Register Number :

Name of the Candidate :

8 7 0 5

B.E. DEGREE EXAMINATION, 2011

(CIVIL ENGINEERING, CIVIL & STRUCTURAL ENGINEERING)

(FIFTH SEMESTER)

CLEC-501 / CSEC-501. NUMERICAL METHODS

(New Regulations)

(For the students joined during 2007-2008 and after)

May] [Time : 3 Hours

Maximum : 60 Marks

Answer any ONE FULL question from each unit.
Use of packet calculator is permitted.
Each question caries 12 marks.

Turn Over

UNIT – I

1. (a) Prove with the usual notations that

$$\mu = \frac{2+\Delta}{2\sqrt{1+\Delta}} = \sqrt{1+\frac{\delta^2}{4}}$$

(b) Solve $y_{n+2} - 4y_{n+1} + 3y_n = 5^n$.

2. (a) Prove with the usual notations that

$$1 + \mu^2 \delta^2 = \left(1+\frac{1}{2}\delta^2\right)^2.$$

(b) Form the Fibonacci difference equation and solve it.

UNIT – II

3. (a) Using Lagrange's formula, fit a polynomial to the data

x	0	1	3	4
y	–12	0	6	12

(b) Evaluate $\int_0^1 e^{-x}\,dx$ with 10 intervals by Simpson's methods.

4. (a) Find the maximum and minimum values of y from the table :

x	0	1	2	3	4	5
y	0	0·25	0	2·25	16	56·25

(b) Evaluate : $\int_0^6 \frac{dx}{1+x^2}$ by using

(i) Simpson's $\frac{1}{3}$ rule.

(ii) Simpson's $\frac{3}{8}$ rule.

UNIT – III

5. (a) Find the root of the equation $xe^x - 3 = 0$ that lies between 1 and 2 correct to 4 decimal places, using the method of false position.

(b) Solve the following system of equations by Gauss-Seidel method :

$$27x + 6y - z = 85$$

$$x + y + 54z = 110$$

$$6x + 15y + 2z = 72$$

6. (a) Solve : $2x^3 + x^2 - 2x - 1 = 0$ by Graffe's root squaring method.

   (b) Using Gauss-Jordan method, solve the following equations :

$$4x - y - z = -7$$

$$x - 5y + z = -10$$

$$x + 2y + 6z = 9$$

UNIT – IV

7. Using Runge-Kutta method of forth order, solve

$$\frac{dy}{dx} = \frac{y^2 - x^2}{y^2 + x^2}$$

with $y(0) = 1$

at $x = 0{\cdot}2,\ 0{\cdot}4$.

8. Determine the value of $y(0{\cdot}4)$ using Milne's method given $\frac{dy}{dx} = xy + y^2$, $y(0) = 1$; use Taylor series to get the values of $y(0{\cdot}1)$, $y(0{\cdot}2)$ and $y(0{\cdot}3)$

UNIT – V

9. Approximate the solution to the following elliptic partial differential equation

$$\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = e^{xy}(x^2 + y^2),$$

$$0 < x < 1,\ 0 < y < 1,\ u(0, y) = 1$$

$u(1, y) = e^y$, $0 \le y \le 1$ and $u(x, 0) = 1$,

$u(x, 1) = e^x$, $0 \le x \le 1$ using $h = k = \frac{1}{3}$.

10. Solve : $\frac{\partial^2 u}{\partial t^2} = 4\frac{\partial^2 u}{\partial x^2}$

with boundary conditions

$$u(0, t) = 0 = u(4, t),$$

$$ut(1, 0) = 0$$

and $u(x, 0) = x(4 - x)$.

10. a) Explain the term: hydraulic Jump.

b) A hydraulic jump forms at down stream end of a spillway carrying $18m^3/S$ discharge. If the depth before the jump is 0.8m, determine the depth after the jump and energy loss.

****

Register Number: **8699**

Name of the Candidate:

B.E. DEGREE EXAMINATION, 2011

(CIVIL ENGINEERING)

(FIFTH SEMESTER)

CLEC-501/PCLEC-103.FLUID MECHANICS
(Old Regulation)
(For the students joined during 2006-2007 and before)

May) (Time: 3 Hours

Maximum: 60 Marks

Answer any ONE FULL question from each unit
All questions carry equal marks

UNIT-I

1. a) Explain the terms:
   i) Dynamic viscosity
   ii) Kinematic viscosity
   b) Define the terms: i)Mass density
   ii) Weight density
   iii) Specific weight and
   iv) Specific volume (12)

2. a)Distinguish between
   i) Ideal fluids and real fluids
   ii) Compressible and incompressible fluids
   b) Explain the phenomenon of capillarity. Obtain an expression for the capillary rise of a liquid. (12)

UNIT-II

3. a) An inverted differential nanometer containing an oil of specific gravity 0.9 is connected to find the difference of pressure at two points of a pipe containing water. If the manometer reading is 40cm, find the difference of pressure.

   b) What do you under stand by total pressure and centre of pressure?

4. a) What are the conditions of equilibrium of a floating body and a submerged body?

   b) A rectangular pontoon is 5M long 3m wide, 1.2m height. The depth of immersion of the pontoon is 0.8m is sea water. If the centre of gravity is 0.6m above the bottom of the pontoon, determine the meta centre height. The density of sea water is $1025kg/m^3$.

UNIT-III

5. a) Define the terms: path line, stream line. Streak line and stream tube.
   b) A 30 cm diameter pipe conveying water branches into two pipes of diameter 20cm and 15am respectively. If the average velocity in the 30cm diameter pipe is 2.5m/S, find the discharge in this pipe. Also determine the velocity in 15cm diameter pipe if the average velocity in 20cm diameter pipe is 2m/S.

6. a) What is Eulers equation of motion? How will you obtain Bernoulli's equation from it?

   b) A Pipe, through which water is flowing is having diameters 20cm and 10cm at cross sections 1 and 2 respectively. The velocity of water at section 1 is given as 4m/S.Find the velocity head at sections 1 and 2 and also rate of discharge.

UNIT-IV

7. a) Define the terms: Hydraulic gradient line and total energy line.

   b) An old water supply distribution pipe of 250mm diameter of a city is to be replaced by two parallel pipes of smaller equal diameter having equal lengths and identical friction factors. Find out the new diameter required.

8. An oil of viscosity $0.1NS/m^2$ and relative density 0.9 is flowing through a circular pipe of diameter 50mm and length 300m. The rate of flow through the pipe is 3.5 litre per second. Find the pressure drop in a length of 300m and also the shear stress at the pipe wall.

UNIT-V

9. a) Explain the terms :
      i)Slope of the bed
      ii) Hydraulic mean depth
      iii) Wetted perimeter
   b) A trapezoidal channel has side slopes of 3 horizontal to 4 vertical and slope of its bed is 1 in 2000. Determine the optimum dimensions of the channel if its is to carry water at $0.5m^3/S$. Take Chezy's constant c as 80.

Register Number: **8700**

Name of the Candidate:

B.E. DEGREE EXAMINATION, 2011

(CIVIL ENGINEERING)

(FIFTH SEMESTER)

CLEC-502/PCLEC-102. SURVEYING-II

(Old Regulations)

(For the students joined during 2006-07 and before)

May] [Time : 3 Hours

Maximum : 60 Marks

Answer any one full Question from each unit

UNIT-I

1. Explain the object and theory of the anallatic lens.(12)

2. a) Derive the expression for horizontal and vertical distances in the fixed hair method, when the staff is held vertically and the measured angle is that of elevation. (6)

b) The following are the records of tacheometric survey:

Instrument station	Staff station	Bearings	Vertical angle	Hair readings
A	B	N 30°30′ E	+10°	1.250, 1.750, 2.250
B	C	S 40°0′ E	+5°	0.950, 1.750, 2.550
C	D	S 45°0′ W	+8°	1.550, 2.150, 2.750

Multiplying constant =100, and additive constant=0. Staff is held vertically. Calculate length and bearing of DA. (8)

UNIT-II

3. Describe the method for setting out a simple circular curve by using offsets from chord produced. (12)

4. Two tangents AB and BC intersect at B. Another line DE intersects AB and BC at D and E such that ∠AOE=130° and ∠DEC=160°. The radius of the first curve is 225m and that of the second is 350m. The chainage of B is 1045m. Compute all data necessary for setting out the compound curve. (12)

UNIT-III

5. Enlist various aspects to be considered while selecting site for baseline. Also, write about various corrections to be applied in base line measurements. (12)

6. The altitudes of two proposed station A and B, 80km apart are 275 and 600m respectively. The intervening obstruction situated at C, 40km from A has an elevation of 340m. Ascertain if A and B are inevitable, and if necessary, find how much B should be raised so that the line of sight must nowhere be less than 3 m above the surface of the ground. (12)

UNIT-IV

7. What is meant by weight of an observation and enumerate laws of weights giving examples. (12)

8. Determine the most probable values of A, B and C from the following observations.

Angle	Weight
A=61° 25′ 20″	3
B=52° 21′ 16″	3
B+C=82° 21′ 20″	2
A+B+C=143° 46′ 36″	2

(12)

UNIT-V

9. Explain briefly various system of coordinates employed to locate position of heavenly body. Why it is necessary to have several system instead of one. (12)

10. Write short notes on of the following: (3×4=12)
    (i) Equation of time
    (ii) Sidereal time
    (iii) Celestial sphere

Register Number: **8701**

Name of the Candidate:

B.E. DEGREE EXAMINATION, 2011

(CIVIL / CIVIL AND STRUCTURAL ENGINEERING)

(FIFTH SEMESTER)

CLEC-503/PCLEC-105/CSEC-504/PCSEC-303. STRUCTURAL MECHANICS-I

(Old Regulations)

(For the students joined during 2006-07 and before)

May] [Time : 3 Hours

Maximum : 60 Marks

Answer any one full Question from each unit

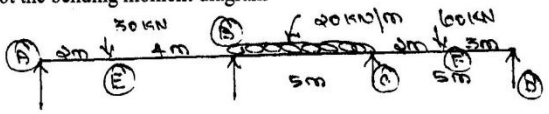
UNIT-I

1. A train of 5 wheels crosses a simply supported beam of span 22.5 m. Using influence lines. calculate the maximum positive and negative shear forces at mid span and absolute maximum bending moment anywhere in the span.

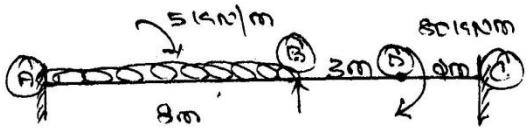
2. A beam ABC of uniform section. length 2L. is hinged at the supports at its centre and ends. Derive the equation to the influence lines for bending moment at the central support. Taking L = 4m, plot the influence line to indicating values at every quarter of each span.

UNIT-II

3. A continuous beam is loaded as shown in figure 1. Determine the bending moments at the supports and plot the bending moment diagram



4. A fixed beam is loaded as shown in figure 2. Determine the bending moments at the supports and plot the bending moment diagram.



UNIT-III

5. A three hinged arch of span 40 m and rise 8 m carries concentrated loads of 200 kN and 150 kN at distances of 8 m and 1 6 m from the left end and an UDL of 50 kN/m on the right half of the span. Find the horizontal thrust.

6. A parabolic arch hinged at the ends has a span of 60m 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. Calculate the horizontal thrust and the reactions at the hinge. Also calculate the net bending moment at the section.

UNIT-IV

7. A warren girder of 25 m span is made up of five panels of 5 m each. The diagonals are inclined at 60 degree to the horizontal. Draw the influence line for force in the lower chord member in the second panel from left. Hence, evaluate the force in it when there is a load of 100 kN at each lower joint.

8. A suspension cable is supported at 2 points 25 m apart. The left support is 2.5 m above the right support. The cable is loaded with a UDL of 10 kN/m throughout the span. The maximum dip in the cable from the left support is 4 m. Find the maximum and minimum tensions in the cable.

UNIT-V

9. A beam ABC 5.5 m long is fixed at A and simply supported at B 4 m from A. It carries a UDL. of 5kN/m on AB and a concentrated load of 6 kN on the overhang at a distance of 1 .10 m from B. Analyze the beam.

10. A symmetrical portal frame ABCD consists of columns AB and DC height 5 m and beam BC of length 5m. The beam carries a UDL 12 kN/m. If $I_{AB}=0.5\ I_{BC}=I_{CD}$. Find the moments at A. B. C and D and the reactions at the supports. Both the supports A and D are fixed.

Register Number :

Name of the Candidate :

8 7 0 9

B.E. DEGREE EXAMINATION, 2011

(PART - TIME)

(CIVIL ENGINEERING)

(FIFTH SEMESTER)

CLEC-505 / PCLEC-403.
STRUCTURAL ENGINEERING - II

(New Regulations)

(For the students joined during 2007-08 and after)

May] [Time : 3 Hours

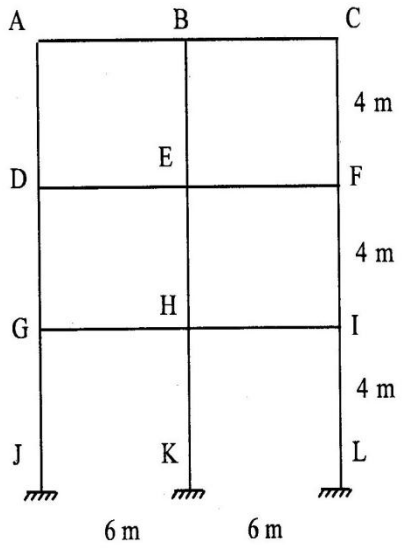
Maximum : 60 Marks

Answer any ONE full question from each unit.
All questions carry equal marks.

Turn Over

UNIT – I

1. In the frame shown in figure wind load transferred to joints A, D and G are 12,000 N, 24,000 N and 24,000 N respectively. Analyse the frame by portal method or cantilever method. Assume all the columns have the same cross sectional area.



2. Describe the methods of analysis of portal method and cantilever method and compare them with suitable sketches.

UNIT – II

3. Design a retaining wall to retain earth 4m above ground level. The angle of surcharge is 20° and the angle of internal friction of soil is 30°. Maximum allowable pressure on soil is 150 KN/m^2. Density of earth is 18,000 N/m^2; $\mu = 0{\cdot}65$.

4. Derive the active and passive earth pressure as per Rankine's theory. Desecribe the surcharge conditions with sketch.

UNIT – III

5. Design an underground rectangular water tank of 3m × 7m × 3m deep. The tank is covered at top. Bearing capacity of the soil is 120 KN/m^2 .

6. Design a circular water tank having diameter of 6m and height of 3 m. The tank is supported on masonry tower.

Turn Over

UNIT – IV

7. Design a slab bridge for the following data :

   Clear span = 5 m;

   Clear width of roadway = 6·8 m

   Live load – class A loading;

   Mix used M_{20}.

   Average thickness of wearing coat = 8cm.

8. Design a solid bridge for effective span of 6m. The clear roadway is 6·8m. The bridge is to be designed for class A and class AA loading.

UNIT – V

9. Design a steel roof truss for the given data. Span of the roof truss is 12m. Spacing of trusses is 4m. Slope of roof truss is 1:2. Wind load on roof truss = 1·0 KN/m^2 . Vertical load from roof sheeting = 0·200 KN/m^2 . Inclination of principal rafter = 30°.

10. Design a steel truss roof for a clear span of 8·6 m for a length of 7·0 m.

    Slope of the truss is 1:2.

    Wind load on roof truss = 1·0 KN/m^2.

    Vertical load from G.I. sheets = 0·250 KN/m^2

    .

Register Number :

Name of the Candidate :

8 7 0 8

B.E. DEGREE EXAMINATION, 2011

(CIVIL ENGINEERING)

(FIFTH SEMESTER)

CLEC-504. SOIL MECHANICS

(New Regulations)

(For the students joined during 2007-2008 and after)

May] [Time : 3 Hours

Maximum : 60 Marks

Answer ONE FULL question from each unit.

Assume any missing data.

All questions carry equal marks.

UNIT – I

1. What are the various methods of soil classification? Describe the Casagrande soil classification.

(OR)

Turn Over

2. Describe the types of rollers used to compact the earth fills. State their advantages and disadvantages.

UNIT – II

3. Explain briefly the procedure adopted to find the co-efficient of permeability of soil by using variable head permeameter method.

(OR)

4. The co-efficient of permeability of a soil at a void ratio of 0·7 is 4×10^{-4} cm/sec. Estimate its value at a void ratio of 0·50.

UNIT – III

5. What is an influence diagram? What is its use in practice?

(OR)

6. A clay soil tested in a consolidation, showed a decrease in void ratio from 1·20 to 1·10 when the pressure was increased from 0·25 to 0·5 kgf / cm^2. Calculate the Co-efficient of compressibility (a_v) and Co-efficient of volume compressibility (m_v).

UNIT – IV

7. Discuss briefly the direct shear test at un-drained condition.

(OR)

8. A cylindrical soil sample failed at an axial load of 140 kN/m^2 in an unconfined compression test. The failure plane makes an angle of 54° with horizontal. Determine the soil properties.

UNIT –V

9. What are the assumptions that are generally made in the analysis of the stability of slopes? Discuss briefly their validity.

(OR)

10. What is Taylor's stability number? How do you use the stability chart?