F 3626 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2014

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. How does Switch statement differ from Nested if ?
2. Give a syntax for 'do-while' statement. Give an example.
3. Define Arrays.
4. How to define a union in C?
5. Define error handling function.

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*

Each question carries 5 *marks.*

6. What is the data type? Explain the various types of data types.
7. Explain nested for loop statement with suitable example.
8. Define Structure in C. Give an example for structure definition.
9. Explain linked list.
10. Write down the syntax for file opening and closing. Explain it.

(5 × 5 = 25 marks)

Part C

Answer **all** *questions.*

Each full question carries 12 *marks.*

11. Write a C Program to print prime numbers between 1 and 100.

Or

12. What is the use of operators in C. List out various types of operators used in C? Explain their working rule, priorities and associativity.

Turn over

13. Explain the difference between 'while' and 'do while' with an example program.

Or

14. Explain 'pass by value' and 'pass by reference' with suitable examples.

15. Explain and write a program for 'searching a particular element from a given array'.

Or

16. Explain sorting of strings in detail.

17. Define and declare a structure to store date, which including day, month and year.

Or

18. Compare structure and union with suitable examples.

19. Explain the concept of FILE Handling. WAP to create a file read the file and write on file. Also explain any 10 File handling pre-defined function corresponding syntax.

Or

20. Write a short note on : (i) Error handling function ; (ii) Command line arguments.

(5 × 12 = 60 marks)

F 3621 (Pages : 4) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2014

Fifth Semester

Branch : Common to all Branches except C.S. and I.T.

EN 010 501-A—ENGINEERING MATHEMATICS—IV

(Regular/Improvement/Supplementary)

[New Scheme—2010 Admission onwards]

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions.*

Each question carries 3 *marks.*

1. An electrostatic field in the xy-plane is given by the potential function $\phi = 3x^2y - y^3$, find the stream function.
2. Find the image of the circle $|z-1|=1$ in the complex plane under the mapping $w=\frac{1}{z}$.
3. Find the real root of the equation $x^2 - 2x - 5 = 0$ by the method of false position correct to 3 decimal places.
4. Solve $\frac{dy}{dx} = 1 - y, y(0) = 0$ in the range $0 \le x \le 3$ by taking $h = 0.1$ by the modified Euler's method.
5. Construct the dual of the L.P.P.

   Maximize $z = 4x_1 + 9x_2 + 2x_3$

   subject to $2x_1 + 3x_2 + 2x_3 \le 7, 3x_1 - 2x_2 + 4x_3 = 5 ; x_1, x_2, x_3 \ge 0.$

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*

Each question carries 5 *marks.*

6. Show that $\sqrt{|xy|}$ is not analytic at the origin, although Cauchy-Riemann equations are satisfied at the point.
7. Find the Taylor's series expansion of $f(z) = \frac{2z^3+1}{z^2+z}$ about $z = i$.

Turn over

8. Find by the iteration method, a real root of $2x - \log_{10} x = 7$.

9. Solve $\frac{dy}{dx} = x + z, \frac{dz}{dx} = x - y^2$ with $y(0) = 2$, $z(0) = 1$ to get $y(0.1)$, $y(0.2)$, $z(0.1)$ and $z(0.2)$ approximately by Taylor's series.

10. Using graphical method, solve the following L.P.P.

Maximize $z = 2x_1 + 3x_2$

subject to $x_1 - x_2 \leq 2$

$x_1 + x_2 \geq 4$,

$x_1, x_2 \geq 0$.

(5 × 5 = 25 marks)

Part C

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

11. (a) Determine the analytic function $f(z) = u + iv$ if $u - v = \frac{\cos x + \sin x - e^{-y}}{2(\cos x - \cosh y)}$ and $f(\pi/2) = 0$.

(6 marks)

(b) Find the bilinear transformation which maps the points $z = 1, i, -1$ into the points $w = i, 0, -i$. Hence find the image of $|z| < 1$.

(6 marks)

Or

12. (a) Prove that the function $f(z)$ defined by $f(z) = \frac{x^3(1+i) - y^3 1 - i}{x^2 + y^2}$, $z \neq 0$ and $f(0) = 0$ is continuous and the Cauchy-Riemann equations are satisfied at the origin, yet $f'(0)$ does not exist.

(6 marks)

(b) Show that the transformation $w = \frac{3 - z}{z - 2}$ transforms the circle with center $\left(\frac{5}{2}, 0\right)$ and radius $\frac{1}{2}$ in the z-plane into the imaginary axis in the w-plane and the interior of the circle into the right half of the plane.

(6 marks)

13. (a) Evaluate $\int_C \frac{z-3}{z^2+2z+5} dz$, where C is the circle (i) $|z| = 1$; (ii) $|z + 1 - i| = 2$; (iii) $|z + 1 + i| = 2$.

(8 marks)

(b) Determine the poles of the function $f(z) = \frac{x^2}{(z-1)^2 (z+2)}$ and the residue at each pole.

(4 marks)

Or

14. (a) Find the Laurent's expansion of $f(z)=\frac{7z-2}{(z+1)\,z\,(z-2)}$ in the region $1<|z+1|<3$. (5 marks)

(b) Show the method of residues, that $\int_0^{\pi} \frac{a}{a^2+\sin^2\theta}\,d\theta=\frac{\pi}{\sqrt{1+a^2}}$. (7 marks)

15. (a) Using Newton's iterative method, find the real root of $x \log_{10} x = 1.2$ correct to five decimal places.

(6 marks)

(b) Solve by Gauss-Seidel method :

$10x + 2y + z = 9$

$2x + 20y - 2z = -44$

$-2x + 3y + 10z = 22.$

(6 marks)

Or

16. (a) Find a real root of the equation $x^3 - x - 11 = 0$, correct to 4 decimal places using the bisection method.

(6 marks)

(b) Find the root of the equation $\cos x - xe^x = 0$ by secant method correct to four decimal places.

(6 marks)

17. Using Runge-Kutta method of fourth order, solve $\frac{dy}{dx} = yz + x$, $\frac{dz}{dx} = xz + y$ given that $y(0) = 1$, $z(0) = -1$ for $y(0.2)$, $z(0.2)$.

Or

18. Apply Milne's method, to find a solution of the differential equation $y' = x - y^2$ in the range $0 \le x \le 1$ for the boundary condition $y = 0$ at $x = 0$.

19. (a) What is the maximization transport problem ? How do you solve it ? (3 marks)

(b) Using simplex method solve the LPP

Maximize $z = 5x_1 + 3x_2$

subject to $x_1 + x_2 \le 2$

$5x_1 + 2x_2 \le 10$

$3x_1 + 8x_2 \le 12,$

$x_1, x_2 \ge 0.$

(9 marks)

Or

20. Find the initial basic feasible solution of the following transportation problem by Vogel's approximation method (VAM). Here, F_1, F_2 and F_3 are factories, and W_1, W_2 and W_3 are warehouses.

	W_1	W_2	W_3	W_4	*Production of Factories*
F_1	21	16	25	13	11
F_2	17	18	14	23	13
F_3	32	27	18	41	19
Capacity of the warehouse	6	10	12	15	43

(5 × 12 = 60 marks)

F 3164 (Pages : 3) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2014

Fifth Semester

Branch : Common to all Branches except C.S. and I.T.

ENGINEERING MATHEMATICS – IV (CMELPASUF)

(Old Scheme—Supplementary/Mercy Chance)

[Prior to 2010 admissions]

Time : Three Hours Maximum : 100 Marks

Answer **all** *questions.*
Each full question carries 20 *marks.*

1. (a) Using Cauchy's integral formula, evaluate $\int_C \frac{z+1}{z^2+2z+5}\,dz$ where C is the circle $|z+1-i|=2$, integration being taken in the counter clockwise direction.

   (b) Expand $\frac{1}{z(z-1)(z-2)}$ in Laurent's series for $|z|>2$.

Or

2. (a) Evaluate $\oint_C \frac{z}{z(z-1)(z-2)^2}\,dz$, where C is the circle $|z-2|=\frac{1}{2}$.

   (b) Evaluate by contour integration $\int_0^\infty \frac{x^2\,dx}{(x^2+9)(x^2+4)^2}$.

3. (a) Find a root of the equation $x^6-x^4-x^3=1$ correct to three decimal places using Regula Falsi method.

   (b) Solve by Gauss-Jacobi's method :

$$\begin{aligned} 54x+y+z &= 110 \\ 2x+15y+6z &= 72 \\ -x+6y+27z &= 85. \end{aligned}$$

Or

Turn over

4. (a) Find a root of $x^3 - 4x - 9 = 0$ correct to three decimal places using Bisection method.

(b) Solve by Gauss-Seidel method :

$$10x_1 - 5x_2 - 2x_3 = 3$$
$$4x_1 - 10x_2 + 3x_3 = -3$$
$$x_1 + 6x_2 + 10x_3 = -3.$$

5. (a) Using Taylor's series method solve $\frac{dy}{dx} = x^2 - y, y(0) = 1$ at $x = 0.1, 0.2, 0.3$ and 0.4.

(b) Use Runge-Kutta method to solve $\frac{dy}{dx} = x^2 - $ [illegible], $y(1) = 1.5$ at $x = 1.2$ in steps of 0.1.

Or

6. (a) Taking $h = 0.05$ and applying modified Euler's method, solve the initial value problem $y' = x^2 + y, y(0) = 1$, obtain $y(0.1)$.

(b) Using Milne's predictor-corrector method solve the initial value problem $\frac{2dy}{dx} = \left(1 + x^2\right)y^2, y(0) = 1$ and obtain y (0.4). Use the solution values :

$$y(0.1) = 1.06, y(0.2) = 1.12, y(0.3) = 1.21.$$

7. (a) Given $Z(u_n) = \frac{2z^2 + 3z + 4}{(z-3)^3}, |z| > 3$, show that $u_1 = 2, u_2 = 21, u_3 = 139$.

(b) Solve $x_{n+1} - y_n = 1, y_{n+1} - x_n = 0, x_0 = 0, y_0 = -1$.

Or

8. (a) Find the z-transform of :

(i) $e^{4t} \sin 3t$.

(ii) $(t + T)e^{-(t+T)}$.

(iii) $4^n + \left(\frac{1}{2}\right)^n + u(n-3)$.

(b) Find the inverse z-transform of $\frac{4z^2 - 2z}{z^3 - 5z^2 + 8z - 4}$.

9. (a) Solve the following L.P.P. by simplex method :

Maximize $Z = x_1 + 2x_2 + 3x_3 - x_4$

subject to
$$x_1 + 2x_2 + 3x_3 = 15$$
$$2x_1 + x_2 + 5x_3 = 20$$
$$x_1 + 2x_2 + x_3 + x_4 = 10.$$

(b) Solve the following transportation problem :

		Destination				Avail
		D_1	D_2	D_3	D_4	
	O_1	5	3	6	2	19
Origin	O_2	4	7	9	1	37
	O_3	3	4	7	5	34
Require		16	18	31	25	

Or

10. (a) Using the duality theory, solve the L.P.P. :

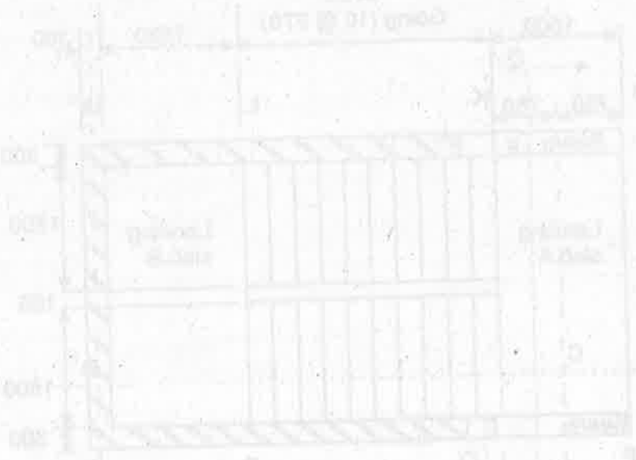
Minimize $Z = 3x_1 - 2x_2 + 4x_3$

subject to
$$3x_1 + 5x_2 + 4x_3 \geq 7$$
$$6x_1 + x_2 + 3x_3 \geq 4$$
$$7x_1 - 2x_2 - x_3 \leq 10$$
$$x_1, x_2, x_3 \geq 0.$$

(b) Apply Vogel's method to find the transportation cost to the following transportation model :

	1	2	3	4	
1	10	2	20	11	15
2	12	7	9	20	25
3	4	14	16	18	10
	5	15	15	15	

(5 × 20 = 100 marks)



F 3634 (Pages : 3) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2014

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 is meant by modular ratio ?
2. Write the equation for nominal shear reinforcement.
3. Define partial safety factor.
4. Distinguish between unsupported length and effective length of column.
5. What are the situations in which combine footings are preferred ?

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*

Each question carries 5 *marks.*

6. Write down the Steps for solving the design type of problem of singly reinforced rectangular beams.
7. How to determine the lever arm ?
8. How to determine the design shear strength of concrete in slabs of different depths having the same percentage of reinforcement ?
9. State the values of design strength of concrete and steel to be considered in the design strength of axially loaded short column.
10. What are the critical sections of determining the bending moment in isolated footing ?

(5 × 5 = 25 marks)

Turn over

Part C

Answer **all** *questions.*

Each question carries 12 *marks.*

11. Determine the moment of resistance of the rectangular beam having b = 600 mm, D = 650 mm, A_{st} = 804 mm^2 (4-16ϕ), σ_{cbc} = 7 N/mm^2 and σ_{st} = 230 N/mm^2. Also determine the balanced moment of resistance of the beam and the balanced area of tension steel. (Working stress method).

Or

12. Establish the equations for determining the depth of neutral axis, moment of resistance and area of tension steel of an under reinforced rectangular beam. (Working stress method).

13. Design a singly reinforced concrete beam to suit the following data. Clear span = 4 m ; width of support = 300 mm; working live load = 5 kN/m ; M25 grade concrete and Fe415 HYSD bars.

Or

14. Determine the ultimate moment capacity of the doubly reinforced beam of b = 350 mm, d' = 60 mm, d = 600 mm, A_{st} = 2945 mm^2 (6-25ϕ), A_{sc} = 1256 mm^2, using M20 and Fe415.

15. Design simply supported slab to suit the following data: clear span 3 m, supported brick walls 230 mm thick. Live load l .5 kN/m^2. Using M20 and Fe415.

Or

16. Design a two way slab for a room size 4 m by 5 m with discontinuous and simply supported edges on all sides with corners prevented from lifting to support a live load of 4 kN/m^2. M20 grade concrete and Fe415 HYSD bars.

17. Design the reinforcement in a column size 400 mm by 600 mm subjected to an axial working load of 2000 kN. The column has an unsupported length of 3 m and is against side sway in both directions. Adopt M20 grade concrete and Fe 415 HYSD bars.

Or

18. Design the reinforcements in a circular column of diameter 300 mm with helical reinforcement to support a factored load of 1500kN. The column has an unsupported length 3 m and is braced against sideway. Adopt M20 grade concrete Fe415 HYSD bars.

19. Design a combine column footing with strap beam for two reinforced concrete column of size 300 mm by 300 mm spaced 4 m centre to centre and each supporting a service load of 500 kN. The safe bearing capacity of the soil at site is 150 kN/mm^2. Adopt M20 grade concrete Fe415 HYSD bars.

Or

20. Design the waist-slab type of the staircase of Fig. 1 (Page on 3). Landing slab A is supported on beams along JK and PQ, while the waist-slab and landing slab B are spanning longitudinally as shown in Fig. 1. The finish loads and live loads are l kN/m^2 and 5 kN/m^2 respectively. Use riser R = 160 mm, trade T = 270 mm, concrete grade = M 20 and steel grade = Fe 415.

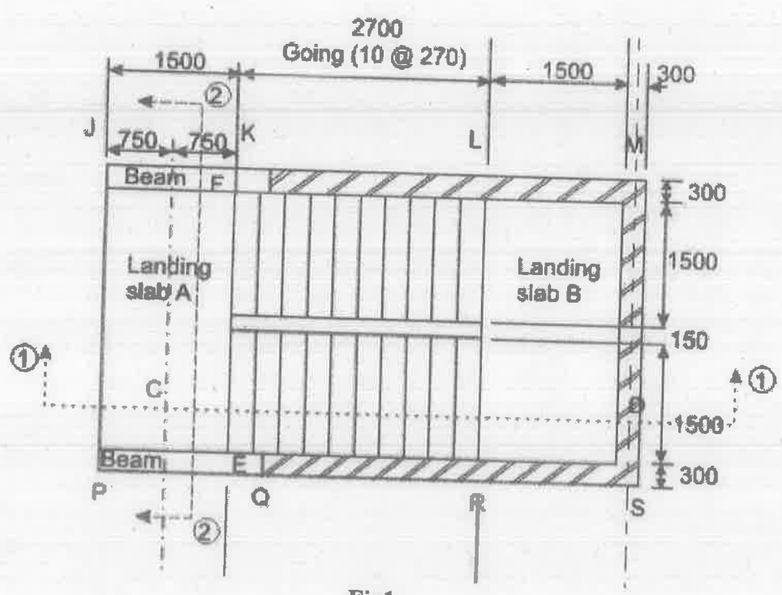
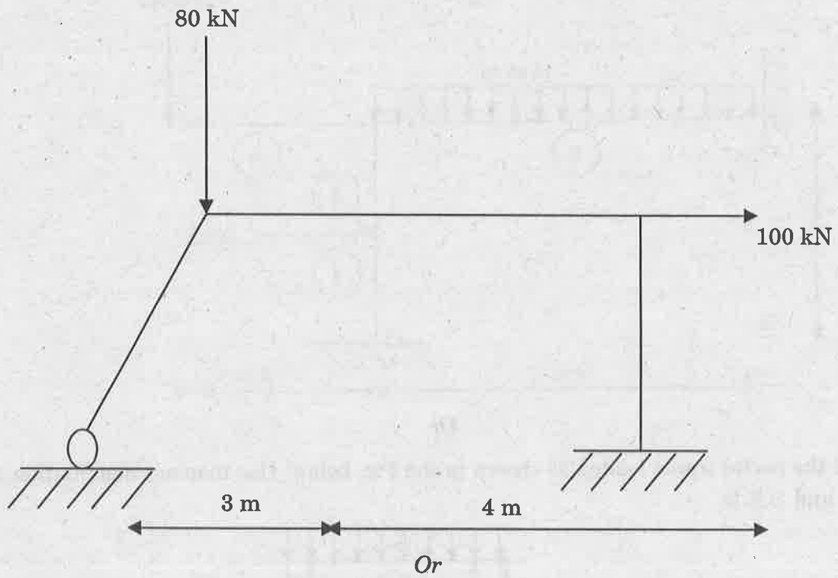


Fig1.

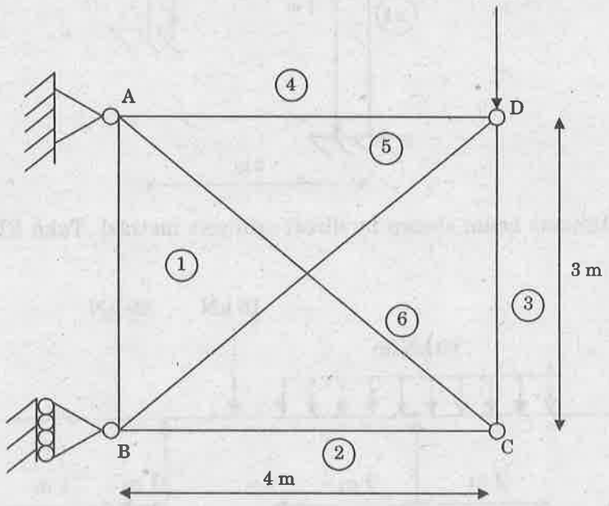
16. Derive the steps involved in the direct stiffness method. Explain it with an example.

17. Analyze the portal frame with inclined leg shown in Fig. below. Use matrix flexibility method.



Or

18. A statically indeterminate frame shown in Fig. below. It carries a load of 80 kN. Analyze the frame by matrix flexibility method. A and E are same for all members.



19. Derive the shape functions for the triangular element. (using natural co-ordinates).

Or

20. With sketches explain significance of displacement models in finite element analysis.

(5 × 12 = 60 marks)

F 3667

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

Name.....

B. TECH. DEGREE EXAMINATION, NOVEMBER 2014

Fifth Semester

Branch : Civil Engineering

CE 010 506—STRUCTURAL ANALYSIS–I (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.

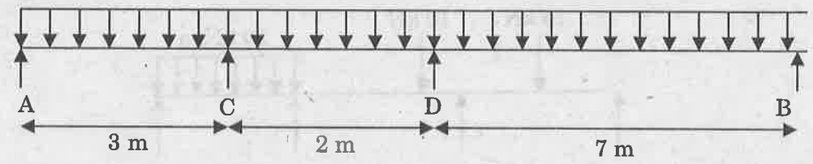
1. Differentiate perfect and imperfect frame.
2. Define Flexural Rigidity of Beams.
3. State relative merit of moment distribution method over slope deflection method.
4. Define carry over factor.
5. Write the three moment equation for general case.

(5 × 3 = 15 marks)

Part B

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

6. A continuous beam shown in Fig. has a span of 12 m. and supports a transverse load of 15 kN/m. Draw the free body diagrams of portions AC, DB and CD.

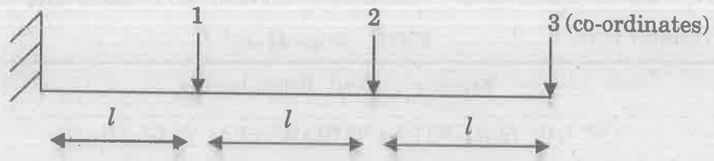


7. Explain Clapyron's theorem of three moments in detail.

8. What are all the steps involved in compatibility method and equilibrium method ?

Turn over

9. Develop the flexibility matrix for the cantilever with the co-ordinates as shown in the Fig. below.



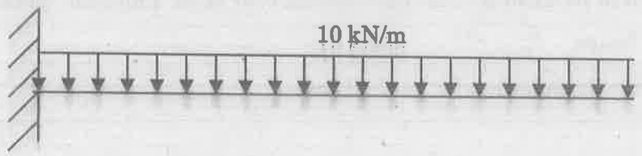
10. Briefly explain the historical development of the Finite Element Model analysis.

(5 × 5 = 25 marks)

Part C

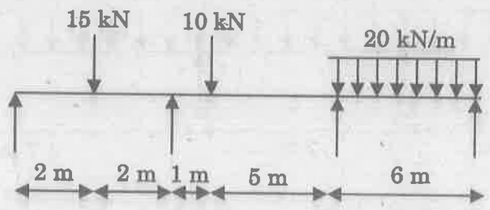
Answer **all** *questions.*
Each question carries 12 marks.

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

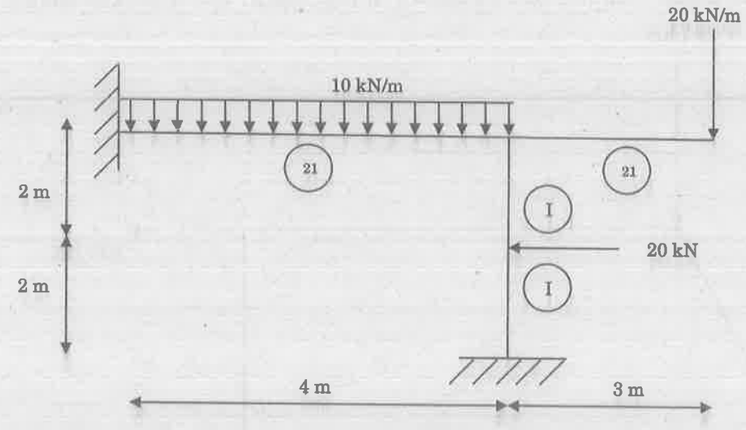


Or

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

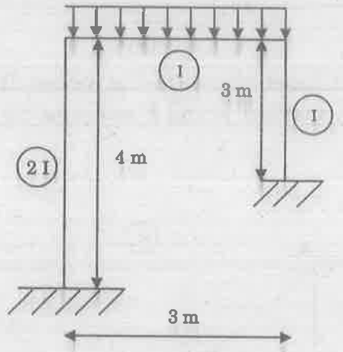


13. Plot B.M.D. and deflected shape of the following structure using slope deflection method.

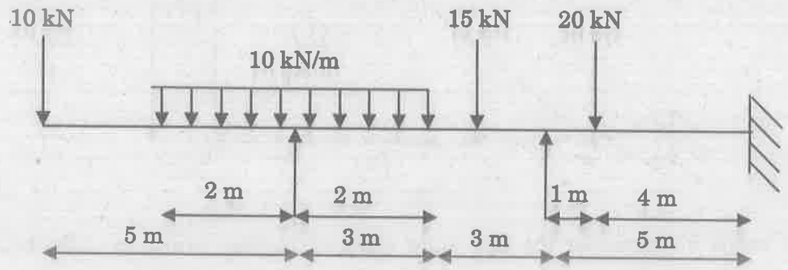


Or

14. Analyze the portal frame loaded as shown in the Fig. below. Use moment distribution and sketch B.M.D. and S.F.D.



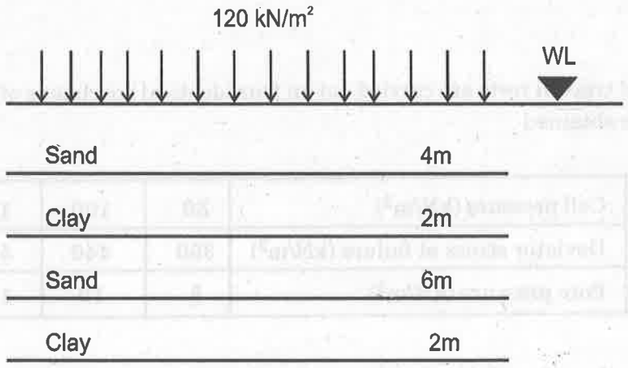
15. Analyze the continuous beam shown by direct stiffness method. Take EI as constant.



Or

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

(b) Compute the total settlement for the soil profile as shown in figure.1 having Saturated unit weight of sand γ_{sat} = 20.8 kN/m^2, w = 38%, C_c = 0.26, G = 2.72.



(8 marks)

[5 × 12 = 60 marks]

F 3645 (Pages : 4) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2014

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/semi log sheets to be supplied.
Missing data if any, may be suitably assumed.

Part A

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

1. Define specific surface of soil.
2. State Darcy's law of permeability.
3. Define the term shear strength of soil.
4. Define zero air void line.
5. Define the term over consolidated soil.

(5 × 3 = 15 marks)

Part B

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

6. Explain the term Density Index and consistency of soil.
7. Explain the term bulking of sand with neat sketch.
8. Write the advantages of triaxial shear test.
9. Explain the types of finite slope failure.
10. Explain square root of time fitting method of determining coefficient of consolidation.

(5 × 5 = 25 marks)

Part C

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

11. (a) Define weathering and explain its types. (6 marks)

(b) The following data on consistency limits are available for two soils A and B :

	Soil A	Soil B
Plastic limit	16%	19%
Liquid limit	30%	52%
Flow Index	11	6
Natural water content	32%	40%

Find which soil is :

(i) More plastic.

(ii) Better foundation material on remoulding.

(iii) Better shear strength as a function of water content.

(iv) Shear strength at plastic limit.

Classify the soil as per ISCS. (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) Laboratory tests on a soil sample obtained from a foundation site reveal the following data : Total mass of soil sieved is 200g, Cumulative mass retained on 4mm sieve is 30g, Cumulative mass retained on 75 μ sieve is 150g, D_{10} = 0.07 mm, D_{30} = 0.12 mm, D_{60} = 1.95mm, Liquid Limit = 38%, Plastic Limit = 28%. Classify the soil according to ISCS.

(6 marks)

13. (a) Explain any two methods to determine the coefficient of permeability of soil with neat sketch.

(6 marks)

(b) Explain the term quick sand condition and what will be the critical gradient at which quick sand condition will occur in a coarse grained soil having voids ratio of 0.78 and of specific gravity 2.67. (6 marks)

Or

14. (a) Explain Darcy's law of permeability. (6 marks)

(b) In a falling head permeameter test on a silty clay sample, the following results were obtained; sample length 12 mm and diameter 80 mm, initial head 1200 mm, falling head 400 mm, time for fall in head 6 min, stand pipe diameter 4 mm. Find the coefficient of permeability of the soil. (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. (6 marks)

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

Or

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

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

17. (a) Explain how the field compaction is achieved. (6 marks)

(b) Explain Swedish slip circle method of analysis for C– 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°, 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 soil layer has a thickness of 5 m and is subjected to a pressure of 60 kN/m^2. If the layer has a double drainage and undergoes 50% consolidation in one year, determine the coefficient of consolidation taking T_v = 0.197. Also if the coefficient of permeability is 0.025 m/year, determine the settlement in one year and rate of flow of water per unit area in one year.

(6 marks)