Register Number :

Name of the Candidate :

3187

B.E. DEGREE EXAMINATION, 2014

(CIVIL ENGINEERING)

(SIXTH SEMESTER)

CLEC-601 / PCLEC-304. HYDROLOGY

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) What are the practical applications of hydrology? Explain them. (8)

   (b) Discuss the statement 'cyclic hydrological turn-over cannot be increased.' (7)

(OR)

2. (a) Describe the hydrologic cycle in nature. (8)

   (b) Enumerate the factors affecting the climate. (7)

UNIT - II

3. (a) What are the different forms of precipitation? Which of them are of significance to a Civil Engineer? (5)

   (b) A two hour rainfall in a catchment of 1000 hectare. The rate of rainfall is tabulated below : (10)

Time duration (minutes):	0-40	40-60	60-80	80-100	100-120
Rate of rainfall (cm/hr)	2·0	2·5	6·5	12·0	4·0

If the value of ϕ - index is 3·0 cm/hr, find out :

(i) Total value of surface run-off. (ii) Total rain fall. (iii) The W-index,

(OR)

4. (a) How will you optimise the number of rain gauge stations? (7)

   (b) Enumeraate the climate and weather seasons in India. Also, bring out the adverse conditions of the above with a special reference to Tamil Nadu. (8)

UNIT - III

5. (a) Describe the factors affecting evaporation. Also, bringout the methods of estimating the evaporation. (10)

   (b) Write a short note on energy budget. (5)

(OR)

6. Estimate the evaporation for a month for a lake of 500 hectare surface area. The mean discharge from a lake is estimated to be 1·00 m^3/sec. The monthly rainfall is about 10 cm. A stream flows with an average discharge of 2·00 m^3/sec into the lake. The water level in the lake dropped about 5 cm in the month. The seepage losses are negligible. (15)

UNIT - IV

7. (a) Enumerate the different factors on which the run-off from a catchment area depends. (7)

   (b) What is a rating curve? Explain its uses and extensivity. Sketch a typical rating curve. (8)

(OR)

8. (a) The following mean monthly discharge data are available for a river :

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Discharge (million cu.m)	50	20	30	70	100	300	1000	900	600	200	90	60

Draw the flow-duration curve and determine :

(i) Percentage of time the average flow is available.

(ii) The flow with 75% dependability.

(iii)The flow with 35% dependability. (10)

   (b) Explain stream gauging by chemical method. (5)

UNIT - V

9. (a) Discuss flood forecasting is a very useful tool in planning flood control. (6)

(b) Elaborate the structural methods of flood control. (9)

(OR)

10. (a) The annual flood peaks at the site on stream from 35 years record is 3000 cumecs and the standard deviation is 375 cumecs. Determine :

(i) Probability of a flood of 4000 cumecs occuring next year.

(ii) Probability of at least one flood peaks at the site occuring during next 50 years.

(iii) Flood with a recurrance interval of 20 years. (10)

(b) What are the limitations of flood control measures? (5)

Register Number :

Name of the Candidate :

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B.E. DEGREE EXAMINATION, 2014

(CIVIL ENGINEERING)

(SIXTH SEMESTER)

CLEC-602. HYDRAULICS AND HYDRAULIC MACHINERY

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) Derive an expression for the gradually varied flow in open channels. (10)

   (b) A Venturiflume, 3 m wide at the entrance and 1·5 m wide at the throat, has a horizontal datum. If the depth of water at the entrance and at the throat is 0·75 m and 0·65 m respectively, calculate the discharge through the flume. (5)

(OR)

2. The flow of liquid over a V-notch of included angle θ - takes place due to gravity and the flow rate depends upon the head of liquid H, density ρ and viscosity μ. Derive the expression for non-dimensional parameters that relates the flow rate θ to the independent variables.(15)

UNIT - II

3. Show that when a jet of water impinges on a series of curved vanes, maximum efficiency is obtained when the vane is semi-circular in section and the velocity of vane is half that of jet. (15)

(OR)

4. 350 litres/sec of water is flowing in a pipe having a diameter of 32 cm. If the pipe is bent by 135°, find the magnitude and direction of resultant force on the bend. The pressure of water flowing in the pipe is 400 kPa. (15)

UNIT - III

5. (a) Explain the components and working principles of Pelton wheel turbine. (10)

   (b) Draw the main and operating characteristics of a hydraulic turbine. (5)

(OR)

6. A reaction turbine works at 500 rpm under a head of 120 metres. Its diameter at inlet is 125 cm and the flow rate is 0·5 m^2. The angles made by the absolute and relative velocities at inlet are 20° and 60° respectively with the tangential velocity. Determine :

   (a) Volume flow rate. (b) Hydraulic power developed.

   (c) Efficiency.

   Assume whirl at outlet to be zero. (15)

UNIT - IV

7. (a) Derive an expression for the minimum starting speed of pump for flow to commence. (10)

   (b) Write short notes on multistage pumps. (5)

(OR)

8. The impeller of a centrifugal pump is 30 cm diameter and 5 cm width at the periphery and has blades whose tip angles incline backwards 60° from the radius. The pump delivers 20 m^3/min and the impeller rotates at 1000 *rpm*. Assuming that the pump is designed to admit radially, calculate :

   (a) Speed and direction of water as it leaves the impeller.

   (b) Torque exerted by the impeller on water.

   (c) Shaft power required and (d) Lift of the pump. (15)

UNIT - V

9. Explain the component parts and working principle of a reciprocating pump. Why a reciprocating pump is called a positive displacement pump? (15)

(OR)

10. A double acting reciprocating pump of plunger diameter 10 cm and stroke length 25 cm is made to run at 100 *rpm*. The suction is through a 5 m long pipe of 10 cm diameter. Calculate the maximum permissble suction lift if separation occurs at a pressure of 2 m of water absolute. Take barometric pressure as 10·3 m of water. (15)

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B.E. DEGREE EXAMINATION, 2014

(CIVIL, CIVIL AND STRUCTURAL ENGINEERING)

(SIXTH SEMESTER)

CLEC-603 / CSEC-602/ PCLEC-205 / PCSEC-504 / PCLEC-303.
STRUCTURAL MECHANICS - 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.
Assume any reasonable missing data.
ALL questions carry EQUAL marks.

UNIT – I

1. Analyse the continuous beam shown in figure-1 by slope deflection method.. Take $E = 2 \times 10^5$ N/ mm^2 and $I = 3 \times 10^8$ N/ mm^4. (15)

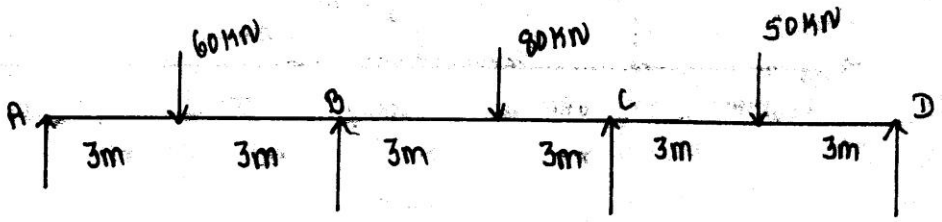

Figure-1

(OR)

2. Analyse the frame shown in figure-2 by slope deflection method. (15)

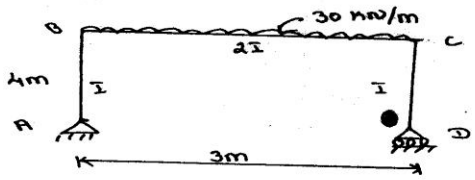

Figure -2

UNIT - II

3. Analyse the continuous beam shown in figure-3 by strain energy method. (15)

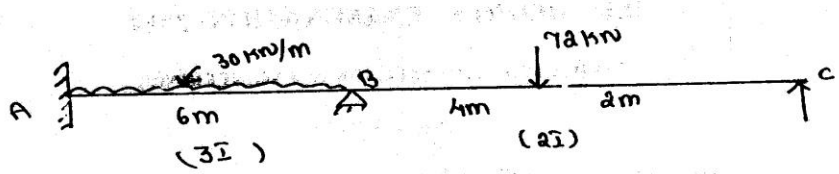

Figure-3

(OR)

4. Analyse the portal frame shown in figure-4 by strain energy method. (15)

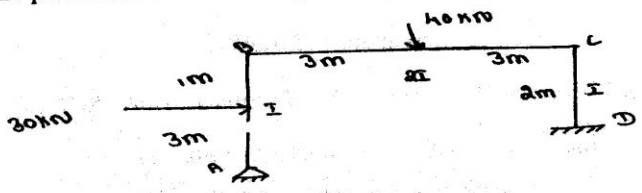

Figure-4

UNIT - III

5. Analyse the continuous beam shown in figure -5 by flexibility method. EI = coonstant. (15)

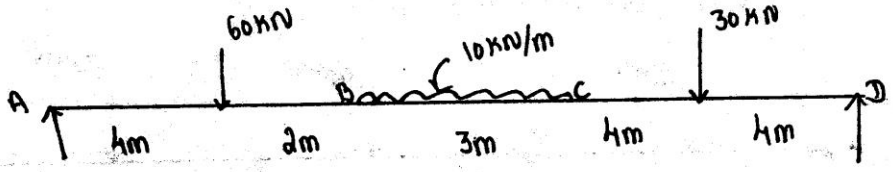

Figure-5

(OR)

6. Analyse the frame shown in figure-6 by flexibility method. Take E = 2×10^5 N/mm^2 and I = 4×10^6 mm^4. (15)

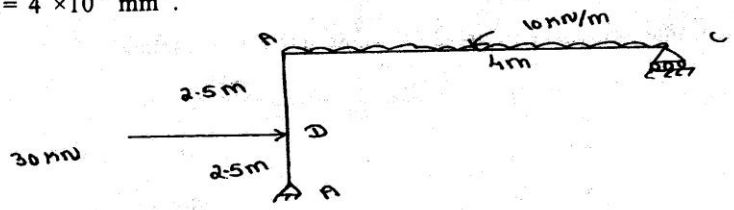

Figure - 6

UNIT - IV

7. Analyse the continous beam shown in figure-7 by stiffness method. Take E = $2 \times 10^5 N/mm^2$ and I = 13160×10^4 mm^4.

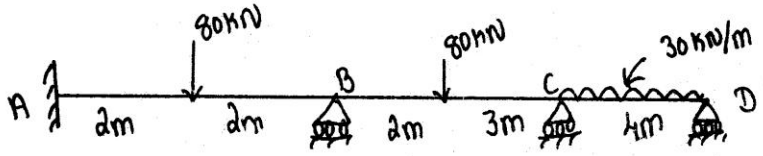

Figure - 7

(OR)

8. Analyse the frame shown in figure-8 by stiffness method. (15)

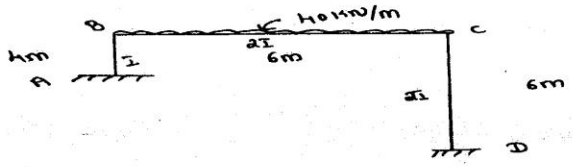

Figure - 8

UNIT - V

9. Analyse the continuous beam showin in figure-9 by stiffness method. (15)

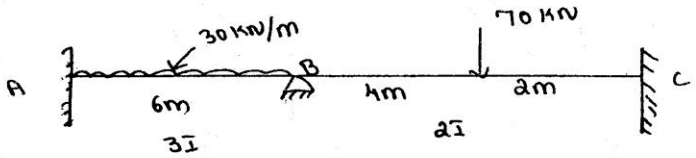

Figure-9

(OR)

10. Analyse the frame shown in figure-10 by stiffness method. Take EI = constant. (15)

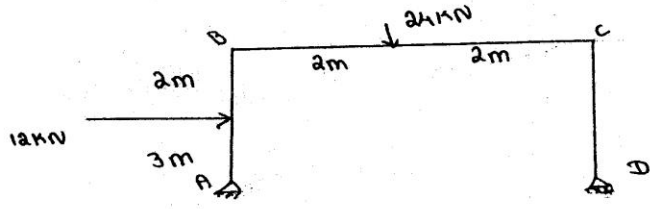

Figure-10

Register Number :

Name of the Candidate :

3193

B.E. DEGREE EXAMINATION, 2014

(CIVIL ENGINEERING)

(SIXTH SEMESTER)

CLEC-604 / PCLEC-403. FOUNDATION ENGINEERING

(For the candidates of 2011-12 batch and later)

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) Calculate the net ultimate bearing capacity of a rectangular footing 2 m × 4 m in plan founded at a depth of 1·5 m below the ground surface. The load on the footing acts at an angle of 15° to the vertical and it is eccentric in the direction of width by 0·15 m. The saturated unit weight of the soil is 18 kN/m^3. The rate of loading is slow and hence, the effective stress shear strength parameters can be used in the analysis. C′ = 15 kN/m^2 and ϕ' = 25°. Natural water table is at a depth of 2 m below the ground surface. Use IS : 6403- 1981 recommendations:

N_c = 20·7; N_q = 10·7; N_γ = 10·9. (10)

(b) List out the factors influencing the bearing capacity of the soil. (5)

(OR)

2. (a) List out the assumptions made in Terzaghi's analysis and limitations of the analysis. (8)

(b) A square footing 2·5 m × 2·5 m is built in a homogenous bed of sand of unit weight 20 kN/m^3 and having an angle of shearing resistance of 36°. The depth of base of footing is 1·5 m below ground surface. Calculate the safe load that can be carried by a footing with a factor of safety against complete shear failure. . Use Terzaghi's analysis. (7)

UNIT - II

3. (a) List out the preliminary steps involved in site investigation and explain them briefly. (5)

(b) Name the types of samples and soil samplers. Also, describe any one of the sampler. (10)

(OR)

4. List out the causes of settlement and explain them. (15)

UNIT - III

5. A retaining wall 4 m high, has a smooth vertical back. The backfill has a horizontal surface in level with the top of the wall. There is uniformly distributed surcharge load of 36 kN/m^2 intensity over the backfill. The unit weight of the backfill is 18 kN/m^3. Its angle of shearing resistance is 30° and cohesion is zero. Determine the magnitude and point of application of active pressure per metre length of the wall. (15)

(OR)

6. Check the stability of a cantilever retaining wall of smooth vertical back of 6 m height and 0·2 m thick at top and 0·3 m at bottom. The foundation base of retaining wall of depth 0·6 m projected on the left side of 0·5 m and 2·0 m on the right side. It supports a sandy backfill with unit weight 18 kN/m^3 levelled to the top of a wall. The angle of internal friction of soil is 34°. Use Rankine's theory. (15)

UNIT - IV

7. Describe plate load test method of determination of load carrying capacity of piles. (15)

(OR)

8. (a) Discuss the method of obtaining ultimate load and also, allowable load on a single pile from pile load test. (5)

   (b) It is proposed to provide pile foundation for a heavy column, the pile group consisting of 4 piles, placed at 2 m centre to centre, forming a square pattern. The underground soil is clay having C_u at surface as 60 kN/m^2 and at a depth of 10 m as 100 kN/m^2. Compute the allowable column load on the pile if the piles are circular having diameters 0·5 m each and length as 10 m. (10)

UNIT - V

9. List out the common types of well shapes with neat sketches. Also, draw the section of a well foundation and indicate the component parts.
   (15)

(OR)

10. Name the tests to assess the swelling potential of the soil and explain them. (15)

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B.E. DEGREE EXAMINATION, 2014

(CIVIL ENGINEERING)

(SIXTH SEMESTER)

CLEC-604 / PCLEC-503. SUB-STRUCTURE DESIGN

(For the candidates of 2011-12 batch and later)

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) Explain the steps involved in determination of bearing capacity of shallow foundation on homogeneous deposits. (9)

   (b) Define : (6)

   (a) Ultimate bearing pressure. (b) Net bearing pressure.

   (c) Allowable bearing pressure.

(OR)

2. A footing 2·5 m square is located at a depth of 2 m below ground level in a sand of $\phi = 38°$. The unit weight of sand above the water table is 18·5 kN/m^3 and the saturated weight is 20·5 kN/m^3. Determine the ultimate bearing capacity of soil. Nq = 49; Nγ = 67, if

   (a) The water table is well below the base of the foundation.

   (b) The water table is at the ground level.

   (c) The water table is at a depth of 1·0 m below the ground level. (15)

UNIT - II

3. Describe the plate load test conducted to determine the bearing capacity and settlement with neat sketches. (15)

(OR)

4. A footing 3 m square is founded at a depth of 2 m in a sand deposit for which the correct value of N = 30. The water table is at a depth of 3m from the surface. Determine the net allowable bearing pressure, if the permissible settlement is 40 mm and factor of safety of 2 is desired against shear failure. (15)

UNIT - III

5. Explain the Culomb's wedge theory of earth pressure with a neat sketch. (15)

(OR)

6. A retaining wall 6 m height retains a backfill of unit weight 19 kN/m^3; C = 20 kN/m^3. Angle of internal friction is 30°. The backfill is horizontal with the top. The backfill carries a surcharge of 30 kN/m^2. Compute the total active and passive earth pressures on the wall and their point of application. Draw the earth pressure distribution diagram. (15)

UNIT - IV

7. List out the various types of piles and explain their functions. (15)

(OR)

8. A 0·3 m diameter pile of length 12 m was subjected to a pile load test and the following results were obtained :

1.	Load in kN	0	500	1000	1500	2000	2500
2.	Settlement during loading in mm	0	8·5	16·5	25·5	38	60
3.	Settlement during unloading in mm	40	46	52	55	58	60

Determine the allowable load. (15)

UNIT - V

9. State the different special foundations and explain them. (15)

(OR)

10. (a) Describe an under reamed pile. How the load carrying capacity of an under reamed pile is determined? (7)

(b) Write about : (8)

(i) Caissoen. (ii) Coffer dam.

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Register Number :

Name of the Candidate :

3191

B.E. DEGREE EXAMINATION, 2014

(CIVIL ENGINEERING)

(SIXTH SEMESTER)

CLEC-605. ENVIRONMENTAL ENGINEERING

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. Enumerate health acceptability.

(OR)

2. Discuss the standards and planning factors for public water supplies in India.

UNIT - II

3. Explain in detail the mass curve analysis.

(OR)

4. How will you estimate the yield of wells under steady state conditions?

UNIT - III

5. State the uses of charts and monograms for flow computation for pipes.

(OR)

6. Enumerate the various appurtenances of pipes.

UNIT - IV

7. Explain the principles, functions and design of sedimentation tanks.

(OR)

8. Discuss the aeration method for removal of iron and manganese.

UNIT - V

9. Discuss in detail the elementary methods of pipe sizing.

(OR)

10. Explain in detail the elevated and ground level reservoirs.

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Name of the Candidate :

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B.E. DEGREE EXAMINATION, 2014

(CIVIL ENGINEERING)

(SIXTH SEMESTER)

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

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 EQUAL marks.

UNIT – I

1. (a) State the need for modern method of construction. (3)

   (b) Explain erection tolerances of pre-cast members. (12)

2. (a) Define pre-fabrication techniques. (5)

   (b) Describe the erection of pre-cast concrete elements. (10)

UNIT - II

3. (a) What are the benefits of modern methods of construction. (3)

   (b) Explain the types of modern methods of construction. (12)

4. (a) Write short notes on the following :

   (i) Concrete buckets. (ii) Pulley blocks. (5)

   (b) Explain the use of an excavator and discuss its different types. (10)

UNIT - III

5. Differenitate site organization and labour organization. (15)

6. Explain in detail the functions of officers in PWD and economical method of executing works. (15)

UNIT - IV

7. (a) What is PERT networks? (3)

   (b) What is meant by scheduling? What are the advantages of scheduling a construction job? (12)

8. (a) Define project planning. (3)

(b) Write PERT formalism has these elements and rules. (12)

UNIT - V

9. (a) What are the major differences between PERT and CPM networks? (5)

(b) Draw a CPM network diagram for the following logic :

Carry out the forward and backward pass for the network and determine the earliest start and the latest start times for each activity as well as cricital path. Activity-B follows Activity-A; Activities-C and -D; Activity-H follows Activity-F and G; Activity-J follows Activity-E; Activity-K follows Activities-H and J. Duration of A, B, C, D, E, F, G, H, J, K are 3, 5, 6, 10, 8, 6, 10, 3, 7, 3 days respectively. (10)

10. (a) Define cost slope. (5)

(b) Explain how CPM can be adopted for determining extension of time of a project. (10)