Register Number :

Name of the Candidate :

3123

B.E. DEGREE EXAMINATION, 2014

(CIVIL, CIVIL AND STRUCTURAL/ MECHANICAL ENGINEERING)

(FIFTH SEMESTER)

CLEC- 501 / CSEC- 501 / MEEC-501 / PMEEC-401. NUMERICAL METHODS

November] [Time : 3 Hours

Maximum : 75 Marks

(Maximum 60 Marks for those who joined before 2011-12)

Answer any ONE FULL question from each unit.
ALL questions carry EQUAL marks.

UNIT – I

1. (a) Show that $E = e^{hD}$. Hence, deduce that $\delta = 2 \sin h \left(\frac{hD}{2} \right)$. (7)

   (b) Assuming that the following values of y_x belong to a polynomial of degree 4, compute the next three values :

k:	0	1	2	3	4	5	6	7
y_x:	1	–1	1	–1	1	--	--	--

(8)

(OR)

2. (a) Solve the difference equation : $y_{n+2} - 8y_{n+1} + 15y_n = 0$. (7)

   (b) The integers 0, 1, 1, 2, 3, 5, 8, 13, 21, ... are said to form a Fibonacci sqeuence. Form the difference equation and solve it. (8)

UNIT – II

3. (a) Dividing the range into ten equal parts, find the approximate value of $\int_0^{\pi} \sin x \, dx$

   by

   (i) Trapezoidal rule. (ii) Simpson's rule. (8)

(b) Given the value :

x:	14	17	31	35
f(x):	68·7	64·0	44·0	39·1

Find the value of f(x) corresponding to $x = 27$ by Lagrange's interpolation . (7)

(OR)

4. (a) Find $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ at $x = 1{\cdot}05$ from the table

x:	1·00	1·05	1·10	1·15	1·20	1·25	1·30
y:	1·00000	1·02470	1·04881	1·07238	1·09544	1·11803	1·14017

(8)

(b) Find the value of Cos 51°42′ by Gauss' backward formula, given that

x:	50°	51°	52°	53°	54°
Cos x:	0·6428	0·6293	0·6157	0·6018	0·5878

(7)

UNIT – III

5. (a) Find the real root of the equation $x^3 + x^2 - 100 = 0$ correct to three decimal places, by iteration method. (8)

(b) Determine the root of $xe^x - 3 = 0$ correct to three decimal places, using the method of false position. (7)

(OR)

6. (a) Solve by Gauss-Jordan method the equations :

$2x + y + 4z = 12.$

$8x - 3y + 2z = 20.$

$4x + 11y - z = 33.$ (7)

(b) Using Crout's method, solve the system of equations :

$2x - 6y + 8z = 24.$

$5x + 4y - 3z = 2.$

$3x + y + 2z = 16.$ (8)

UNIT - IV

7. (a) Solve by Euler's method, $y' = -y$ given $y(0) = 1$ and find $y(0{\cdot}04)$. (7)

   (b) Solve numerically, using Milne's method :

   $$y' = \frac{1}{x + y}, \; y(0) = 2.$$

   Given that $y(0{\cdot}2) = 2{\cdot}0933$, $y(0{\cdot}4) = 2{\cdot}1755$, $y(0{\cdot}6) = 2{\cdot}2493$. Find the values of $y(0{\cdot}8)$ and $y(1{\cdot}0)$. (8)

(OR)

8. (a) Tabulate by Runge-Kuta method the numerical solution of $\frac{dy}{dx} = 1 + y^2$, with $y(0) = 0$, and the step size $h = 0{\cdot}2$ for $x = 0, 0{\cdot}2, 0{\cdot}4, 0{\cdot}6, 0{\cdot}8, 1{\cdot}0$. (8)

   (b) Use Taylor series solution to solve numerically $\frac{dy}{dx} = x^2 - y$, $y'(0) = 1$. Tabulate y for $x = 0{\cdot}1, 0{\cdot}2, 0{\cdot}3, 0{\cdot}4$. (7)

UNIT - V

9. Solve the equation $U_{xx} + U_{yy} = 0$ for the following square mesh with the boundary values as shown in figure-1. (15)

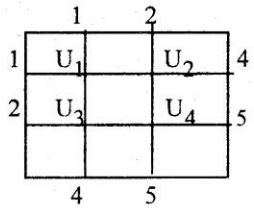

Figure- 1

(OR)

10. Find the solution of the parabolic equation $\frac{\partial^2 u}{\partial x^2} - 2\frac{\partial u}{\partial t} = 0$

    whene $u(0, t) = 0$. $u(4, t) = 0$, $u(x, 0) = x(4 - x)$. Assume $h = 1$. Find the values upto $t = 5$. (15)

Register Number:

Name of the Candidate:

3388

B.E. DEGREE EXAMINATION, 2014

(CIVIL ENGINEERING)

(FIFTH SEMESTER)

PCLEC-501 COMPUTER PROGRAMMING

(For those who have joined from 2011-12 batch and later)

November] [Time : 3 Hours

Maximum : 75 Marks

Answer any ONE FULL question from each UNIT **(5 × 15= 75)**

UNIT-I

1. Explain the methods for initialization of variables.
2. What are different operators available in C? Explain with examples.

UNIT-II

3. Describe the looping statements in C with examples.
4. Explain the following conditional statements (a) Nested –if-else statement (b) Switch-case statement.

UNIT-III

5. Explain the categories of functions in a detailed fashion.
6. Why register storage class does not support all data types? State the limitations of register variables.

UNIT-IV

7. Explain the need for array variables. Describe the following with respect to arrays: Declaration of array, Two-dimensional array and accessing an array element.
8. Write a function using pointers to multiply two matrices and to return the resultant matrix to the calling function.

UNIT-V

9. Write a program to determine shear force at any section for simply supported beam with a point load acting at the centre. Assume point load as W and length as L.
10. How to determine the inverse of a matrix 3×3 using C.

Register Number :

Name of the Candidate :

3124

B.E. DEGREE EXAMINATION, 2014

(CIVIL ENGINEERING)

(FIFTH SEMESTER)

CLEC-502 / PCLEC-102. SURVEYING - II

November] [Time : 3 Hours

Maximum : 75 Marks

(Maximum 60 Marks for those who joined before 2011-12)

Answer any ONE FULL question from each unit.
Each FULL question carries FIFTEEN marks.

UNIT – I

1. (a) Explain the basic principle of Tachometry. (8)

   (b) Differentiate between the fixed hair method and the movable hair method of tachometry. (7)

(OR)

2. Draw a neat sketch and describe the construction of a box sextant. Describe the procedure for testing and adjusting a box sextant. (15)

UNIT - II

3. Describe the different methods of setting out a right angle at a point on a chain line using chain only. (15)

(OR)

4. (a) Explain the term compound curve and its use. (7)

   (b) Describe how consistency in linear and angular measurements can be achieved. (8)

UNIT - III

5. Explain the concept of order of triangulation and the specifications for different orders of trangulation. (15)

(OR)

6. (a) Explain the method used to decide the intervisibility of stations. (7)

(b) Describe briefly the corrections to be made to field measurements with a tape. (8)

UNIT - IV

7. (a) Explain the concept of weight measurement. (7)

(b) Write a short note on systematic error and accidential error. (8)

(OR)

8. State and prove the principle of least squares. (15)

UNIT - V

9. Find the local sidereal time at a place of longitude 68° 40′ E and the local mean time is 22 h 40 m and the GST of GMN is 5 h 38 m. (15)

(OR)

10. Explain in detail extra-meridian observation of Sun. (15)

Register Number :

Name of the Candidate :

3125

B.E. DEGREE EXAMINATION, 2014

(CIVIL ENGINEERING)

(FIFTH SEMESTER)

CLEC-503 / PCLEC-105. STRUCTURAL MECHANICS - I

November] [Time : 3 Hours

Maximum : 75 Marks

(Maximum 60 Marks for those who joined before 2011-12)

Answer any ONE FULL question from each unit.
ALL questions carry EQUAL marks.

UNIT – I

1. A beam AB of span L is fixed at both ends and carries a point load 'W' at its centre. The moment of inertia of first half portion of the beam is 2I and that of the next half is I. Compute the fixed end moment by using column analogy method.

(OR)

2. A continuous beam ABCD consists of three spans AB = BC = CD = 6 m. The end A is fixed and D is simply supported. Span AB is subjected to a *udl* of 5 kN/m. A concentrated load of 20 kN acts at the centre of the span BC and a load of 30 kN acts at 4 m from the end D. Determine th shear force and bending moment at the supports and draw the shear force diagram and bending moment diagram. Adopt Theorem of three moments method.

UNIT - II

3. Five point loads 8 kN, 8 kN. 15 kN, 15 kN and 9 kN spaced at 7 m 8 m, 7 m and 6 m in order to cross a girder of 80 m span from left to right with 8 kN load leading. Calculate the maximum bending moment at 30 m from left hand support and also, the position and amount of maximum bending moment anywhere in the girder.

(OR)

4. Draw the influence line for bending moment at the midpoint D of the span AB of a continuous beam ABC shown in figure-1. Determine the influence line ordination at every quarter of each span and plot the same.

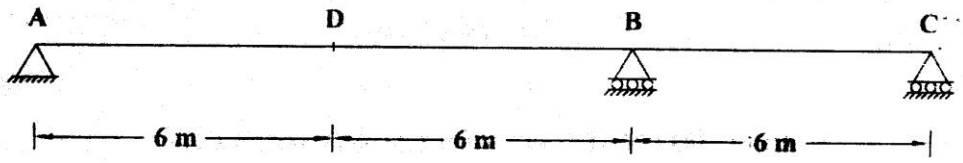

Figure - 1.

UNIT - III

5. A three hinged parabolic arched rib ACB with supports at different levels. It has a horizontal span of 15 m, the hinge at the crown 'C' being 6 m horizontally from A and 2 m vertically above it. Calculate the difference between levels of the supports at A and B. The arch carries a uniform load of 15 kN/m horizontally from A to C. Calculate the horizontal thrust of the arch and the position and amount of maximum negative bending moment.

(OR)

6. A parabolic arch hinged at the ends has a span of 60 m and a rise of 12 m. A concentrated load of 8 kN acts at 15 m from the left hinge. The second moment of area varies as the secant of the inclination of the arch axis. Calcualte the horizontal thrust and the reactions at the hinges. Also, calculate the maximum negative bending moment.

UNIT - IV

7. A cable of horizontal span 21 m is to be used to support six equal loads of 40 kN each at 3 m spacing. The central dip of the cable is limited to 2 m. Find :
   (a) The length of the cable. (b) The maximum tension in the cable.
   (c) The cross-sectional area of the cable, if the safe tensile stress is limited to 750 N/mm^2.

(OR)

8. A supsension bridge of 100 m span has two three hinged stiffening girders supporte by two cables with a central dip of 10 m. If three point loads of 20 kN each are placed along the centre line of the roadway at 10, 15 and 20 m from the left hand hing, find the shear force and bending moment in each girder at 30 m from each end. Calculate the maximum tension in the cable.

UNIT - V

9. Analyse the continuous beam as shown in figure-2, by moment distribution method. Draw the shear force and bending moment diagram.

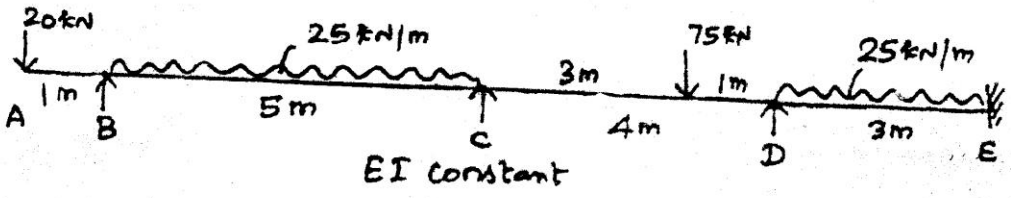

Figure-2.

(OR)

10. Analyse the portal frame ABCD and draw the bending moment diagram by adopting moment distribution method. The ends A and D are fixed. The horizontal member BC is 6 m. It subjected to a uniformly distributed load of 10 kN/m with moment of inertia as '2I'. The vertical members AB and CD are having 4 m length and moment of inertia is 'I". The frame is subjected to also, a lateral load of 30 kN at B acting from left to right.

Register Number :

Name of the Candidate :

3 1 2 6

B.E. DEGREE EXAMINATION, 2014

(CIVIL ENGINEERING)

(FIFTH SEMESTER)

CLEC- 504 / PCLEC- 302. SOIL MECHANICS

November] [Time : 3 Hours

Maximum : 75 Marks

(Maximum 60 Marks for those who joined before 2011-12)

Answer any ONE FULL question from each unit.
ALL questions carry EQUAL marks.

UNIT – I

1. (a) A fire grained soil has liquid limit of 60% plastic limit of 26%, classify the soil as per IS classification system. (7)

   (b) Discuss various methods available for field compaction. (8)

(OR)

2. (a) Derive the relationship $S.e = \omega G$. from the fundamental principles. (7)

   (b) Derive the relationship $\gamma_d = \frac{\gamma}{1+\omega}$ from fundamental principles. (8)

UNIT – II

3. Explain the factors affecting permeability of soil and expalin in detail the constant head permeability test. (15)

(OR)

4. (a) What is flow net? Describe the method used to construct the flow net. (10)

   (b) What is soil suction? How is it measured? What are the factors that affect soil suction? (5)

UNIT – III

5. A rectangular foundation 3·0 m × 1·5 m carries a uniform load of 40 kN/m^2. Determine the vertical stress at 'P' which is 3 m below the ground surface (refer the figure-1). Use equivalent point load method. (15)

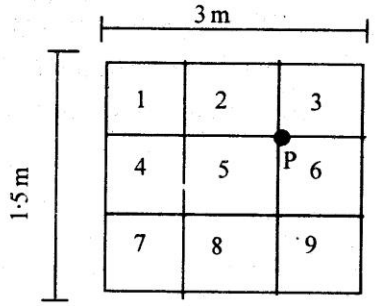

Figure -1

(OR)

6. Discuss the Terzaghi's theory of consolidation. Stating the various assumptions and their validity. (15)

UNIT - IV

7. What is Mohr's strength theory for soil? Derive the expression relating major and minor principal stresses and shear strength parameters of soil. (15)

(OR)

8. Explain the direct shear test in detail. (15)

UNIT - V

9. A retaining wall 6 m high, with vertical back, supports a cohesive backfill having unit weight = 19 kN/m^3, apparent cohesion = 26 kN/m^2 and angle of internal friction zero. Calculate :

   (a) Internal pressure intensity at the top of the wall.

   (b) Depth of tension cracks and

   (c) Lateral pressure intensity at the base. (15)

(OR)

10. Discuss friction circle method for stability analysis of slope. (15)

Register Number :

Name of the Candidate :

3128

B.E. DEGREE EXAMINATION, 2014

(CIVIL ENGINEERING)

(FIFTH SEMESTER)

CLEC-505. STRUCTURAL ENGINEERING - II

November] [Time : 3 Hours

Maximum : 75 Marks

(Maximum 60 Marks for those who joined before 2011-12)

Answer any ONE FULL question from each unit.
USE of IS 456-2000, IS 800-2007: SP :7-1983, SP: 16-1980 are permitted.
ALL questions carry EQUAL marks.

UNIT – I

1. Design the beam for the mid-span of the four storey frame using substitution frame method which are spaced at 4·5 metres center to center having a live load of 3 kN/m^2 and dead load of 3 kN/m^2 on the frame. The frame consists of three spans of 5m, 3·5 m, 2 m and a height of 3 m each and the size of the column is 450 × 300 mm and that of beam is 300 × 450 mm respectively. Adopt M-20 grade concrete and Fe-415 steel. The unit weight of concrete may be taken as 25 kN/m^2 and assume suitable data if required. (15)

(OR)

2. Analyse the two storey frame using portal or cantilever method which are spaced at 3 metres center to center having a horizontal load of 200 kN and 180 kN at first and second storey. The frame consists of three spans of 6 m, 3 m, 4 m and a height of 3 m each and assume suitable data, if required. (15)

UNIT - II

3. Design the stem of a cantilever type retaining wall for the following data :
   (a) Height of wall above ground = 3m
   (b) Depth of foundation = 1 m below G.L.
   (c) Unit weight of earth fill = 18 kN/m^3.

(d) Safe bearing capacity of soil = 100 kN/m^2.

(e) Co-efficient of friction = 0·5.

(f) Angle of internal friction = 30°.

(g) Concrete grade = M-20.

(h) Steel grade = Fe-415. (15)

(OR)

4. Design the counter fort for a retaining wall based on the following data :

(a) Height of wall ground = 8 m

(b) Spacing of counter forts = 2 m c/c.

(c) Depth of foundation = 1·5 m.

(d) Unit weight of earth fill = 18 kN/m^3.

(e) Safe bearing capacity of soil = 200 kN/m^2.

(f) Co-efficient of friction = 0·55.

(g) Angle of internal friction = 30°.

(h) Concrete grade = M-20.

(i) Steel grade = Fe-415. (15)

UNIT - III

5. Design the base slab of a circular water tank with domical top for a capacity of 200,000 litres and the depth of water is to be 4 m with a free board of 0·20 m. The tank is supported by a masonary staging of 1·5 m height above ground level. Adopt M-20 grade concrete and Fe-415 steel. (15)

(OR)

6. Design the dome of an Intze type water tank of capacity 100 kl of water supported on an elevated tower comprising of 12 columns. The base of the tank is 12 m above ground level and the depth of foundation is 2 m below ground level. Adopt M-20 grade concrete and Fe-415 steel. (15)

UNIT - IV

7. Design the sidewall of a box culvert having inside dimension 4·5 m × 4·5 m and is subjected to a superimposed load of 15000 N/m^2 and a live load of 50000 N/m^2 from the top. Assume unit weight of the soil as 18000 N/m^3 and angle of repose 30°. Adopt M-20 grade concrete and Fe-415 steel. (15)

(OR)

8. Design a solid slab bridge for class-A loading for the following data :

   (a) Clear span = 5 m.

   (b) Clear width of roadways = 7·5 m.

   (c) Average thickness of wearing coat = 75 mm.

   Use M-20 mix. Take unit weight of concrete as 24000 N/m^3. Fe-415 grade steel. (15)

UNIT - V

9. Explain in detail about the various types of loads that act on an industrial roof trusses. (15)

(OR)

10. Design the rafter and purlin of a steel roof truss to suit the following data :

   (a) Span of truss = 15 m.

   (b) Type of truss = Fink truss.

   (c) Roof cover = Galvanized corrugated sheeting.

   (d) Materials = Rolled steel angles.

   (e) Spacing of roof truss = 4·5 m.

   (f) Wind pressure = 1·2 kN/m^2. (15)

Register Number :

Name of the Candidate :

3 1 2 9

B.E. DEGREE EXAMINATION, 2014

(CIVIL ENGINEERING)

(FIFTH SEMESTER)

CLE€-506. TRANSPORTATION ENGINEERING - II

November] [Time : 3 Hours

Maximum : 75 Marks

(Maximum 60 Marks for those who joined before 2011-12)

Answer any ONE FULL question from each unit.
ALL questions carry EQUAL marks.

UNIT – I

1. Write brief specifications of various components of track structure recommended for M.G system on Indian Railways. (15)

(OR)

2. Explain briefly about the compressed air brakes and vaccum brakes with neat sketches. (15)

UNIT - II

3. What is meant by a crossing? What are the essential requirements of a good crossing? Discuss various types of crosssings in use on Indian Railways. (15)

(OR)

4. What is the necessity of equipment in station yards? Enumerate the different equipments required on important station yards. (15)

UNIT - III

5. Briefly explain about the two operations involved in the drainage tunnel. (15)

(OR)

6. What are the materials generally used for a tunnel lining? Give a neat dimensional sketch of timber lining for a tunnel 6 m wide. Explain how this lining is actually erected. (15)

UNIT - IV

7. Give a typical cross section of a dock wall and explain the various aspects of construction. (15)

(OR)

8. Write short notes on the following :

(a) Staging method. (b) Tribars. (c) Break water. (5+5+5)

UNIT - V

9. Give a brief description of an all purpose dredge suitable for use in deep water. (15)

(OR)

10. Give typical cross-sections of the several standard types of quay walls and explain their construction. (15)

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3389

B.E. DEGREE EXAMINATION, 2014

(PART-TIME)

(CIVIL ENGINEERING)

(FIFTH SEMESTER)

PCLEC-504. IRRIGATION STRUCTURE AND WATER POWER ENGINEERING

November] [Time : 3 Hours

Maximum : 75 Marks

Answer any ONE FULL question from each unit **(5 × 15= 75)**
Use of IS 800-2007 and steel tables are permitted

UNIT-I

1. Explain in detail the design principles of Trapezoidal Notch Fall. (15)
2. What is meant by duty? Enumerate the factors affecting duty. (15)

UNIT-II

3. Briefly explain the salient features of Khosla's theory and how it is used in the design of permeable foundation. (15)
4. Briefly explain about the hydraulic design of the weir. (15)

UNIT-III

5. Describe the modes of failure and criteria for structural stability of gravity dams. (15)
6. Write short notes on the following terms: (3×5=15)
   a) Hydraulic failures.
   b) Seepage failures.
   c) Structural failures of the earthen dams.

UNIT-IV

7. What is meant by water-logging? What are its illeffects? Describe some anti-water – logging measures with suitable sketches. (15)
8. Write down the step by step procedure adopted for designing an unflumed sypron aqueduct. (15)

UNIT-V

9. What are the principal components of a hydro-electric scheme? Discuss the utility of each component. (15)
10. What is meant by canal regulation? What are the different canal regulation works? (15)

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B.E. DEGREE EXAMINATION, 2014

(PART-TIME)

(CIVIL ENGINEERING)

(FIFTH SEMESTER)

PCLEC-504. IRRIGATION STRUCTURE AND WATER POWER ENGINEERING

November] [Time : 3 Hours

Maximum : 75 Marks

Answer any ONE FULL question from each unit **(5 × 15= 75)**
Use of IS 800-2007 and steel tables are permitted

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