Register Number:

Name of the Candidate:

8804

B.E. DEGREE EXAMINATION, 2012

(CIVIL ENGINEERING)

(SIXTH SEMESTER)

CLEC-601/PCLEC-301. STATISTICS AND NUMERICAL METHODS

(APPLIED TO CIVIL ENGINEERING)

(Old Regulation)

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

May) (Time: 3 Hours

Maximum: 60 Marks
Answer any ONE question from each unit
Use of statistical tables is permitted
All questions carry equal marks

UNIT-I

1. The following are scores of two batsmen A and B in a series of innings:

A	12	115	6	73	7	19	119	36	84	29
B	47	12	16	42	4	51	37	48	13	0

Who is the better score getter and who is more consistent?

2. Find the co-efficient of correlation between industrial production and export using the following data and comment on the result.

Production (in crore tons)	55	56	58	59	60	60
Exports(in crore tons)	35	38	38	39	44	43

UNIT-II

3. A simply supported beam carries a concentrated load P(kg) at its mid point. Corresponding to various values of P, the maximum deflection y(m) is measured. The data are given below:

P	100	120	140	160	180	200
Y	0.45	0.55	0.60	0.70	0.80	0.85

Find a law of the form $y = a+bp$

4. A communication system consists of n components each of which will independently function with probability p. The total system will be also to operate effectively if atleast one half of its components function. For what values of p is a 5-component system more likely to operate effectively than a 3-component system?

UNIT-III

5. The velocity v is a particle at distances from a point on its path is given by the table:

s	0	10	20	30	40	50	60	meter
V	47	58	64	65	61	52	38	meter/min

Estimate the time taken to travel 60 meters by using Simpson's one third rule. Compare the result with Simpson's $\frac{3}{8}$ rule.

6. A beam of length L and of uniform flexural rigidity EI is freely supported at its ends. The beam carries a uniformly distributed load of intensity ωkN/m over its entire span length. Determine the deflections at centre of span using six segments and adopting Newmark's method.

UNIT-IV

7. A beam of length L supports a uniformly distributed load of intensity ωkN/m. Calculate the maximum moment and deflection in the beam. Assume EI as constant.

8. Estimate the largest buckling load of a uniform pin-ended column of length L and flexural rigidity EI, using three subintervals.

UNIT-V

9. Solve the following LPP by simplex method:
Maximize $z = x_1 - 3x_2 + 3x_3$
Subject to $3x_1 - x_2 + 2x_3 \leq 7$
$2x_1 + 4x_2 \geq -12$
$-4x_1 + 3x_2 + 8x_3 \leq 10$
$x_1, x_2, x_3 \geq 0$

10. Using graphical method, solve the following LPP:
Maximize $z = 2x_1 + 3x_2$
Subject to $x_1 - x_2 \leq 2$
$x_1 + x_2 \geq 4$
$x_1, x_2 \geq 0$

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Register Number :

Name of the Candidate :

8 8 1 1

B.E. DEGREE EXAMINATION, 2012

(CIVIL ENGINEERING)

(SIXTH SEMESTER)

CLEC - 605.
ENVIRONMENTAL ENGINEERING - I

(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.

UNIT - I

1. What is meant by variation in the rate of demand? What are the effects of these variations on the design of various units of a water supply scheme? (12)

(OR)

Turn over

2. Write short notes on :

   (a) Objectives of public water supply schemes. (6)

   (b) Provisions of "fire demand" in water supply. (6)

UNIT - II

3. What are the causes for pollution of surface and subsurface sources of water? State the measures to be adopted to prevent pollution of water. (12)

(OR)

4. Explain briefly infiltration galleries with neat sketch. (12)

UNIT - III

5. Discuss briefly the R.C.C pipes and enumerate their advantages and disadvantages. (12)

(OR)

6. Sketch and explain the importance and functioning of gate valves, reflux valves and manholes. (12)

UNIT - IV

7. Discuss the construction procedure of the following :

   (a) Flocculation tank. (6)

   (b) Mixing basins with baffle walls. (6)

(OR)

8. Enumerate the types of filters. Discuss the construction, cleaning and operation of rapid gravity filters with neat sketch. (12)

UNIT - V

9. What do you understand by continuous and intemittent systems of water supply? What are their relative advantages and disadvantages?(12)

(OR)

10. Explain in detail, the Hardy-Cross method of pipe network analysis. (12)

Register Number :

Name of the Candidate :

8 8 1 2

B.E. DEGREE EXAMINATION, 2012

(CIVIL ENGINEERING)

(SIXTH SEMESTER)

CLEC-606/PCEC-601. CONSTRUCTION TECHNIQUES AND MANAGEMENT

(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.

UNIT – I

1. Explain in detail various modern methods of on site construction.
2. Explain the concept of transportation and erection of precast units.

Turn Over

UNIT – II

3. Explain the following construction equipments :

   (a) Belt conveyors.

   (b) Wire ropes.

   (c) Hoists.

4. Explain the modern construction techniques used for systems for housing.

UNIT – III

5. Explain the types of contract in detail.

6. Explain the objectives and functions of construction management.

UNIT – IV

7. (a) Explain with a suitable example the construction of bar chart.

   (b) What is network diagram? Explain briefly.

8. (a) Explain the concept of slack and critical path.

   (b) Explain briefly the time estimates.

UNIT – V

9. The network for a certain project is shown in figure-1. Determine the expected time for each of the path. Also, find the critical path.

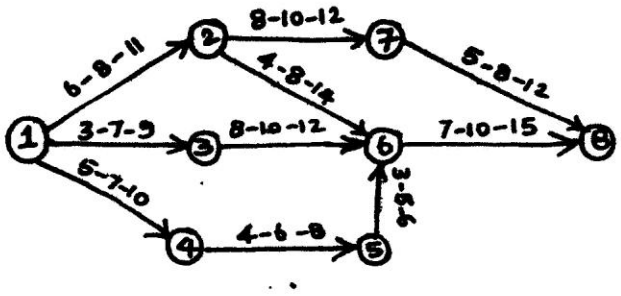


Figure - 1

10. Table shows information regarding various activities of network shown in figure-2.

Activity	Normal Duration (days)	Normal cost (₹)	Crash duration (days)	Crash cost (₹)
1-2	9	8,000	6	9,500
2-3	5	5,000	3	5,500

The project overhead costs are ₹ 300 per day.

Turn Over

Determine.

(i) Direct cost – duration relationship.

(ii) Total cost – duration relationship

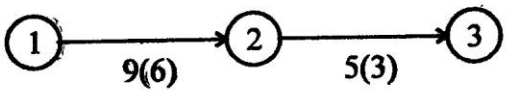


Figure - 2

Register Number :

Name of the Candidate :

8805

B.E. DEGREE EXAMINATION, 2012

(CIVIL ENGINEERING)

(SIXTH SEMESTER)

CLEC -602 / PCLEC - 202.
HYDRAULICS AND
HYDRAULIC MACHINERY

(Old & New Regulations)

May] [Time : 3 Hours

Maximum : 60 Marks

Answer any ONE FULL question from each Unit.
ALL questions carry equal marks.

UNIT - I

1. (a) Derive the equation for gradually varied flow. (6)

   (b) Find the slope of the free water surface in a rectangular channel of width 20 m having depth of flow 5 m. The discharge through the channel is 50 m^3/s. The bed of the channel is

Turn over

having a slope of 1 in 4,000. Take the value of Chezy's constant C = 60. (6)

(OR)

2. (a) State Buckingham's π - theorem. (2)

(b) The efficiency η of a fan depends on density ρ, dynamic viscosity μ of the fluid, angular velocity ω, diameer D of the rotor and the discharge Q. Express η in terms of dimensionless parameters. (10)

UNIT - II

3. A jet of water of diameter 7·5 cm strikes a curved plate at its centre with a velocity of 20 m/s. The curved plate is moving with a velocity of 8 m/s in the direction of the jet. The jet is deflected through an angle of 165°. Assuming the plate smooth, find

(a) Force exerted on the plate in the direction of jet.

(b) Power of the jet.

(c) Efficiency of the jet. (12)

(OR)

4. A jet of water having a velocity of 35 m/s impinges on a series of vanes moving with a velocity of 20 m/s. The jet makes an angle of 30° to the direction of motion of vanes when entering and leaves at an angle of 120°. Draw the triangles of velocities at inlet and outlet and find :

   (a) The angles of vanes tips so that water enters and leaves without shock.

   (b) The workdone per unit weight of water entering the vanes

   and (c) The efficiency. (12)

UNIT - III

5. The internal and external diameter of an outward flow reaction turbine are 2 m and 2·75 m respectively. The turbine is running a 250 *rpm* and rate of flow of water through the turbine is 5 m^3/s. The width of the runner is constant at inlet and outlet and is equal to 250 mm. The head on the turbine is 150 m. Neglecting thickness of the vanes and taking discharge radial at outlet,

determine:

(a) Vane angle at inlet and outlet.

(b) Velocity of flow at inlet and outlet.(12)

(OR)

6. A Kaplan turbine working under a head of 20 m develops 11,772 KW shaft power. The outer diameter of the runner is 3·5 m and hub diameter 1·75 m. The guide blade angle at the extreme edge of the runner is 35°. The hydraulic and overall efficiencies of the turbines are 88% and 84% respectively. If the velocity of whirl is zero at outlet, determine :

(a) Runner vane angles at inlet and outlet at the extreme edge of the runner.

(b) Speed of the turbine. (12)

UNIT - IV

7. A centrifugal pump with 1·2 m diameter runs at 200 rpm and pumps 1,880 litres/s, the average lift being 6 m. The angle which the vanes make at exit with the tangent to the impeller is 26° and the radial velocity of flow is 2·5 m/s. Detemine the

manometric efficiency and the least speed to start pumping against a head of 6 m, the inner diameter of the impeller being 0·6 m. (12)

(OR)

8. The diameter of a centrifugal pump, which is discharging 0·03 m^3/s of water against a total head of 20 m is 0·4 m. The pump is running at 1,450 *rpm*. Find the head, discharge and ratio of powers of a geometrically similar pump of diameter 0·25 m when it is running at 2,500 *rpm*. (12)

UNIT - V

9. A single acting reciprocating pump has a stroke length of 15 cm. The suction pipe is 7 m long and the ratio of the suction diameter to the plunger diameter is 3/4. The water level in the sump is 2·5 m below the axis of the pump cylinder, and the pipe containing the sump and pump cylinder is 7·5 cm diameter. If the crank is running at 75 *rpm*, determine the pressure head on the pistion :

   (a) In the beginning of the suction stroke.

   (b) In the end of the suction stroke

   and (c) In the middle of the suction stroke.

   Take co-efficient of friction as 0·01. (12)

(OR)

10. Derive an expression for the head lost due to friction in the delivery pipe of a reciprocating pump with and without an air vessel. (12)

Register Number :

Name of the Candidate :

8 8 1 0

B.E. DEGREE EXAMINATION, 2012

(CIVIL ENGINEERING)

(SIXTH SEMESTER)

CLEC - 601. HYDROLOGY

(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.

UNIT - I

1. Explain with the help of a neat sketch, the hydrological cycle with its various components. (12)

(OR)

2. Define air mass and air front. Discuss the characteristics of cold air and warm air mass.(12)

Turn over

UNIT - II

3. Describe the working principle of a non-recording type rain gauge with neat sketch, mentioning its advantages and disadvantages. (12)

(OR)

4. How precipitation is measured? Discuss the three methods which convert the point precipitation to areal precipitation and comment on the best method. (12)

UNIT - III

5. With the help of conceptual sketch, differentiate between infiltration and percolation state, how infiltration is measured in field. (12)

(OR)

6. State any four factors affecting evaporation. Also, state any four measures to control the evaporation. (12)

UNIT - IV

7. With the help of typical hydrographs, describe the salient features of

   (a) Perinnial.

   (b) Intermittent

   and (c) Epithermal steams. (12)

(OR)

8. What do you understand by unit hydrograph? Explain how it is used in construction of flood hydrograph using two or more periods of rainfall data. (12)

UNIT - V

9. Derive the Muskingum routing equation and the expression for the routing co-efficients C_0, C_1 and C_2. (12)

(OR)

10. Describe the method of estimating a T_r -year flood using Gumbels method of distribution. (12)

Register Number :

Name of the Candidate :

8811

B.E. DEGREE EXAMINATION, 2012

(CIVIL ENGINEERING)

(SIXTH SEMESTER)

CLEC - 605.
ENVIRONMENTAL ENGINEERING - I

(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.

UNIT - I

1. What is meant by variation in the rate of demand? What are the effects of these variations on the design of various units of a water supply scheme? (12)

(OR)

Turn over

2. Write short notes on :

   (a) Objectives of public water supply schemes. (6)

   (b) Provisions of "fire demand" in water supply. (6)

UNIT - II

3. What are the causes for pollution of surface and subsurface sources of water? State the measures to be adopted to prevent pollution of water. (12)

(OR)

4. Explain briefly infiltration galleries with neat sketch. (12)

UNIT - III

5. Discuss briefly the R.C.C pipes and enumerate their advantages and disadvantages. (12)

(OR)

6. Sketch and explain the importance and functioning of gate valves, reflux valves and manholes. (12)

UNIT - IV

7. Discuss the construction procedure of the following:

   (a) Flocculation tank. (6)

   (b) Mixing basins with baffle walls. (6)

(OR)

8. Enumerate the types of filters. Discuss the construction, cleaning and operation of rapid gravity filters with neat sketch. (12)

UNIT - V

9. What do you understand by continuous and intemittent systems of water supply? What are their relative advantages and disadvantages?(12)

(OR)

10. Explain in detail, the Hardy-Cross method of pipe network analysis. (12)

Register Number :

Name of the Candidate :

8807

B.E. DEGREE EXAMINATION, 2012

(CIVIL ENGINEERING)

(SIXTH SEMESTER)

CLEC - 604 / PCLEC -503.
SUB STRUCTURE DESIGN

(Old & New Regulations)

May] [Time : 3 Hours

Maximum : 60 Marks

Answer any ONE FULL question from each Unit.
ALL questions carry equal marks.

UNIT - I

1. What are the factors that influence the bearing capacity and explain the bearing capacity of shallow foundations with bearing pressures. (12)

(OR)

Turn over

2. Explain the types of shallow foundations. (12)

UNIT - II

3. (a) Explain soil samples and samplers. (6)

   (b) Explain the process of exploration. (6)

(OR)

4. (a) Explain settlement of footing. (6)

   (b) Explain the field tests for determination of bearing capacity. (6)

UNIT - III

5. (a) Explain Coulomb theories. (6)

   (b) Design a gravity retaining wall, 5 m high with vertical back to retain a dry cohesionless backfill of unit weight 18 KN/m^3 and angle of shearing resistance 30°. Find the factor of safety against sliding by assuming the angle of friction between the base of the wall and the foundation soil as 30°. The wall is to be 1 m wide at weight 20 KN/m^3. Use Rankine's theory. (6)

(OR)

6. Derive the expression of minimum depth of foundation by Rankine analysis. (12)

UNIT - IV

7. (a) Explain pile load test. (6)

   (b) Write the consideration leading to selection of piles. (6)

(OR)

8. Explain the types of piles with neat sketch and also, explain pile drilling and load carrying capacity of piles. (12)

UNIT - V

9. Explain in detail the construction and use of under- reamed pile foundations. (12)

(OR)

10. Explain the principles of design and construction for Caissons well foundation and Coffer dams. (12)

Register Number :

Name of the Candidate :

8 8 0 6

B.E. DEGREE EXAMINATION, 2012

(CIVIL ENGINEERING)

(SIXTH SEMESTER)

CLEC-603 / CSEC-602 / PCLEC-205 / PCSEC-504/ PCLEC-303. STRUCTURAL MECHANICS - II

(Old & New Regulations)

May] [Time : 3 Hours

Maximum : 60 Marks

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

UNIT – I

1. (a) Analyse the continous beam loaded as shown in Figure – 1 by slope deflection method.

$E = 2 \times 10^5$ N/mm^2) $I = 16 \times 10^7$mm^4.

Sketch the BMD.

Turn Over

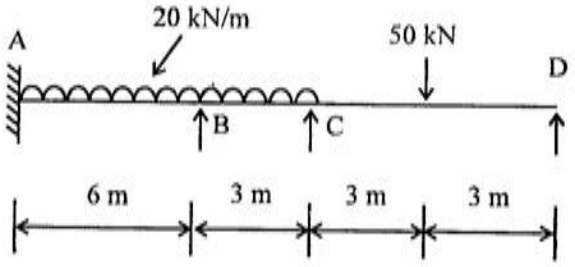


Figure - 1

(OR)

2. Analyse the portal frame shown in figure – 2 by consistant – deformation method and sketch the BMD and SFD.

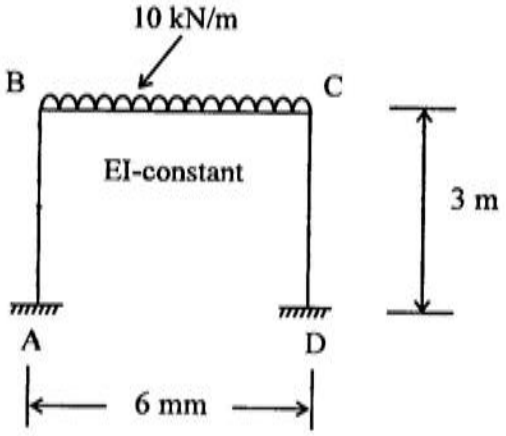


Figure - 2

UNIT – II

3. Analyse the continuous beam shown in figure – 3 by the strain energy method.

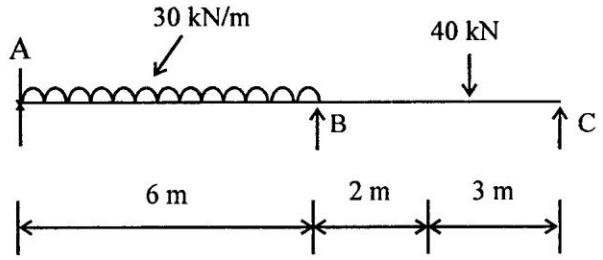


Figure – 3

(OR)

4. Analyse the structure shown in figure – 4 by the strain energy method. Sketch the BMD.

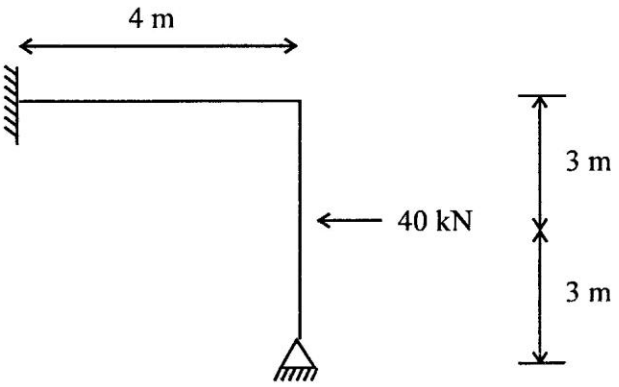


Figure – 4

Turn Over

UNIT - III

5. Using the matrix flexibility method analyse the truss loaded as shown in figure – 5 and find the member forces. 'A' and 'E' are the same for all members.

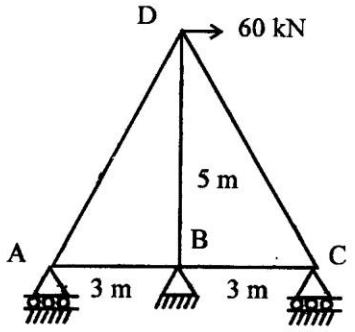


Figure - 5

(OR)

6. Analyse the frame shown in figure – 6 by the matrix flexibility method.

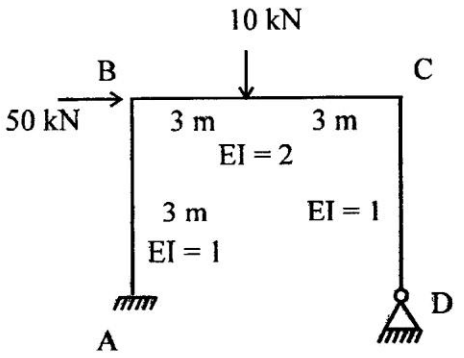


Figure - 6

UNIT – IV

7. Analyse the continous beam shown in figure – 7 by stiffness method. Draw the BMD.

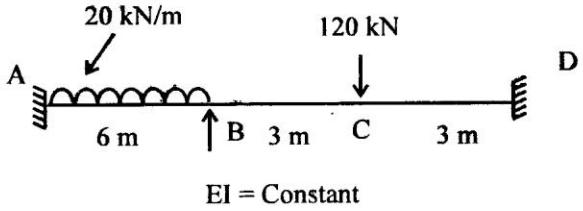


Figure – 7

(OR)

8. Analyse the frame shown in figure – 8 by stiffness method. Draw the BMD.

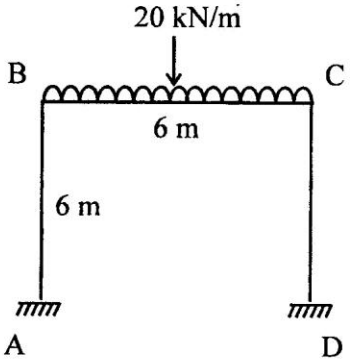


Figure – 8

UNIT – V

9. The member BE was last to be fitted in the truss as shown in figure – 9. While fitting, it was observed that the member was 1 mm longer than the required length. Find the forces developed in all the members of the truss due to forcing the member BE into position. The following particulars are given.

7

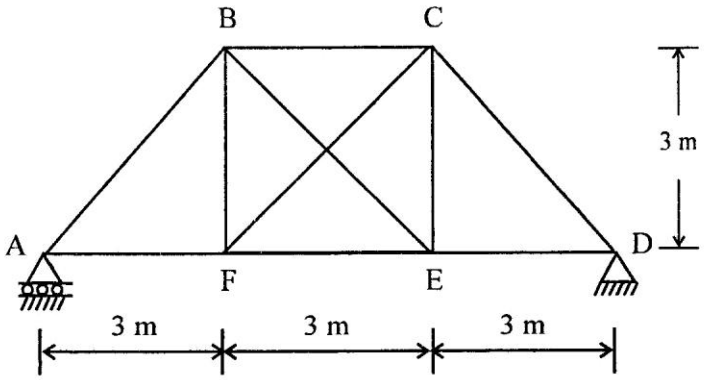


Figure – 9

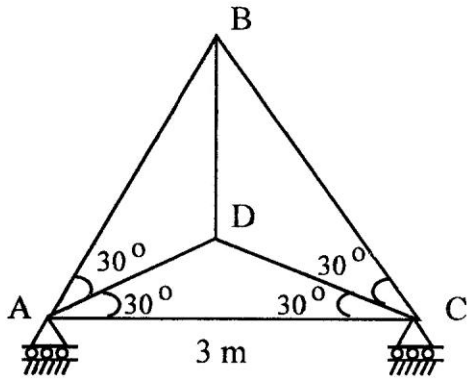
Area of all members = 4000 mm^2

E = 2×10^5 N / mm^2.

(OR)

Turn Over

10. Find the forces developed in all the members of the truss shown in figure–10, if the temperature of member AC goes by $20^{\circ}C$, Take the co-efficient of thermal expansion $\alpha = 12 \times 10^{-6}/^{\circ}C$. cross sectional area of members is 2500 mm^2 and $E = 2 \times 10^5$ N / mm^2.



Figure–10