F 4878 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2015

Fifth Semester

Branch : Civil Engineering

CE 010 503 – DESIGN OF CONCRETE STRUCTURES – I (CE)

(New Scheme – 2010 Admission onwards)

[Regular/Improvement/Supplementary]

Time : Three Hours Maximum : 100 Marks

Missing data if any may be suitably assumed and stated.
IS: 456 *and SP :* 16 *are allowed to be used.*

Part A

Answer **all** *questions.*
Each question carries 3 *marks.*

1. What are the assumptions of the working stress method?
2. What is doubly reinforced beam?
3. Differentiate between one way slab and two way slab.
4. What are the factors affecting behaviour for design of column?
5. Write down the different types of footings and their suitability.

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*
Each question carries 5 *marks.*

6. Draw a cross section of a singly reinforced rectangular beam, the strain and stress distribution along the depth of the section.
7. Why do we consider most of the beams as T or L beams between the supports and rectangular beams over the support of continuous span?
8. Explain the share of loads by the supporting beam in one and two-way slabs.
9. Classify the columns separately based on loadings and slenderness ratio.
10. How would we determine the minimum depth of foundation?

(5 × 5 = 25 marks)

Turn over

Part C

Answer **all** *questions.*

Each full question carries 12 *marks.*

11. Design a reinforced concrete beam simply supported on masonry walls 30 mm thick and 6 m apart to support a distributed live load of 10 kN/m and a dead load of 5 kN/m in addition to its own weight. Assume M20 grade concrete and Fe415 HYSD bars. (working stress method)

Or

12. A double reinforced beam is to be designed having an overall cross sectional dimensions of 250 mm by 400 mm with effective span of 4 m. The beam has to support an uniformly distributed dead load of 2.5 kN/m together with a live load of 20 kN/m in addition to its self weight. Adopting M20 grade concrete and Fe415 HYSD bars, deign suitable reinforcement in the beam. (working stress method)

13. Design a singly reinforced concrete beam to suit the following data : Clear span = 3 m ; width of support = 200 mm ; working load = 6 kN/m ; M20 grade concrete and Fe415 HYSD bars.

Or

14. Determine the tensile reinforcement A_{st} of the flanged beam when the imposed load = 12 kN/m^2. D_f = 100 mm, D = 750 mm, b_w = 350 mm, spacing of beams = 4000 mm c/c, effective span = 12 m, simply supported, cover = 90 mm and d = 660 mm. use Fe415 and M20.

15. (i) State the limit of the aspect ratio of l_y / l_x of one and two way slabs.

    (ii) Explain the share of loads by the supporting beams in one and two way slabs.

    (iii) How to determine the design shear strength of concrete in slabs of different depths having the same percentage of reinforcement?

    (2 + 5 + 5 = 12 marks)

Or

16. Determine the areas of steel, bar diameters and spacings in the two directions of a simply supported slab of effective spans 3.5 m by 8 m subjected to live loads of 4 kN/m^2 and the load of floor finish 1 kN/m^2. Use Fe415 and M20. Draw the diagrams showing the detailing of reinforcement.

17. Design a circular column of 400 mm diameter with helical reinforcement subjected to an axial load of 1500 kN under service load and live load. The column has an unsupported length of 3 m effectively held in position at both ends but not restrained against rotation. Use M25 concrete and Fe415 steel.

Or

18. Design a square, short tied column of b = 500 mm to carry a total factored load of 4000 kN using M20 and Fe415. Draw the reinforcement diagrams.

19. Design one isolated footing for a column 300 mm by 450 mm, having 20 bars of 20 mm diameter (A_{st} = 4021 mm^2) carrying P_u = 1620 kN and M_u = 170 kN-m using M25 and Fe415. Assume that the moment is reversible. The safe bearing capacity of the soil is 200 kN/m^2 at a depth of 1 m from the ground level.

Or

20. (i) Draw a typical flight and show: (a) tread, (b) tread, (c) riser, (d) waist and (e) going.

    (ii) Draw the schematic diagrams of different types of staircases based on structural systems.

    (6 + 6 = 12 marks)

[5 × 12 = 60 marks]

F 4868 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2015

Fifth Semester

Branch : Civil Engineering

CE 010 502 – COMPUTER PROGRAMMING (CE)

(New Scheme – 2010 Admission onwards)

[Regular/Improvement/Supplementary]

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions.*

Each question carries 3 *marks.*

1. Write down the various operators used in C language.
2. Define storage classes.
3. How is array of strings represented in C?
4. State the difference between structure and union.
5. Define data files.

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*

Each question carries 5 *marks.*

6. What is the use of using control statements in C. List out the various control statements using in C?
7. How will define a function in C? What are the steps in writing a function in a program?
8. Define Pointer. Explain it with suitable example.
9. Define Union. How can you access the members of the Union?
10. Write down the applications of file pointers.

(5 × 5 = 25 marks)

Part C

Answer **all** *questions.*

Each question carries 12 *marks.*

11. Explain the various identifiers and keywords used in C.

Or

12. Explain expression statements used in C.

13. Explain the various storage classes in C.

Or

14. What do u means by Function in C ? Explain the advantage of using function. Also explain the modular programming concept.

15. Display the 2D Array in matrix form, traversing the individual row and column, accessing different element of matrix, matrix addition, and multiplication.

Or

16. Comparison between 1-D Array and 2-D array.

17. Explain dynamic memory allocation.

Or

18. Write a C program to create a mark sheet for students using structure.

19. Explain reading and writing operation of files with example.

Or

20. Explain the concept of FILE Handling. WAP to create a file read the file and write on file. Also explain any *ten* File handling pre-defined function with corresponding syntax.

(5 × 12 = 60 marks)

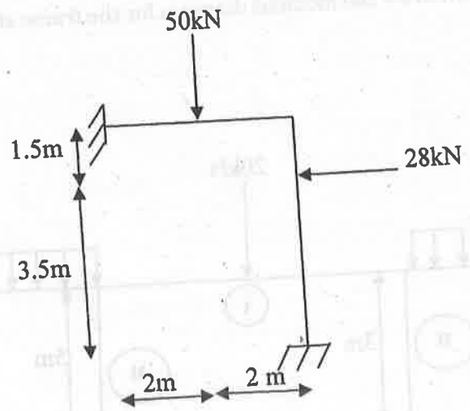

Fig. 8

Or

18. Analyze the continuous beam fig. 9 shown below. Use force transformation matrix approach :

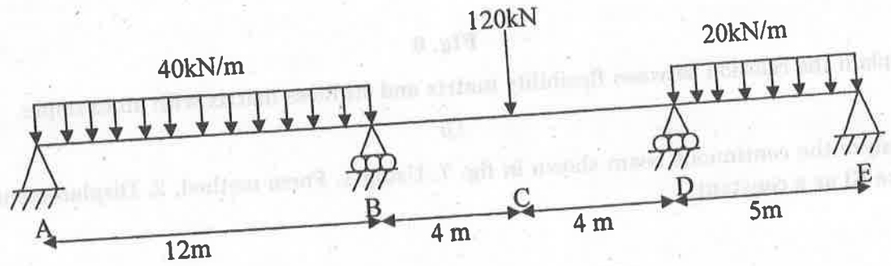

Fig. 9

19. Briefly discuss the Finite Element approach in structural analysis. Also discuss the FEM formulation for a linear differential equation.

Or

20. Drive shape function for first order rectangular element.

(5 × 12 = 60 marks)

F 4920

(Pages : 4)

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B.TECH. DEGREE EXAMINATION, NOVEMBER 2015

Fifth Semester

Civil Engineering

CE 010 506—STRUCTURAL ANALYSIS—I (CE)

(2010 Admission onwards)

[New Scheme—Regular/Improvement/Supplementary]

Time : Three Hours

Maximum : 100 Marks

Part A

Answer **all** *questions.*
Each question carries 3 *marks.*

1. Write any *two* important assumptions made in the analysis of trusses.
2. What is degree of kinematic indeterminacy ?
3. What are the limitations of slope deflection method ?
4. State the advantages of continuous beam over simply supported beam.
5. Explain the significance of compatibility equations.

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*
Each question carries 5 *marks.*

6. Draw the free body diagram for the simply supported beam shown in the fig. 1

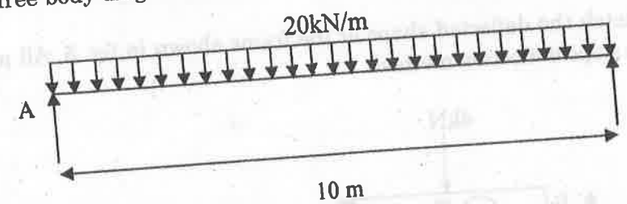


Fig. 1

7. Explain degree of static indeterminacy in detail.
8. Develop the flexibility matrix for the simply supported beam shown in the fig. 2

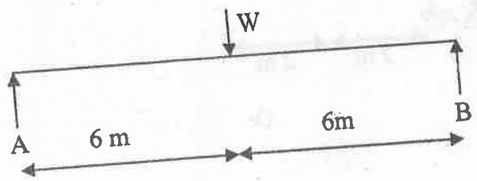


Fig. 2

9. Explain force transformation matrix with an example.

10. What are the steps involved in finite element analysis and explain it.

(5 × 5 = 25 marks)

Part C

Answer **all** *questions.*
Each full question carries 12 *marks.*

11. Calculate the moments for the given beam using method of consistent deformation :

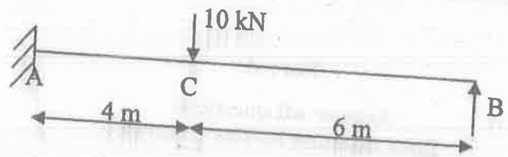


Fig. 3

Or

12. Determine the Shear force and B.M of the given continuous beam shown in the fig. 4. Use theorem of three moment.

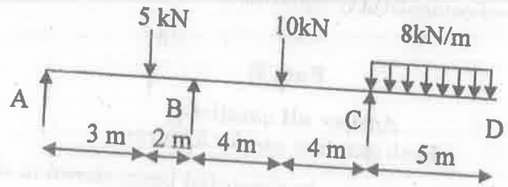


Fig. 4

13. Draw BMD and sketch the deflected shape of the frame shown in fig. 5. All members are of the same material. Use slope deflection method.

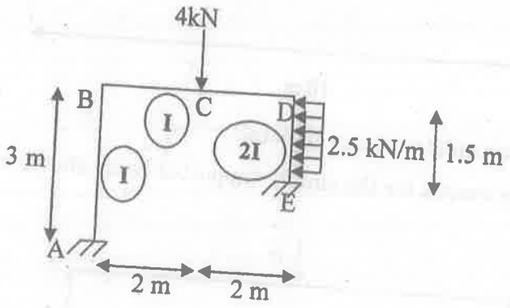


Fig. 5

Or

14. Determine the end moment draw the moment diagram for the frame shown in fig. 6 Using moment distribution method.

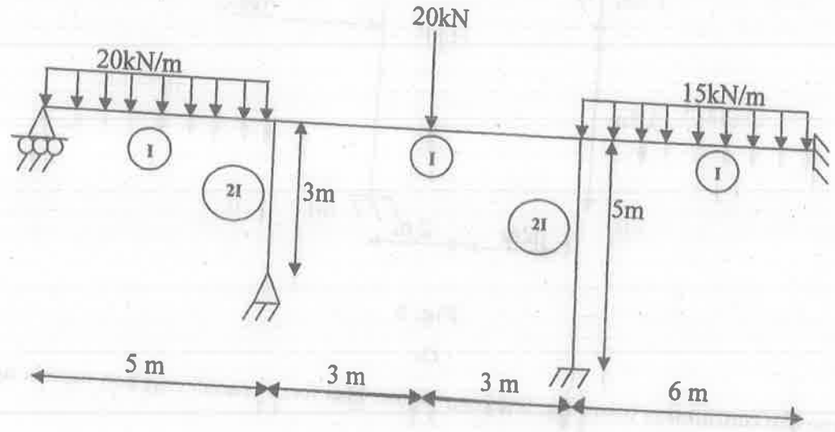


Fig. 6

15. Explain the relation between flexibility matrix and stiffness matrix with an example.

Or

16. Analyze the continuous beam shown in fig. 7. Using 1. Force method, 2. Displacement method. Take EI as a constant

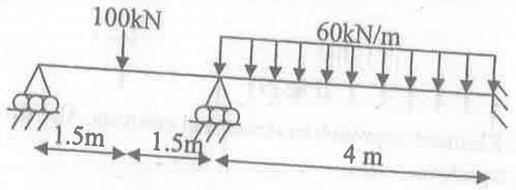
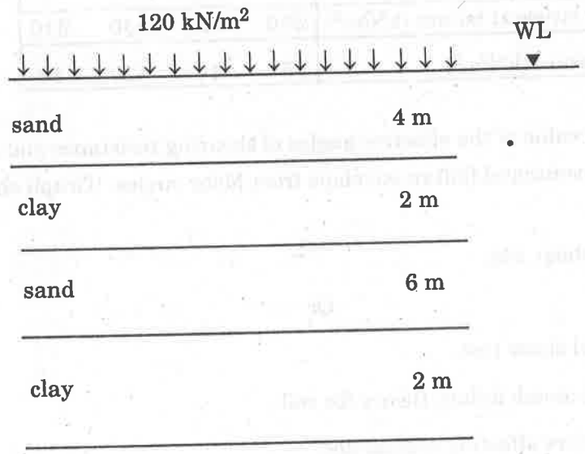


Fig. 7

17. Analyze the rigid frame as shown in fig. 8 on 4th page. Use direct stiffness method. Assume E = 200 GPa ; $I_{zz} = 1.33 \times 10^{-4}\ m^4$ and A = 0.04 m^2. The flexural rigidity EI and axial rigidity are the same for both the beams.

20. (a) Explain the phenomena of secondary consolidation. (4 marks)

(b) Compute the total settlement for the soil profile as shown in Figure below having saturated unit weight of sand γ_{sat} = 20.86 kN/m^2, w = 38%, C_c = 0.26, G = 2.72.



(8 marks)

[5 × 12 = 60 marks]

F 4892 (Pages : 4) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2015

Fifth Semester

Branch : Civil Engineering

CE 010 504—GEOTECHNICAL ENGINEERING – I (CE)

(New Scheme—2010 Admission onwards)

[Regular/Improvement/Supplementary]

Time : Three Hours Maximum : 100 Marks

Graph / Semilog sheets to be supplied.
Missing data if any, may be suitably assumed.

Part A

Answer **all** *questions.*
Each question carries 3 *marks.*

1. Define alluvial soil and lacustrine soil.
2. Define the term ground water and capillary water.
3. Define the term Thixotropy.
4. Define optimum moisture content and maximum dry density.
5. Explain spring analogy.

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*
Each question carries 5 *marks.*

6. Explain the soil phase system with neat sketch.
7. Define flow net and explain graphical method of flow net construction.
8. Explain Mohr's stress circle.
9. A cohesive soil yields a maximum dry density of 1.8 g/cc at an OMC of 16% during a standard protector test. If the value of G is 2.65, what is the degree of saturation and what is the maximum dry density it can further compacted to ?
10. List the assumptions of Terzaghi's theory for one-dimensional consolidation.

(5 × 5 = 25 marks)

Part C

Answer **all** *questions.*
Each full question carries 12 *marks.*

11. (a) Obtain the relationship between void ratio, water content and specific gravity for a fully saturated soil.

(6 marks)

(b) Explain the methods of determining the field density of soil with neat sketch. (6 marks)

Or

12. (a) The mass specific gravity of a soil equals 1.64. The specific gravity of solids is 2.70. Determine the voids ratio under the assumption that the soil is perfectly dry. What would be the voids ratio, if the sample is assumed to have a water content of 8% ?

(6 marks)

(b) The in-situ density of an embankment, compacted at a water content of 12% was determined with the help of a core cutter. The empty mass of the core cutter was 1286 g and the cutter full of soil had a mass of 3195 g, the volume of the cutter being 1000 cm^3. Determine the bulk density, dry density and the degree of saturation of the embankment. If the embankment becomes fully saturated during rains, what would be its water content and saturated unit weight. Assume no volume change in soil on saturation. Take the specific gravity of the soil as 2.70.

(6 marks)

13. (a) Explain the factors affecting permeability. (6 marks)

(b) Explain flow net and its application in detail. (6 marks)

Or

14. (a) Calculate the co-efficient of permeability of a soil sample, 6 cm in height and 50 cm^2 in cross-sectional area, if a quantity of water equal to 430 ml passed down in 10 min, under an effective constant head of 40 cm. On oven drying the test specimen has a mass of 498 g. Taking the specific gravity of soil solids as 2.65, calculate the seepage velocity of water during the test.

(6 marks)

(b) Explain how the average permeability of stratified soil layers was determined. (6 marks)

15. (a) Undrained triaxial tests are carried out on four identical specimens of silty clay and following results are obtained :

Cell pressure (kN/m^2)	50	100	150	200
Deviator stress at failure (kN/m^2)	350	440	530	610
Pore pressure (kN/m^2)	5	10	120	18

Determine the value of the effective angles of shearing resistance and the cohesion intercept by plotting conventional failure envelope from Mohr circles. (Graph sheet).

(6 marks)

(b) Explain Vane shear test. (6 marks)

Or

16. (a) Explain Triaxial shear test. (6 marks)

(b) Derive Mohr Coulomb failure theory for soil. (6 marks)

17. (a) Explain the factors affecting compaction. (6 marks)

(b) Explain Swedish slip circle method of analysis for purely cohesive soil. (6 marks)

Or

18. (a) Explain the effect of compaction on soil properties. (6 marks)

(b) Calculate the factor of safety with respect to cohesion of a clay slope laid at 1 in 2 to a height of 10 m, if the angle of internal friction is 10^0, C = 25 kN/m^2 and γ = 19 kN/m^2. What will be the critical height of the slope in this soil ?

(6 marks)

19. (a) Explain laboratory consolidation test with neat sketch. (6 marks)

(b) A clay stratum has 3 m thickness and has an initial overburden pressure of 40 kN/m^2. The clay is over consolidated, with a pre-consolidation pressure of 60 kN/m^2. Determine the final settlements due to an increase in pressure of 50 kN/m^2 at the middle of the clay layer having swelling index of 0.05, compression index 0.28, initial voids ratio 1.3.

(6 marks)

Or

F 4907 3

(Pages : 3)

Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2015

Fifth Semester

Civil Engineering

CE 010 505—QUANTITY SURVEYING AND VALUATION (CE)

(New Scheme—2010 Admission onwards)

[Regular/Improvement/Supplementary]

Time : Three Hours Maximum : 100 Marks

Assume any missing data suitably, and stated.

I. (a) (i) Explain in detail the different methods of estimation. (5 marks)

(ii) Explain in detail the main items of work with their measurement units for a single storey R.C.C. building. (15 marks)

(iii) Estimate the quantity of the following item of a residential building and based on that prepare the abstract of estimated cost for the 8 outer columns work for the given drawing (Figure on page 3). (20 marks)

Or

(b) (i) Estimate the quantity of the following item of a residential building and based on that prepare the abstract of estimated cost for the R.C.C. work for Roof Slab and plinth beam for the given drawing (Figure on page 3) ? (20 marks)

(ii) Prepare a bar bending schedule for the (Figure on page 3) :

1 Plinth beam.

2 Roof beam. (2 × 10 = 20 marks)

II. (a) (i) Prepare a conveyance statement for the transfer of building materials for a single storey building (Cement, brick, fine and coarse aggregate) from main road to the site 800 m apart. (10 marks)

(ii) Explain in detail general specification for first class building. (5 marks)

(iii) Write down the detailed specification for excavation for trenches. (5 marks)

Or

Turn over

(b) (i) Write down the detailed specification for the following items of work for a first class building :

1 R.C.C. roofing.

2 R.C.C. slab

3 Pointing and Doors

4 Painting on wood works.

III. (a) (i) Work out the labour requirement, material ingredients and rate analysis (use local prevailing rate) for the following items of work : (4 × 5 = 20 marks)

1 Brickwork (10 cu. m)

2 Cement plastering C.M 1 : 5 for the above brickwork.

(ii) Explain in detail about overhead costs. (2 × 8 = 16 marks)

Or

(b) (i) Briefly discuss the important factors affecting rate analysis. (4 marks)

(ii) Work out the labour requirement, material ingredients and rate analysis (use local prevailing rate) for the following items of work for the given drawing (Figure on page 3) : (4 marks)

1 Wood works for doors.

2 Roof slab form work.

IV. (a) Explain the following terms in detail : (2 × 8 = 16 marks)

1 Scrap values. (2 marks)

2 Depreciation and sinking fund. (3 marks)

3 Valuation and purpose of valuation. (3 marks)

4 Obsolescence. (2 marks)

Or

(b) Explain the following terms in detail :

1 Different methods of valuation. (4 marks)

2 Outings and its types. (3 marks)

3 Annuity. (3 marks)

V. (a) A two- storied building is standing on a plot of land measuring 750 sq. m. and the cost of land may be taken as Rs. 2575.00 per sq. m. The plinth area of each storey is 430 sq. m. The building is of load bearing structure and the future life may be taken as 45 years. The building fetches a gross rent of Rs. 2500.00 per month. Work out the capitalized value of the property on the basis of 6.5% net yield. For sinking fund 3% compound interest may be assumed. Other data required can be assumed. (10 marks)

Or

(b) A building is situated by the side of a main road of Kochin city on a land of 450 sq. m. The built up portion is 28 × 15 m. The building is first class type and provided with water supply, sanitary and electrical fittings, and the age of the building is 35 years. Workout the valuation of the property. Assume the local prices. (10 marks)