Register Number :

Name of the Candidate :

0285

B.E. DEGREE EXAMINATION, 2014

(CIVIL ENGINEERING)

(SIXTH SEMESTER)

CLEC-601. HYDROLOGY

May] [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. Discuss the hydrological water budget with the aid of examples. (15)

(OR)

2. Describe the hydrological cycle. Explain the man's interference in various parts of cycle. (15)

UNIT – II

3. Define rain gauge. What are the different types of rain gauges? Describe with neat sketch the principle of working of "Tipping Bucket Type" recording rain gauge. (15)

(OR)

4. (a) The isohyetal weights of the stations in and around a river basin are 0·30, 0·04, 0·12, 0·08, 0·25, 0·05, 0·10 and 0·06 respectively, Station 3, 5, 7 lie outside the basin while the remaining is inside. The rainfalls recorded at these stations are 123, 234, 321, 195,252, 274, 281 and 246 respectively. Determine the average depth of rainfall over the catchment by arithmetic and isohyetal mean methods. (10)

Turn Over

(b) How do you measure rainfall using radar? (5)

UNIT – III

5. (a) State the Horton's equation for infiltration capacity curve and sketch with salient components of the curve. (8)

(b) Explain briefly about the Φ–Index and W-index. (7)

(OR)

6. (a) Differentiate the reservoir evaporation from the agricultural field evaporation. (5)

(b) A reservoir with a surface area of 300 hectares has the following meteorological values during a given winter: Water temperature –30°C, relative humidity – 50%, wind velocity above ground is 12 km/hr, mean barometric reading is 750 mm of mercury. Estimate the average daily evaporation from the reservoir. Use Meyer's or Rowher's equation. (10)

UNIT – IV

7. A run-off data at a stream gauge station for a flood are given below in the table: Drainage area is 42 km^2. If the duration of rainfall is 3 hours, derive a 3 hours unit hydograph for the basin.

Time (hrs)	0	3	6	9	12	15	18	21
Total run-off (m^3/s)	50	47	75	120	225	290	270	145
Base flow (m^3/s)	50	47	46	45	45	45	46	48
Time (hrs)	24	27	30	33	36	39	42	45
Total Run-off (m^3/s)	110	90	80	70	60	55	51	50
Base flow (m^3/s)	50	53	54	57	60	55	51	50

(15)

(OR)

8. Describe:

   (i) Influent stream and effluent stream.

   (ii) Area velocity method for discharge. (15)

UNIT – V

9. The peak flow records for a river at a station, where a reservoir is to be constructed for a period of 80 years is as follows:-

   (i) The arithmetic mean of peaks = 7820 cumec.

   (ii) The standard deviation = 2500 m^3/s.

   Using Gumbel's method, determine the recurrence interval for a flood of 1500 cumecs. (15)

(OR)

10. (a) Derive the Muskingum routing equation and his expression for the routing coefficients C_0, C_1 and C_2. (8)

    (b) What are the flood control measures? Mention some of the flood control measures to mitigate the effect of floods. (7)

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B.E. DEGREE EXAMINATION, 2014

(CIVIL ENGINEERING)

(SIXTH SEMESTER)

CLEC- 602. HYDRAULICS AND HYDRAULIC MACHINERY

May] [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 types of surges used in open channel. (6)

   (b) A rectangular channel 4 m wide is narrowed to 2 m width to cause critical flow in the contracted section. If the depth in this section is 1·2 m, calculate the flow and depth in the 4 m section. Neglect energy losses in transistion. (9)

(OR)

2. (a) Briefly explain geometric, kinematic and dynamic similarities. (7)

   (b) A geometrically similar model of spillway is to be laid to a scale of 1 in 50. Calculate the velocity ratio, discharge ratio and acceleration ratio. (8)

Turn Over

UNIT - II

3 A 10 cm diameter jet having a velocity of 30 m/s strikes a flat plate, the normal of which is inclined at 45° to the axis of the jet. Find the normal force exerted on the plate

(a) When the plate is stationary.

(b) When the plate is moving with a velocity of 18 m/s in the direction of the jet.

Also, determine the power and effficiency of system. (15)

(OR)

4. A boat is driven by jet propulsion, discharging water at a speed of 10 m/s relative to the ship in a jet of 300 cm^2 cross-sectional area. If the boat moves through water with a velocity of 25 km/hr, find the resistance of the vessel and power exerted by the jet. What is the efficiency of jet apart from losses in pumping machinery? Assume that inlet orifices face the direction of flow. (15)

UNIT - III

5. (a) Distinguish between inward and outward flows reaction turbines. (10)

(b) Draw the different types of draft tubes. (5)

(OR)

6. Test carried on a Pelton wheel gave the following results : (15)

Head at the base of nozzle = 28 m; Discharge = 250 litres/sec.

Diameter of jet = 12 cm ; Power developed = 52 kW.

Power absorbed = 4 kW.

Calculate the power lost in the nozzle and also power absorbed due to hydraulic resistance in the runner.

UNIT - IV

7. Draw a neat sketch of centrifugal pump and explain how does it operate. (15)

(OR)

8. A centrifugal pump with 1·3 m diameter runs at 250 rpm and discharges 2,500 litres /sec. 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 m/sec. Determine 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. (15)

UNIT - V

9. Derive an expression for pressure head due to acceleration of the piston of a reciprocating pump. Assume motion of pistion to be simple harmonic. (15)

(OR)

10. A single acting reciprocating pump has a stroke length of 18 cm, the suction pipe is 8 m long and the ratio of suction pipe diameter to the plunger diameter is $\frac{3}{4}$. The water level in the sump is 2·5 m below the axis of the pump cylinder and the pipe connecting the sump and cylinder is 7·5 cm diameter. If the crank is running at 75 *rpm*, determine the pressure head on the pistion at the beginning, mid and end of the suction stroke. Take friction co-efficient $f = 0{\cdot}1$. (15)

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B.E. DEGREE EXAMINATION, 2014

(CIVIL ENGINEERING)

(SIXTH SEMESTER)

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

May] [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. Analyse the frame shown in figure – 1 by Slope Deflection Method and draw the Bending Moment Diagram.

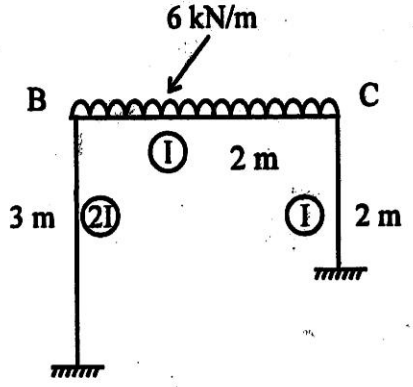

Figure - 1

(OR)

2. Using the Consistent Deformation Method, analyze the continuous beam shown in figure-2 and draw the Bending Moment Diagram for the beam. EI is constant.

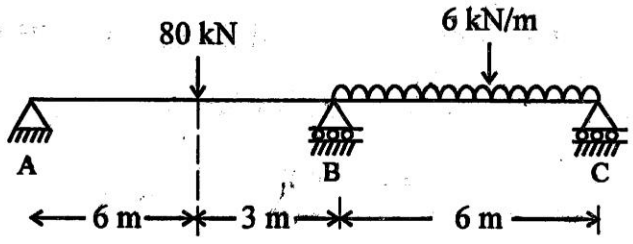

Figure - 2

UNIT – II

3. A circular section of radius "r" is bent in the form of rectangle and fixed at A and D as shown in figure-3. The load on the straight portion is W at the midpoint. Draw the Bending Moment Diagram and determine the deflection at the midpoint of BC. Take G = 0·4 E.

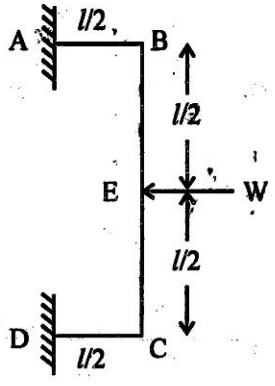

Figure - 3

(OR)

4. Analyse the hinged base portal frame shown in figure – 4 by Strain Energy Method. Also, plot the Bending Moment Diagram.

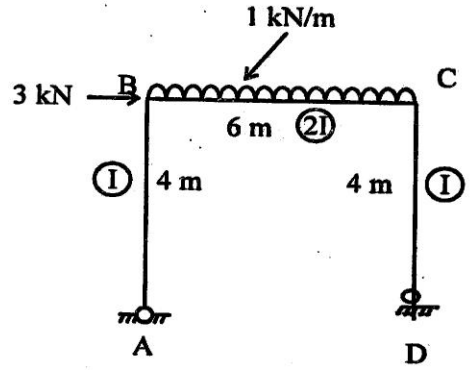

Figure - 4

UNIT – III

5. Analyse the continuous beam shown in figures-5 by the flexibility matrix method and draw the Bending Moment Diagram.

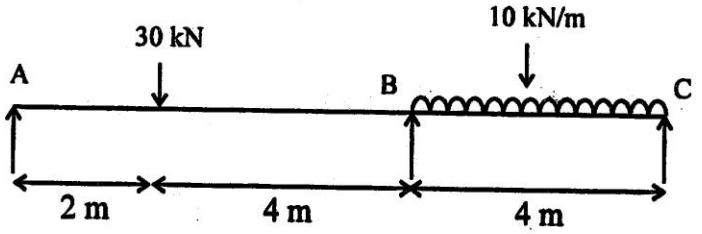

Figure - 5

(OR)

6. Analyse the frame shown in figure–6 by the flexibility matrix method and draw the Bending Moment Diagram.

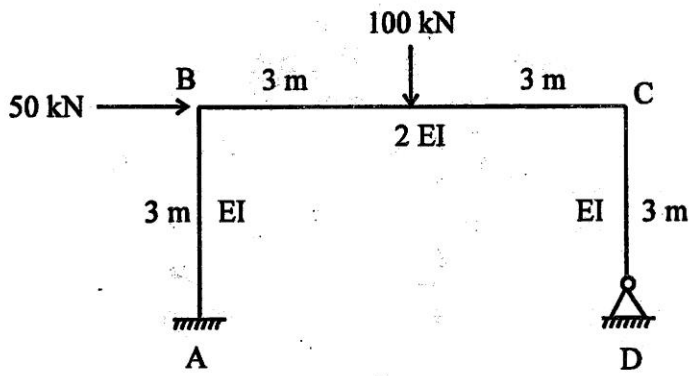

Figure - 6

UNIT – IV

7. Analyse the continuous beam shown in figure–7 by the stiffness matrix method. EI is constant.

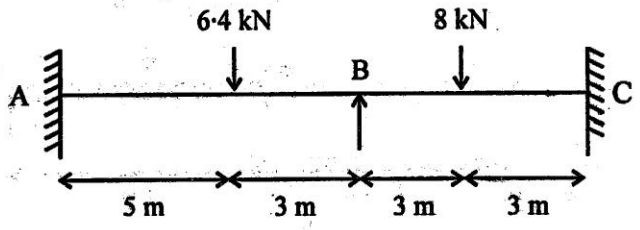

Figure - 7

(OR)

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

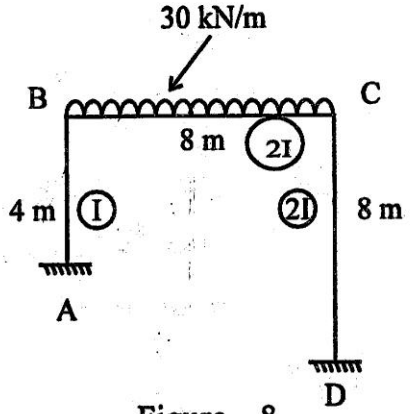

Figure - 8

UNIT – V

9. While fabricating the pin jointed frame shown in figure– 9, the member AC was the last member to be fitted and was found to be 1·5 mm short of the required length. Find the forces induced in all the members of the frame when the member AC is forced into position. The diagonal members are each 1000 mm^2 in area, while the remaining members are 2000 mm^2 in area. Take E = 2 × 10^5 N/mm^2.

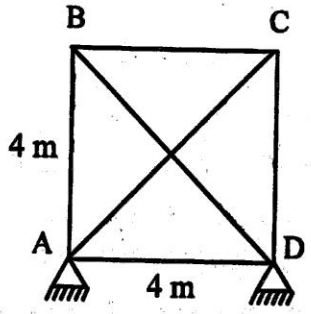

Figure - 9

(OR)

10. Determine the forces in all the members of the frame shown in figure – 10 due to a fall in temperature of the member BC by 28° C. All the members have a cross sectional area of 1300 mm^2. Coefficient of expansion = 0·000012 per degree centigrade.

Take E = 2 × 10^5 N/mm^2.

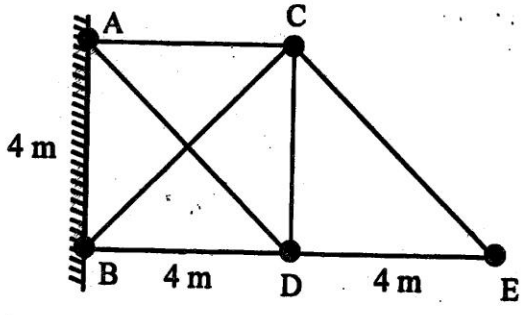

Figure - 10

Register Number:

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Name of the Candidate:

B.E. DEGREE EXAMINATION, 2014

(CIVIL ENGINEERING)

(SIXTH SEMESTER)

CLEC-604/PCLEC-503. SUB STRUCTURE DESIGN

May] Maximum: 60 Marks [Time : 3 Hours

Answer One Full Question from each Unit
All questions carry equal marks

UNIT – I

1. Distinguish between
   a) Combined footing and strap footing (6)
   b) Gross and Net bearing capacity of soil (6)

(OR)

2. a) Differentiate ultimate from allowable bearing pressure. (6)

   b) Explain bearing capacity. What are the factors influencing bearing capacity of shallow foundations? (6)

UNIT – II

3. a) Define site explorations. Discuss the object of site exploration. (6)
   b) Explain different types of samples. (6)

(OR)

4. a) Discuss briefly about the causes of settlement of footings (6)
   b) Explain briefly plate load test on sandy soil to estimate settlement. (6)

UNIT – III

5. Derive the expression of minimum depth of foundation by Rankine's analysis. (12)

(OR)

6. A retaining wall 4m 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 $34KN/m^2$ intensity over the backfill. The unit weight of the backfill is $18kN/m^3$, its angle of shearing resistance is 30° and cohesion is zero. Determine the magnitude and point of application of active pressure per meter length of the wall. (12)

UNIT – IV

7. a) Derive the static pile load formula for estimating the point load resistance and skin friction resistance of a single pile installed in sandy soil. (6)

   b) What are the factors to be considered while selecting a pile foundation? (6)

(OR)

8. a) Explain pile load test. (6)
   b) Explain group efficiency of a pile group. (6)

UNIT – V

9. a) Discuss with neat sketches
   i) Caissons well foundation
   ii) Coffer dams (6)
   b) Discuss the principles of design of coffer dams. (6)

(OR)

10. a) Explain with neat sketch about the under reamed pile foundation. (6)
   b) Explain the factors influencing the design of foundations on expansive soil. (6)

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Register Number :

Name of the Candidate :

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B.E. DEGREE EXAMINATION, 2014

(CIVIL ENGINEERING)

(SIXTH SEMESTER)

CLEC-604. FOUNDATION ENGINEERING

May] [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. Discuss in detail the design requirement of a foundation. (15)

(OR)

2. Compute the safe bearing capacity of a sequence footing 1·5 m × 1·5 m located at the depth of 1 m below the ground level in a soil of average density 20 k N/m^3; $F = 20^o$, Nc = 17·7, Nq = 7·4, Nr = 5. Assume a suitable factor of safety and that the water table is very deep. Also, compute the reduction in safe bearing capacity of footing it the water table rises to ground level. (15)

UNIT – II

3. Explain the different methods of obtaining undisturbed samples in clay layer and sand deposits. (15)

(OR)

4. A 3 m thick clay layer in the field under a given surcharge will undergo 7 cm of total primary consolidation. If the first 4 cm of settlement takes 90 days, calculate the time required for the first 2 cm of settlement. (15)

Turn Over

UNIT – III

5. A retaining wall with vertical back retains 5 m to non-cohesive coarse material, having level surface at top. The water table is 2·5 m from top (r_{sat}) above water table = 18 kN/m^3, $F = 14{\cdot}5^\circ$, Ka = 0·23. Calculate the resultant force acting on the base of wall r_{sat} below water table is 20 kN/m^3. (15)

(OR)

6. Compare Rankine's theory and Coulomb's theory. (15)

UNIT – IV

7. Describe under what circumstances different types of pile foundations may be selected. (15)

(OR)

8. A group of sixteen (4 × 4), 400 mm diameter and 10 m long bored and cast-in-piles are spaced at

   (a) 600 mm and

   (b) 1200 mm centres in clay soil of r = 20 kN/m^3, UCC = 100 kN/m^2. Determine the safe load carrying capacity of the pile group. (15)

UNIT – V

9. Explain the principles of design and construction for machinery foundation. (15)

(OR)

10. (i) Discuss selection of foundation for expansive soils. (15)

    (ii) Mention the use of under-reamed piles. (15)

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B.E. DEGREE EXAMINATION, 2014

(CIVIL ENGINEERING)

(SIXTH SEMESTER)

CLEC-605 / PCLEC-502. ENVIRONMENTAL ENGINEERING - I

May] [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. Explain water analysis and variation in demand pattern. (15)

(OR)

2. Explain health acceptability, adequacy and convenience. (15)

UNIT – II

3. Briefly describe the values intake structures and explain the working of infiltration galleries with a neat sketch. (15)

(OR)

4. Explain how yield of wells is done under steady condition. (15)

UNIT – III

5. Explain the laying, jointing and testing of R.C.C pipes. (15)

(OR)

Turn Over

6. Explain in detail how monograms are used for flow computation. (15)

UNIT – IV

7. With a neat sketch, explain the principles, functions and design of mixing basins. (15)

(OR)

8. With a neat sketch, explain the working of sedimentation tank. (15)

UNIT – V

9. Differentiate between continuous and intermittent water supply types. Explain the procedure of analysis of distribution networks. (15)

(OR)

10. Write short notes on equivalent pipe and operation and maintenance system in detail. (15)

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B.E. DEGREE EXAMINATION, 2014

(CIVIL ENGINEERING)

(SIXTH SEMESTER)

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

May] [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. Explain the off-site construction in detail. (15)

(OR)

2. Discuss in detail the transportation and erection of precast units. (15)

UNIT – II

3. Explain the various construction equipment in detail. (15)

(OR)

4. Explain briefly the modern construction techniques adopted for systems for housing. (15)

UNIT – III

5. Explain the various types of contracts in detail. (15)

(OR)

Turn Over

6. Explain the site and labour organization. (15)

UNIT – IV

7. Explain the Bar and Gantt charts. (15)

(OR)

8. Explain with a suitable example project planning, scheduling and controlling. (15)

UNIT – V

9. Widgetco is about to introduce a new product. One unit of this product is produced by assembling sub-assembly 1 and sub-assembly 2. Before production begins on either sub-assembly, raw materials must be purchased and workers must be trained. Before the sub-assemblies can be assembled into the final product, the finished sub-assembly 2 must be inspected. A list of activities, their predecessors, and their durations is given in the following Table.

Activity	Predecessors	Duration (days)
A – Train workers	---	6
B – Purchase raw materials	---	9
C – Make sub-assembly 1	A, B	8
D – Make sub-assembly 2	A, B	7
E – Inspect sub-assembly 2	D	10
F – Assembles Sub-assemblies	C, E	12

(i) Draw a project diagram (network) for this project.

(ii) What is the total project time?

(iii) What is the critical path? (15)

10. A project has been defined to contain the following list of activities along with their required times for completion: (15)

Activity No	Activity	Expected Completion time	Dependency
1.	Requirements collection	5	-
2.	Screen design	6	1
3.	Report design	7	1
4.	Database design	2	2, 3
5.	User documentation	6	4
6.	Programming	5	4
7.	Testing	3	6
8.	Installation	1	5, 7