction of Pile. (06 Marks)
 c. Define Under reamed piles : Under what circumstances it is employed and hence explain how the estimation of its design capacity is done. (06 Marks)

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Fifth Semester B.E. Degree Examination, Aug./Sept.2020 Air Pollution and Control

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Define Air Pollution. Explain different categories of air pollutants indicating their sources. (10 Marks)
b. What is Smog? Discuss its causes and effect. (10 Marks)

OR

- 2 a. Explain the following with respect to air pollution :
i) Point sources ii) Area sources iii) Line sources. (10 Marks)
b. Illustrate with sketch, the formation of photo chemical smog. (10 Marks)

Module-2

- 3 a. Explain the effects of air pollution on human health. (10 Marks)
b. Explain stable, unstable and inversion of the atmosphere. (10 Marks)

OR

- 4 a. Explain the various meteorological factors that influence air pollution. (10 Marks)
b. A large power plant has a 250m stack with inside radius 2m. The exit velocity of the stack gases is estimated at 15m/s at a temperature of 140°C. Ambient temperature is 25°C and winds at stack height are estimated to be 5m/s. Estimate the effective height of the stack if
i) the atmosphere is stable with temperature increasing at the rate of 2°C/km.
ii) the atmosphere is slightly unstable class C. (10 Marks)

Module-3

- 5 a. What is Isokinetic sampling? Explain preliminary considerations and stages of sampling. (10 Marks)
b. Explain the gravitational methods of estimating particulate matter. (10 Marks)

OR

- 6 a. Explain the procedure for the collection of suspended particulates by high volume samples. (10 Marks)
b. Enumerate various analytical methods available for monitoring air pollution. (10 Marks)

Module-4

- 7 a. With a neat sketch, explain the principle, construction and working of an electrostatic precipitator. (10 Marks)
b. A cement plant was emitting the gas at the rate of 19500m³/h. Assuming the inlet gas velocities of 1.8 m/s. Design a tubular ESP with 0.15 diameter with 7 cylinders to achieve the efficiency of 90% to 95%. (10 Marks)

OR

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and/or equations written eg. 42+8 = 50, will be treated as malpractice.

- 8 a. List the different types of scrubbers and with a neat sketch, explain any one of them. (10 Marks)
- b. Calculate the 50% cutoff diameter for particles of CaO suspended in an airstream at 100°C and at atmospheric pressure for a gravitational settling chamber is 1m/s. 50% cutoff diameter is defined as the particle diameter at which $\eta_g = 50\%$ (i.e 50% of the particles of this dia, are collected and 50% are lost). (10 Marks)

Module-5

- 9 a. Discuss the different control measures adopted to check the air pollutants emitted by automobiles. (10 Marks)
- b. List out the effects of noise pollution. Explain the control and preventive measures of noise pollution. (10 Marks)

OR

- 10 a. What is green house effect? Explain briefly the effect of green house on environment. (10 Marks)
- b. What is Acid rain? What are the causes for acid rain? Explain briefly the effects of acid rain on vegetation. (10 Marks)

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Fifth Semester B.E. Degree Examination, Aug./Sept. 2020 Traffic Engineering

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. List and explain Road our characteristics. (10 Marks)
 b. Discuss various urban traffic problems that India is facing and give some remedial measures for their problems. (10 Marks)

OR

- 2 a. Explain PIEV theory with neat sketch and reaction time of the driver. (10 Marks)
 b. A passenger car weighing 2 tonnes is required to accelerate at a rate of 3 m/sec^2 in the first gear from a speed of 10 kmph. The gradient is 1% and the road has black topped surface. The frontal projected area of car is 2 m^2 . The car tyres have radius of 0.33m. The rear axle gear ratio is 3.82 : 1 and the first gear ratio is 2.78 : 1. Calculate the engine horse power needed and speed of engine. Make suitable assumption. (10 Marks)

Module-2

- 3 a. Determine :
 i) The upper and lower speed limit
 ii) The design speed for the following spot speed studies data : (10 Marks)

Speed range (km ph)	Number of vehicles observed	Speed arrange (km ph)	Number of vehicles observed
0 to 10	12	50 to 60	255
10 to 20	18	60 to 70	119
20 to 30	68	70 to 80	43
30 to 40	89	80 to 90	33
40 to 50	204	90 to 100	09

- b. Explain the relationship between speed, density and flow. (10 Marks)

OR

- 4 a. Explain the various methods of conducting OD studies. (10 Marks)
 b. A vehicle of 2 to tones skids through a distances equal to 40m before colliding with another parked vehicle of weight 1 tonne. After collection both the vehicles skids through a distances equal to 12m before stopping. Compute the speeds of the vehicles before, after and at collision. (10 Marks)

Module-3

- 5 a. Design Rotary interaction element with neat sketch. (10 Marks)
 b. Explain the type of grade separated interchange with neat sketch. (10 Marks)

OR

- 6 a. The average normal flow of traffic on cross roads A and B during design period are 400 and 250 PCU per hour. The saturation flow values on these roads are estimated as 1250 and 1000 PCpU per hour respectively. The all red time required for pedestrian crossing is 12 sec. Design two phase traffic signal with pedestrian crossing by Webster's method. (10 Marks)

- b. Explain types of parking facility. (10 Marks)

Module-4

- 7 a. Explain the factors to be considered for design of road lighting. (10 Marks)
b. Explain the factor that causes accidents. (10 Marks)

OR

- 8 a. Explain the detrimental effect of traffic noise and also explain the technique available to control the traffic noise. (10 Marks)
b. Explain the various measures of decrease the accident rates. (10 Marks)

Module-5

- 9 a. Define Travel Demand Management (TDM) and explain management measures. (10 Marks)
b. Explain the type of traffic signs as per IRC. (10 Marks)

OR

- 10 Write a short note on :
a. Level of Service
b. Road Marking
c. Traffic volume
d. Congestion pricing. (20 Marks)

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15CV/CT51

Fifth Semester B.E. Degree Examination, Aug./Sept.2020 Design of RC Structural Elements

Time: 3 hrs.

Max. Marks: 80

- Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. Use of IS456-2000 and SP16 is permitted.*

Module-1

- 1 a. Explain balanced section, under reinforced section, and over reinforced section. (04 Marks)
b. Obtain an expression for stress block parameter compressive force C_u and its position $\bar{y} = 0.42 x_u$ from top. (08 Marks)
c. Obtain an expression for limiting percentage of steel and find limiting steel for M20 concrete and Fe415 steel. (04 Marks)

OR

- 2 a. Explain limit state of deflection and limit state of cracking. (04 Marks)
b. What are the factors and which influence deflection? (04 Marks)
c. Check the deflection requirement for the T beam continuous over 10m span having flange width 1200 mm web width 250mm and effective depth 400mm. Area of tension reinforcement 1500mm^2 area of compression reinforcement 960mm^2 . Adopt Fe415 steel. (08 Marks)

Module-2

- 3 a. A singly reinforced concrete beam 250 mm and 450mm deep up to centre of reinforcement is reinforced with 3-16mm dia effective cover 50mm, Effective span 6m. Determine central point load that can be applied in addition to self weight. Adopt M20 concrete and Fe500 steel. (08 Marks)
b. Find the steel for a rectangular beam $300 \times 700\text{mm}$ E.span 6m supporting a load of 80 kN/m. Adopt M20 concrete and Fe415 steel. (08 Marks)

OR

- 4 a. A doubly reinforced concrete beam having rectangular section $250\text{mm} \times 500\text{mm}$ is reinforced with 2-12 mm dia in compression 4-20 mm dia in tension. Effective cover 40 mm, Effective span 5 m. Find M_u . Adopt M20 concrete and Fe415 steel. (08 Marks)
b. A T beam having flange $1200\text{mm} \times 100\text{mm}$ web width 300 mm E.depth 550 mm, Area of tension steel 2280mm^2 . Find M_u . Adopt M20 concrete and Fe 500 steel. (08 Marks)

Module-3

- 5 Design a singly reinforced beam having effective span 7m to carry a live load of 20 kN/m for flexure and shear. Adopt M20 concrete and Fe415 steel. Also check the design for deflection and bond. (16 Marks)

OR

- 6 A hall $6\text{m} \times 16\text{m}$ supported by beam spaced 4m c/c slab thickness 120mm. Supporting a live load 4 kN/m^2 and finishing 1 kN/m^2 . Design interior T beam. Adopt M20 concrete and Fe415 steel. Assume bearing 500 mm. Overall depth limited to 450 mm. Take Effective cover 40mm. (16 Marks)

Module-4

- 7 Design a slab over a room $5.5\text{m} \times 4\text{m}$. Supporting a live load 4 kN/m^2 . Floor finishing 1.0 kN/m^2 . Design the slab if edges are restrained. Adopted M15 concrete and Fe415 steel. (16 Marks)

OR

- 8 The main stair of an office building has to be located in a stair case measuring $3.5\text{m} \times 5.5\text{m}$. Distance between the floor 3.75m . Design the stair. Live load 3 kN/m^2 . Adopt M20 concrete and Fe415 steel. (16 Marks)

Module-5

- 9 a. Design a column to support an ultimate load 1800 kN . Effective length of column 1.85m adopt M20 concrete Fe415 steel. (08 Marks)
b. A column $300 \times 500\text{ mm}$ supporting an ultimate load 1000 kN . $M_u = 25\text{ kNm}$. Find steel Adopt M20 concrete, Fe415 steel. Take cover 50mm . (08 Marks)

OR

- 10 Design a flat square footing to carry a column load 1000 kN column size $400 \times 400\text{mm}$ SBC of soil 100 kN/m^2 . Adopt M20 concrete, Fe415 steel. Show by calculation one way shear check, two way shear bond check and transfer of load at column base. (16 Marks)

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CBCS SCHEME

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15CV52

Fifth Semester B.E. Degree Examination, Aug./Sept.2020

Analysis of Indeterminate Structures

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 Analyze the continuous beam shown in Fig.Q1 by slope deflection method and sketch BMD.

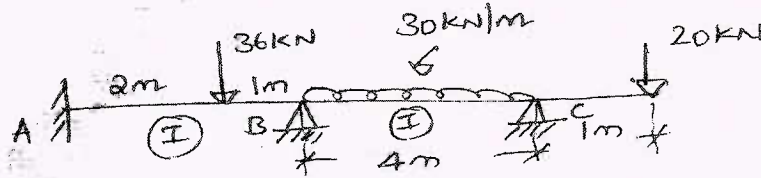


Fig.Q1

(16 Marks)

OR

- 2 Analyze the rigid plane frame shown in Fig.Q2 by slope deflection method and draw BMD.

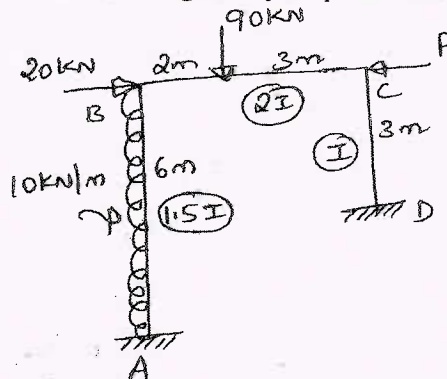


Fig.Q2

(16 Marks)

Module-2

- 3 Determine the moments for the given continuous beam shown in Fig.Q3 by moment distribution method. Sketch BMD.

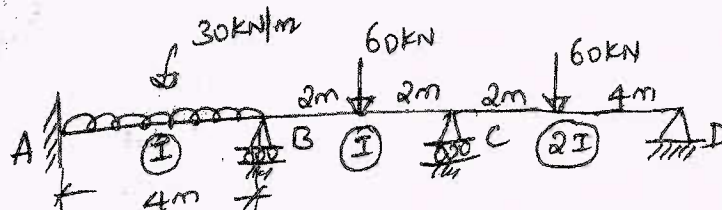


Fig.Q3

(16 Marks)

OR

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and/or equations written eg, 42+8 = 50, will be treated as malpractice.

- 4 Analyze the given frame shown in Fig.Q4 by moment distribution method. Sketch BMD.

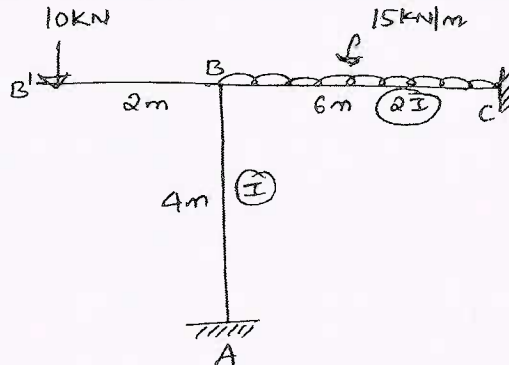


Fig.Q4

(16 Marks)

Module-3

- 5 Analyze the beam shown in Fig.Q5 by Kani's method. Draw BMD.

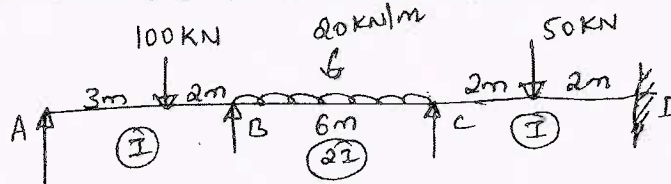


Fig.Q5

(16 Marks)

OR

- 6 Analyze the given frame shown in Fig.Q6 using Kani's method. Draw BMD.

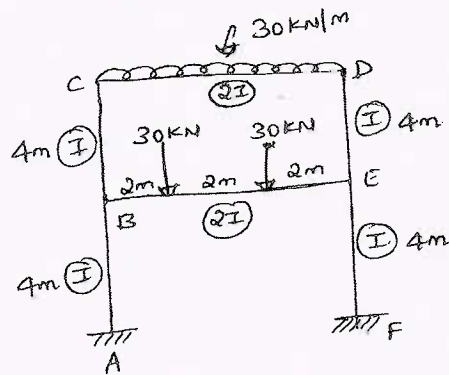


Fig.Q6

(16 Marks)

Module-4

- 7 Analyze the frame shown in Fig.Q7 and sketch BMD. Use flexibility method.

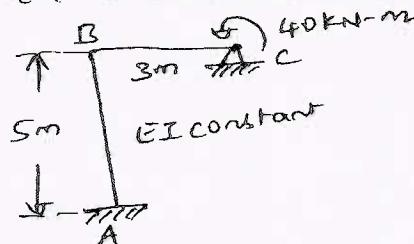


Fig.Q7

(16 Marks)

OR

- 8 Using the flexibility method, analyze the pin-jointer frame in Fig.Q8. The cross-sectional areas A and E for all members is same.

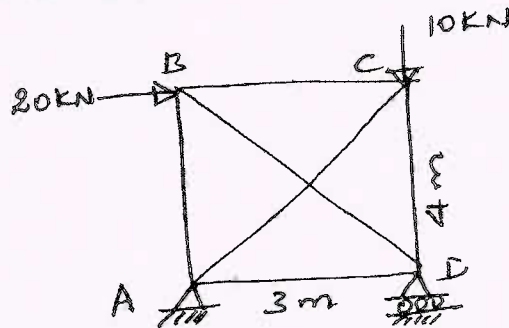


Fig.Q8

(16 Marks)

Module-5

- 9 Using displacement method, analyze the continuous beam shown in Fig.Q9 and sketch BMD.

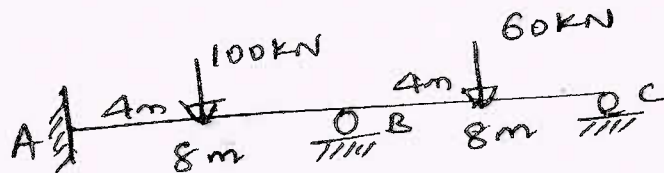


Fig.Q9

(16 Marks)

OR

- 10 Analyze the frame shown in Fig.Q10 by stiffness method.

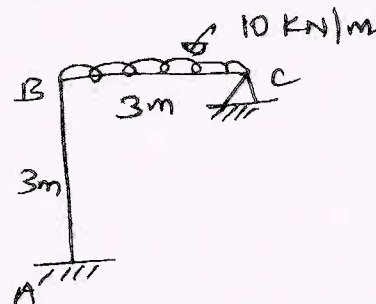


Fig.Q10

(16 Marks)

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Fifth Semester B.E. Degree Examination, Aug./Sept.2020 Applied Geotechnical Engineering

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. With a neat sketch of a soil sampler, define i) Area ratio ii) Inside clearance
iii) Outside clearance iv) Recovery ratio. (06 Marks)
b. Briefly explain wash boring method of making boreholes, with a neat sketch. (05 Marks)
c. Discuss the Electrical Resistivity method of soil exploration. (05 Marks)

OR

- 2 a. List the various methods of dewatering during excavations. Explain Electro – Osmotic method of dewatering with a sketch. (08 Marks)
b. Estimate the ground water table for the following data. Depth up to which water is bailed out is 18 meters. Water rise on first day = 0.95m, Second day = 0.86m and Third day = 0.78m. Use Hvorselev's method. (08 Marks)

Module-2

- 3 a. Derive the equation for vertical stress below the centre of a circular area with uniform load intensity 'q'. (08 Marks)
b. A point load of 500kN acts on the ground surface. Calculate the vertical pressures at a point 5m directly below the load and at a distance of 4m from the axis of loading. Assume $\mu = 0$. Use i) Bousinesq's analysis ii) Westergaard's analysis. (08 Marks)

OR

- 4 a. Explain the components of total settlement. (06 Marks)
b. A square footing of sides 2m is founded at a depth of 1.5m below ground level carrying a load of 600kN. The soil below the foundation upto 4m depth is fully saturated clay with $r_{sat} = 20\text{kN/m}^3$, Liquid limit = 35%, Natural water content = 15%, $G = 2.6$. The soil above the base of footing is sandy soil with $r = 16\text{kN/m}^3$. Calculate the primary consolidation settlement assuming load dispersion at 2V : 1H. (10 Marks)

Module-3

- 5 a. Describe Rehmann's graphical method of determining the active earth pressure on a retaining wall. (08 Marks)
b. A vertical smooth wall 6m high retains cohesionless soil with $\phi = 30^\circ$, $G = 2.65$ and $e = 0.8$. Water table is at a depth of 2m from top. A uniform surcharge of 40kN/m^2 is applied on top of backfill surface. Assume soil above water table is dry. Draw active earth pressure diagram and obtain the magnitude and location of active earth pressure using Rankine's theory. (08 Marks)

OR

- 6 a. Explain the causes for slope failure with sketches. Explain Swedish circle method of slices of stability analysis for slopes. (10 Marks)
b. An embankment is inclined at an angle of 35° and its height is 15m. The angle of internal friction is 15° and the cohesion is 200kN/m^2 . $r = 18\text{kN/m}^3$. Find the factor of safety with respect to cohesion, if $S_n = 0.06$. (06 Marks)

Module-4

- 7 a. Explain the types of shear failures with neat sketch. (06 Marks)
- b. A strip footing 2m wide carries a load intensity of 400kN/m^2 at a depth of 1.2m in sand. r_{sat} of sand is 19.5kN/m^3 and r above water table is 16.8kN/m^3 and $\phi = 35^\circ$. Using Terzaghi's analysis, determine factor of safety with respect to shear failure for the following locations of water table. Take $N_q = 41.4$, $N_r = 42.4$, $C = 0$.
- Water table 4m below ground level.
 - Water table 1.2m below ground level.
 - Water table at ground level.
- (10 Marks)

OR

- 8 a. Explain plate load test with neat sketch to determine the bearing capacity of soils. (08 Marks)
- b. Design a square footing located at a depth of 1.3m below ground level, which carries a safe load of 800kN. The desired factor of safety is 3. Use Terzaghi's analysis for general shear failure. Take $C = 8\text{kN/m}^2$, $N_c = 37.2$, $N_q = 22.5$, $N_r = 19.7$, $r = 18\text{kN/m}^3$. (08 Marks)

Module-5

- 9 a. Explain the classification of piles based on function and based on materials. (08 Marks)
- b. A reinforced concrete pile weighing 30kN (inclusive of helmet and dolly) is driven by a drop hammer weighing 40kN and having an effective fall of 0.8m. The average set per blow is 1.4cm. The total temporary elastic compression is 1.8cm. Assuming the coefficient of restitution as 0.25 and a factor of safety of 2, determine the ultimate bearing capacity and the allowable load for the pile. (08 Marks)

OR

- 10 a. Explain the term 'negative skin friction'. (06 Marks)
- b. In a 16 pile group, the pile diameter is 45cm and centre to centre spacing of the square group is 1.5m. If $C = 50\text{kN/m}^2$, determine whether the failure would occur with the pile acting individually or as a group? Neglect bearing at the tip of the pile. All piles are 10m long. Take $m = 0.7$ for shear mobilization around each pile. (10 Marks)

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CBCS SCHEME

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15CV561

Fifth Semester B.E. Degree Examination, Aug./Sept.2020 Traffic Engineering

Time: 3 hrs.

Max. Marks: 80

*Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. Missing data, if any, can be assumed suitably.*

Module-1

- 1 a. Explain in detail, the various aspects of human vision which affect the road users. (05 Marks)
b. List the various urban traffic and transport problems in India. (06 Marks)
c. Write a note on sustainable approach for land use, transport and model integration. (05 Marks)

OR

- 2 a. Explain PIEV theory, with a neat sketch and standards. (05 Marks)
b. A vehicle is accelerating on a gradient of 1.5 percent, upwards, with a rate of 0.8m/s^2 , from initial speed of 15 to 25 kmph. Calculate the various resistances encountered by the vehicle and the horse power required, using the following data:
Mass of the vehicle = 1500kg
Coefficient for rolling resistance = 0.02
Frontal area of vehicle = 3.5m^2
Coefficient of air resistance = 0.40kg/m^3 . (06 Marks)
c. Explain the relationship between various flow parameters, speed, density and volume with neat sketches. (05 Marks)

Module-2

- 3 a. In a moving car observer method of speed and delay on a stretch of a road 1km long, six runs were made each in up and down directions and the average values are given below: Calculate the flow in PCU/hour in both directions and also the journey speed and running speed.

Direction	Journey time (min)	Stopped time (min)	Opposing traffic	Overtaking vehicles	Overtaken vehicles
up	1.0	0.10	30	1.5	1.0
down	1.2	0.12	20	1.8	0.8

(06 Marks)

- b. Write a note on application of statistical methods in traffic studies. (05 Marks)
c. With the help of neat sketches, explain the various methods of presenting traffic volume studies data collected. (05 Marks)

OR

- 4 a. Explain condition and collision diagram with neat sketches. (05 Marks)
b. List the various methods of parking studies and explain any one method, in detail. (05 Marks)

- c. The field data collected through a field study is summarized in table below. Find out:
 i) Median speed ii) Modal speed iii) Speed limits for traffic regulation iv) Speed limit for geometric design. (06 Marks)

Speed range, kmph	Number of vehicles observed
10 – 14.99	3
15 – 19.99	10
20 – 24.99	21
25 – 29.99	31
30 – 34.99	54
35 – 39.99	43
40 – 44.99	21
45 – 49.99	10
50 – 54.99	5
55 – 59.99	2

Module-3

- 5 a. List and explain any six design elements to be provided in a Rotary Intersection. (06 Marks)
 b. Explain the role and requirements of a traffic engineer. (05 Marks)
 c. Explain, in detail the need for Traffic forecasting and various, types of Traffic forecasting, with neat sketches. (05 Marks)

OR

- 6 a. The saturation flow and normal traffic volumes on North, South, East and West approaches of a four legged intersection are given below:

	North	South	East	West
Normal traffic volume PCU/hr	500	400	300	250
Saturation flow, in PCU/hr	1500	1200	1200	1250

- Assume inter-green period as 8 seconds between each phase and red or red-amber shows simultaneously and they lost time delay due to starting on each phase is 2 seconds. Determine the optimum cycle time for a two phase signal and distribution of green time on NS and EW approaches by using Webster's method. (06 Marks)
 b. Explain the classification of Intersections at grade, in detail. (05 Marks)
 c. Explain the various functions of i) Traffic signs ii) Pavement or Road markings. (05 Marks)

Module-4

- 7 a. List and explain the various causes of road accidents. (05 Marks)
 b. Explain the various approaches or measures to be taken to reduce the noise pollution. (06 Marks)
 c. Explain the various measures to be taken for promotion of non-motorized transport. (05 Marks)

OR

- 8 a. List and explain the various detrimental effects of traffic on the environments. (05 Marks)
 b. Explain various factors to be considered in the design of road lighting. (05 Marks)
 c. Explain the various measures to be taken to reduce the rate of accidents. (06 Marks)

Module-5

- 9 a. Explain the various traffic segregation techniques, in detail. (05 Marks)
 b. Explain the direct and indirect methods of traffic restraint, in detail. (05 Marks)
 c. Explain the role of intelligent transport system in management, enforcement of traffic. (06 Marks)

OR

- 10 a. Write a note on Area Traffic Control, in detail. (06 Marks)
 b. What are the various Traffic regulations required for safe Traffic operation. (05 Marks)
 c. Explain the various effects of congestion related to Traffic. (05 Marks)

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Sixth Semester B.E. Degree Examination, Aug./Sept.2020 Design of Steel Structural Elements

Time: 3 hrs.

Max. Marks: 80

- Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. Use of IS-800-2007, SP(6)-1 or steel table is permitted.*

Module-1

- 1 a. What are the advantages and disadvantages of steel structures? (08 Marks)
- b. Explain limit state of strength and limit state of serviceability. (08 Marks)

OR

- 2 a. State upper bound, lower bound and uniqueness theorems. (06 Marks)
- b. A propped cantilever ABCD is loaded as shown in Fig.Q.2(b). Find the collapse load if the beam is of uniform cross section. (10 Marks)

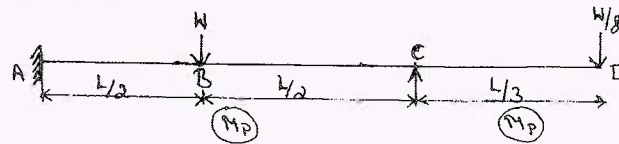


Fig.Q.2(b)

Module-2

- 3 a. Explain the phenomenon of load transfer in high strength friction grip bolts. (06 Marks)
- b. A double cover butt joint is used to connect two flats 200 ISF 10 with 8mm cover plates. The two plates are connected by 9 bolts in chain bolting at a pitch of 60mm and edge distance of 40mm. The bolts are arranged in 3 rows with 3 bolts in each row as shown in the Fig.Q.3(b). Determine the strength and efficiency of the joint. The diameter of the bolts used is 20mm. Assume grade of bolt as 4.6. (Assume both thread and shank to interfere the shear plane). (10 Marks)

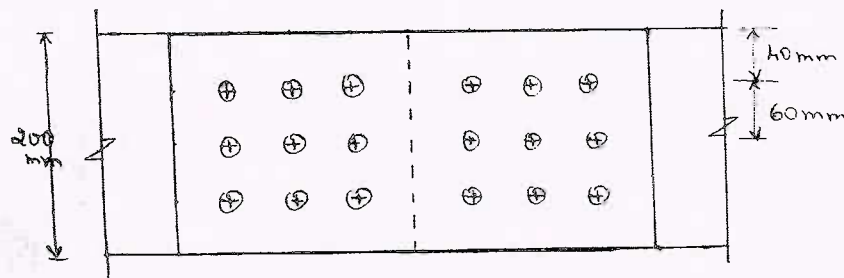


Fig.Q.3(b)

OR

- 4 a. Write the advantages of welded connections over bolted connections. (06 Marks)
- b. A tie member consisting of an ISA 80 × 50 × 8mm (Fe 410 grade steel) is welded to a 12mm thick gusset plate at site. Considering the size of weld as 6mm, find the length of weld required to transmit load equal to design strength of the member. (10 Marks)

Module-3

- 5 a. Determine the design strength of ISHB300@ 0.588kN/m, used as stanchion. Effective length of stanchion is 3.0m. (04 Marks)
- b. Design a compression member of a roof truss to carry an axial load of 150kN. Design the member using a single unequal angle and the corresponding connections to a gusset plate using 20mm diameter bolts of grade 4.6 grade, connecting the longer legs to the gusset plate of 8mm thick. Take effective length of the member as 2.5m. (12 Marks)

OR

- 6 The axial load on a steel column is 2000kN. The column of length 5m is effectively held in position at both ends and restrained in direction at the end. Design a suitable built-up column made of 2 I-sections spaced apart, adopting a single lacing system. Consider permissible stress (f_{cd}) = 180N/mm². (16 Marks)

Module-4

- 7 a. Explain: i) Lug angles ii) Shear Lag. (06 Marks)
- b. Determine the design tensile strength of the plate 200 × 10mm with bolts as shown in Fig.Q.7(b). The yield and ultimate strengths of steel are 250MPa and 410MPa respectively. The diameter of bolt used is 20mm. (10 Marks)

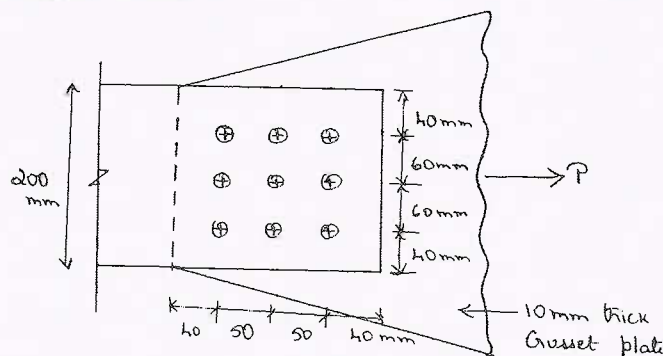


Fig.Q.7(b)

OR

- 8 a. With the help of neat sketches, explain the different types of column bases. (06 Marks)
- b. Design a suitable slab base for a column carrying an axial load of 800kN. The section of the column is built up by ISHB250 @ 54.7 kg/m and 2 plates 300mm × 10mm one on each flange of the joint section. The bearing capacity of the soil is 250 kN/m². Consider grade of concrete as M20, thickness of weld as 8mm and bearing strength of concrete as 9N/mm². (10 Marks)

Module-5

- 9 a. Explain the factors affecting the lateral stability of beams. (08 Marks)
- b. Calculate the moment and shear capacity of a laterally restrained beam ISLB350 @ 0.486kN/m. (08 Marks)

OR

- 10 a. Write a note on the ways to connect a beam and a column. (04 Marks)
- b. Check the adequacy of a laterally restrained cantilever beam ISMB 550@ 1.037 kN/m to withstand a moment of 562.5 kN-m and shear force of 225kN, performing all checks necessary for design of a beam. (12 Marks)

CBCS SCHEME

USN

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15CV64

Sixth Semester B.E. Degree Examination, Aug./Sept.2020 Water Supply and Treatment Engineering

Time: 3 hrs.

Max. Marks: 80

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. Draw neat sketches wherever necessary.

Module-1

- 1 a. Discuss the need for a protected water supply. (06 Marks)
b. List the various types of water demand and explain any four only. (10 Marks)

OR

- 2 a. Explain the term "Design Period" and factors affecting the same. (06 Marks)
b. The census record of a town shown population of 50000, 110000 and 160000 for the years 1971, 1991, 2011 respectively. Estimate
i) Saturation population and
ii) Expected population in 2031. Use Logistic curve method. (06 Marks)
c. Explain the term variations in demand of water. (04 Marks)

Module-2

- 3 a. Draw a neat treatment flow chart for a river source drawn from a balancing reservoir and explain the significance of each unit operation or process. (10 Marks)
b. Explain the term surface and sub – surface sources. (06 Marks)

OR

- 4 a. Explain the grab sampling and composite sampling techniques for water. (04 Marks)
b. Discuss the terms Palatability and Wholesomeness of water. (04 Marks)
c. Give the permissible limits (as per IS 10500 : 1991) and ill effects caused if exceeded (for any eight parameters only) in water used for drinking purpose. (08 Marks)

Module-3

- 5 a. Explain the term plain sedimentation and sedimentation aided with coagulation. (08 Marks)
b. A settling tank with a continuous flow regime is 3m deep and 60m long. Determine the velocity of water to be maintained for effective removal of particles for the following data :
Diameter of particle = 0.025mm ; Sp. gr. Of particles = 2.65 ;
Kinematic viscosity of water at 25°C = 0.01 cm²/sec. (08 Marks)

OR

- 6 a. Explain the theory of Filtration. (04 Marks)
b. Discuss the types of filters used and their classification. (06 Marks)
c. Design a rapid sand filter unit for 4 MLD water supply.
Assume 4% filtered water for washing every day.
Rate of filtration = 5000 litres/hr/m².
Length of filter bed = 1.5 × width.
30 minutes are lost every day for washing filter. (06 Marks)

Module-4

- 7 a. Give the comparison between Lime soda process and Zeolite process of softening water. (10 Marks)
 b. Explain briefly with a neat sketch, the principle showing Reverse Osmosis. (06 Marks)

OR

- 8 a. Discuss the emphasis on treatment of water for community bathing during a fair. (06 Marks)
 b. Explain briefly available technologies for Defluoridation of water. (06 Marks)
 c. Write a note on waterborne diseases and their prevention. (04 Marks)

Module-5

- 9 a. Define the term intake structures and illustrate with neat sketches river intake. (06 Marks)
 b. Obtain the size of the "Main" and BHP of pump required for following data :
 Population of Town = One Lakh ; Per capita demand = 150 Lpcd ;
 Length of pipe = 1800 m ; RL of sump = 100.00 ;
 RL of service reservoir = 136.00 ; Maximum demand = $1.8 \times$ Average demand
 Working hour of pumps = 12 hours ; Flow velocity, through pipe = 1.5 m/s
 Hazen William's coefficient = $C_H = 120$ for material of pipe. (10 Marks)

OR

- 10 a. Explain the different pipe materials used in water supply scheme along with advantages and disadvantages. (08 Marks)
 b. Explain methods of Distribution system. (08 Marks)

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Sixth Semester B.E. Degree Examination, Aug./Sept.2020 Water Resources Management

Time: 3 hrs.

Max. Marks: 80

Note : 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. Missing data if any may be assumed suitably.

Module-1

- 1 a. Explain Hydrological cycle with sketch. (08 Marks)
b. What are the types of aquifers? Explain with neat sketch. (08 Marks)

OR

- 2 a. Discuss the global water budget and India's water budget. (08 Marks)
b. With a sketch, explain different types of aquifers. (08 Marks)

Module-2

- 3 a. Narrate the necessity of Water Resources Planning and Management. (08 Marks)
b. Explain the integrated adaptive policies of Water Resource Management. (08 Marks)

OR

- 4 a. Explain Water Resources Planning and Management Approaches. (08 Marks)
b. What are the types of Water Resources Planning and Management aspects? (08 Marks)

Module-3

- 5 a. Define IWRM and explain the principles of IWRM. (08 Marks)
b. Explain Legislative and Organisational frame work of IWRM. (08 Marks)

OR

- 6 a. Explain the implementation of IWRM. (08 Marks)
b. What are motives for involvement of private sector participation in IWRM and explain the types of PPP in IWRM. (08 Marks)

Module-4

- 7 a. Explain National Water Policies. (08 Marks)
b. Discuss IMT and its activities. (08 Marks)

OR

- 8 a. Explain briefly about the National level water commissions. (08 Marks)
b. What are the steps for establishment of legal registration of WUA's? (08 Marks)

Module-5

- 9 a. Discuss the principles of water harvesting and conservation. (08 Marks)
b. Describe the practical water harvesting and conservation techniques. (08 Marks)

OR

- 10 a. What are the design system component for root top water harvesting system? (08 Marks)
b. With sketches, explain Farm pond and Percolation tank. (08 Marks)

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Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.