

B.E. DEGREE EXAMINATION, 2015

(CIVIL ENGINEERING)

(SIXTH SEMESTER)

CLEC-601 / PCLEC-304. HYDROLOGY

(Common with Part-Time)

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. Describe the hydrological cycle with a neat sketch. (15)

(OR)

2. Name the constituents of atmosphere and explain. (15)

UNIT - II

3. Define precipitation. Name the different types of precipitation and explain them. (15)

(OR)

4. Name the different methods to find the mean precipitation over an area and explain them. (15)

UNIT - III

5. List out the factors affecting the evaporation and explain them. (15)

(OR)

6. The following meteorological data pertain to a large reservoir with a waterspread area of 15 km
- ²
- . The data represents the average values for the day :

Water temperature = 24°C. Air temperature = 26°C.

Atmospheric pressure = 752 mm of Mercury.

Wind speed at 0.5 m above ground level = 25.3 km/h.

Relative humidity = 46%.

Estimate the average daily evaporation from the reservoir and also, the evaporation losses from the reservoir for a period of one week using any three methods. (15)

UNIT - IV

7. Define run-off. Discuss the factors affecting run-off in detail. (15)

(OR)

8. Given below are the ordinates of 6-h unit hydrograph for a catchment. Calculate the ordinates of Direct Run-off Hydrograph due to a rainfall excess of 3.5 cm occurring in 6 h. (15)

Time (h)	0	3	6	9	12	15	18	24	30	36	42	48	54	60	69
UH ordinate m ³ /s	0	25	50	85	125	160	185	160	110	60	36	25	16	8	0

UNIT - V

9. What are the methods available for estimating the magnitude of flood peak? Explain any one method in detail. (15)

(OR)

10. Write short notes on : (15)

(a) Reservoir routing. (b) Channel routing. (c) Muskingum method of routing.

B.E. DEGREE EXAMINATION, 2015

(CIVIL ENGINEERING)

(SIXTH SEMESTER)

CLEC-602 / PCLEC-202. HYDRAULICS AND HYDRAULIC MACHINERY*(Common with Part-Time)*

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. Determine the dimensions of the most economical trapezoidal earth lined channel to carry $14 \text{ m}^3/\text{s}$ at a slope of 1 in 2500. Take Manning's constant $N = 0.02$.

(OR)

2. Define the following dimensionless numbers and state their significance for fluid flow problems:
(a) Reynolds numbers. (b) Froude number and (c) Mach number.

UNIT - II

3. A jet of water 75 mm diameter strikes a curved vane at its centre with a velocity of 20 m/s. The curved vane is moving with a velocity of 8 m/s in the direction of jet. Find the force exerted on the plate in the direction of the jet, power and efficiency of the jet.

(OR)

4. In a jet propeller boat water is drawn amid-ship and discharged at the back with an absolute velocity of 20 m/s. If the cross sectional area of the jet is 200 cm^2 and the boat is moving in sea-water with a speed of 8.33 m/s, determine the propelling force on the boat, power required to drive the pump and efficiency of jet propulsion.

UNIT - III

5. A Pelton wheel has a mean bucket speed of 12 m/s and is supplied with water at the rate of $0.7 \text{ m}^3/\text{s}$ under a head of 30 m. If the buckets deflect the jet through an angle of 160° , find the power and the efficiency of the turbine.

(OR)

6. Derive an expression for hydraulic efficiency of a Pelton wheel.

UNIT - IV

7. A centrifugal pump is running 1000 *rpm* and working against a head of 20 m. The rate of flow through the pump is $0.2 \text{ m}^3/\text{s}$. The outlet vane angle of impeller is 45° and the velocity of flow at outlet is 2.5 m/s. If the manometric efficiency of the pump is 80 percent, calculate the diameter and width of impeller at outlet.

(OR)

8. Find the number of pumps required to take water from a deep well under a total head of 120 m. All the pumps are identical and are running at 800 *rpm*. The specific speed of each pump is given as 25 while the rated capacity of each pump is $0.16 \text{ m}^3/\text{s}$.

UNIT - V

9. (a) What is a negative slip in reciprocating pump? (3)
 (b) Explain with neat sketches the function of air vessels in a reciprocating pump. (12)

(OR)

10. A single acting reciprocating pump having a bore of 150 mm and a stroke of 300 mm is raising water to height of 20 m above the sump level. The pump has an actual discharge of $0.0052 \text{ m}^3/\text{s}$. The efficiency of the pump is 70%. If the speed of pump is 60 *rpm*, determine:
 (a) Theoretical discharge. (b) Theoretical power. (c) Actual power and
 (d) Percentage slip.

B.E. DEGREE EXAMINATION, 2015

(CIVIL ENGINEERING)

(SIXTH SEMESTER)

CLEC-603 / CSEC-602 / PCLEC-303 / PCSEC-504 / PCLEC-202.

STRUCTURAL MECHANICS - II*(Common with Civil and Structural Engineering and Part - Time)*

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.***UNIT - I**

1. Analyze the frame shown in Figure-1 by consistent deformation method. Also, draw the Bending Moment Diagram (BMD).

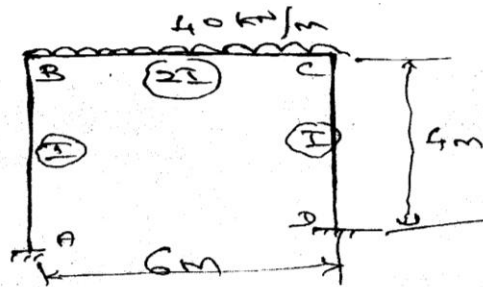


Figure-1

(OR)

2. Determine the reaction components in the continuous beam shown in figure-2 by consistent deformation method. The flexural rigidity is constant throughout.

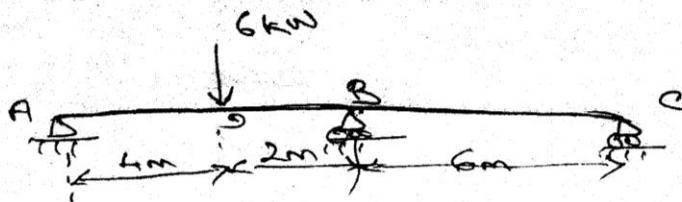


Figure-2

UNIT - II

3. Determine the deflection and rotation at the free end of the cantilever beam shown in figure-3. Use unit load method. Assume $E = 200 \text{ kN/mm}^2$ and $I = 12 \times 10^6 \text{ mm}^4$.

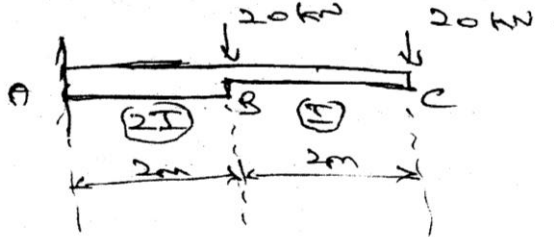


Figure-3

(OR)

4. Determine the vertical and horizontal displacement at the free end D in the frame shown in figure-4. Take $EI = 12 \times 10^{13} \text{ N}\cdot\text{mm}^2$. Use Castigliano's theorem.

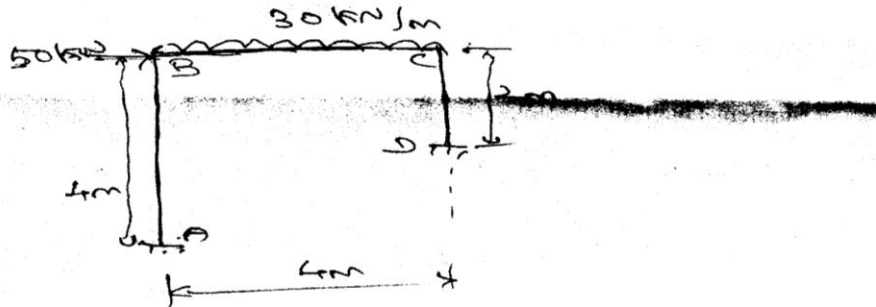


Figure-4.

UNIT - III

5. Analyze the continuous beam shown in figure-5. Using flexibility method and find the moments over the supports. Assume EI is constant throughout.

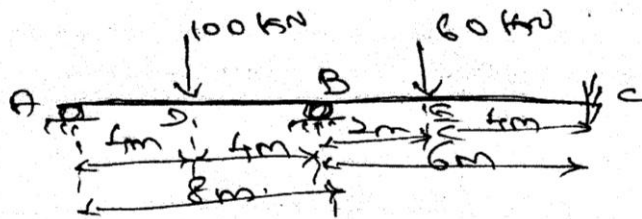
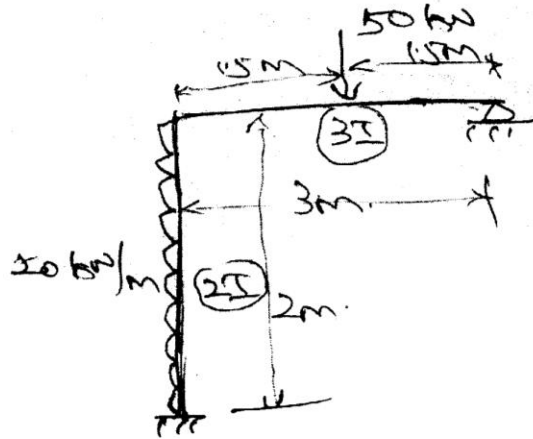


Figure-5

(OR)

6. Determine the end moments and draw the BMD for the frame shown in figure-6 by flexibility method.



UNIT - IV

7. Analyze the continuous beam shown in figure-7 by stiffness method. Assume EI is constant.

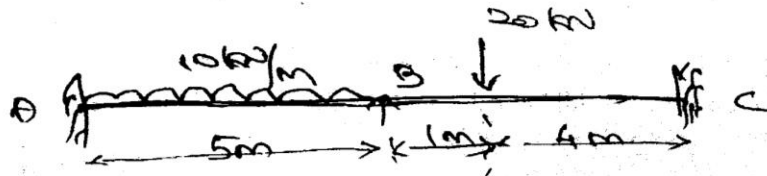


Figure-7

(OR)

8. Analyse the structure shown in figure-8 by stiffness method. Take EI is constant.

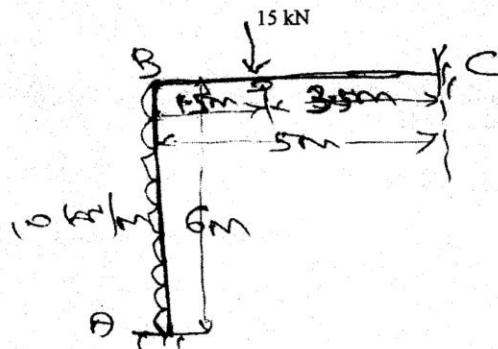


Figure-8

UNIT - V

9. Using matrix stiffness method, analyze the portal frame shown in figure-9. Take $A = 500 \text{ mm}^2$, $I = 750 \text{ mm}^4$ and $E = 200 \text{ kN/mm}^2$.

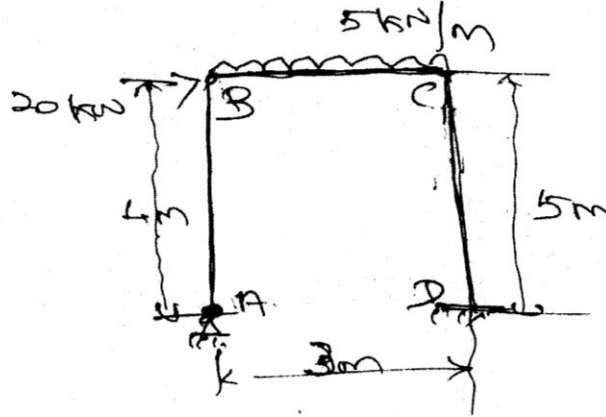


Figure-9

(OR)

10. Analyze the L bend grid shown in figure-10 by matrix stiffness method. EI is constant for all the members. A uniformly distributed load of 40 kN/m acts on AB and a concentrated load of 25 kN is applied at mid-span of BC . Take $E = 200 \text{ kN/mm}^2$, $G = 80 \text{ kN/mm}^2$, $I = 2 \times 10^{-6} \text{ m}^4$ and $J = 4 \times 10^{-6} \text{ m}^4$.

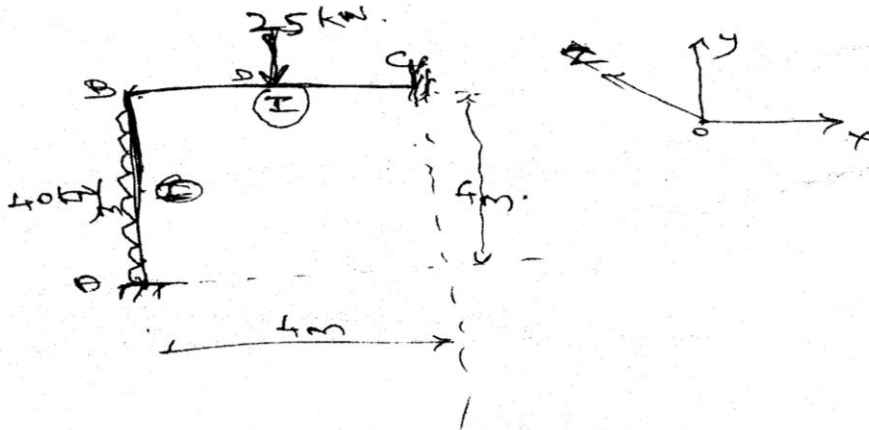


Figure-10

B.E. DEGREE EXAMINATION, 2015

(CIVIL ENGINEERING)

(SIXTH SEMESTER)

CLEC-604. FOUNDATION ENGINEERING*(New Regulations)*

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.***UNIT - I**

1. (a) Define ultimate bearing capacity. (3)
- (b) A square footing $1.50 \text{ m} \times 1.50 \text{ m}$ rests at a depth of 1.20 m in a saturated clay layer 4 m deep. The clay is normally consolidated, having an unconfined compressive strength of 40 kN/m^2 . The soil has a liquid limit of 30% , $\gamma_{\text{sat}} = 17.80 \text{ kN/m}^3$, $w = 28\%$ and $G = 2.68$. (12)

(OR)

2. (a) Define allowable bearing capacity, safe bearing capacity. (5)
- (b) What are the types of bearing capacity failures? Define with sketch. (10)

UNIT - II

3. What are the various methods of site explorations? Explain in detail. (15)

(OR)

4. Explain how to determine the ultimate bearing capacity of soil and the probable settlement under a given loading using plate load test with sketch. (15)

UNIT - III

5. A retaining wall 5 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 32 kN/m^2 intensity over the backfill. The unit weight of the backfill is 18 kN/m^3 , the 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. Explain Coulomb's wedge theory. (15)

UNIT - IV

7. Determine the load carrying capacity of pile by dynamic formulae. (15)

(OR)

8. (a) What are the stages involved in the construction of under reamed pile foundation with neat sketch. (8)
- (b) A n -pile group has to be proportioned in a uniform pattern in soft clay with equal spacing in all directions. Assuming any value of C , determine the optimum value of spacing of piles in the group. Take $n = 25$ and $m = 0.70$. Neglect the end bearing effect and assume that each pile is circular in section. (7)

UNIT - V

9. What are the types of Caisson foundations which are normally in use for foundation of bridges with its advantages and disadvantages? (15)

(OR)

10. (a) Suggest suitable foundations on expansive soil and justify. (5)
- (b) Explain components of well foundation with neat sketch. (10)

B.E. DEGREE EXAMINATION, 2015

(CIVIL ENGINEERING)

(SIXTH SEMESTER)

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

(Common with Part-Time)

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.

Nomograph for Hozen William Formula is permitted.

UNIT - I

1. Discuss in detail the various factors affecting per capita demand. (15)

(OR)

2. The population of five decades from 1930 to 1970 are given. Find out the population in one, two and three decade by arithmetic increase method : (15)

Year	1930	1940	1950	1960	1970
Population	25000	28000	34000	42000	47000

UNIT - II

3. What are the common sources of water and state the factors governing their selection. (15)

(OR)

4. Derive the Dupit formula for confined (Artesian) and unconfined (Gravity well) aquifer. (15)

UNIT - III

5. What are the different materials commonly used for water supply pipes? Explain. (15)

(OR)

6. Estimate the hydraulic gradient in 2 m diameter smooth concrete pipe carrying a discharge of $3 \text{ m}^3/\text{s}$ at 10°C using Darcy Weisbach formula, Manning formula and Hozen Williams formula. Assume suitable data, if not given. (15)

UNIT - IV

7. With help of a neat sketch, explain the working principle of slow sand filter. (15)

(OR)

8. (a) What is meant by disinfection and its importance. (7)
(b) Discuss the use of chlorine as disinfection agent with reference to its action, dose, forms and testing its residuals. (8)

UNIT - V

9. Explain with neat sketch overhead distribution reservoir and its fitting with connection. (15)

(OR)

10. Write short notes on :

- (a) Stand pipes. (b) Leak detection. (c) Leak prevention. (5 + 5 + 5)

B.E. DEGREE EXAMINATION, 2015

(CIVIL ENGINEERING)

(SIXTH SEMESTER)

CLEC-606 / PCLEC-601. CONSTRUCTION TECHNIQUES AND MANAGEMENT*(Common with Part-Time)*

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. Explain how pre-cast units are produced, transported and erected. (15)
(OR)

2. Explain the various modern methods of offsite construction in detail. (15)

UNIT - II

3. (a) Explain the types of bulldozers used in construction. (8)
(b) Explain the uses of wire ropes in construction field. (7)

(OR)

4. Explain in details of the various modern construction techniques used in industrial buildings. (15)

UNIT - III

5. Explain the organization structure of PWD and also, state the roles and responsibilities of each officer. (15)

(OR)

6. Explain in detail the types of contract used in construction industry. (15)

UNIT - IV

7. (a) Explain how project planning and control is carried on. (8)
(b) Explain how bar chart helps in tracking project progression. (7)

(OR)

8. A project has the following activities and characteristics :

Activity	Estimated duration in days		
	Optimistic	Most likely	Pessimistic
1 -2	2	5	8
1 -3	4	10	16
1 -4	1	7	13
2 -5	5	8	11
3 -5	2	8	14
4 -6	6	9	12
5 -6	4	7	10

- (a) Find the expected duration of each activity.
 (b) Draw the project network and expected duration of the project.
 (c) Find the variances of activities on critical path and its standard deviation. (15)

UNIT - V

9. (a) Explain the terms float, critical activity and path. (8)
 (b) Differentiate between crash cost and normal cost with example. (7)

(OR)

10. For the following data, draw the network diagram, and then crash the activities to find the time-cost trade-off points that the company should want to consider. Start with the plan that has the longest duration. (15)

Activity	Preceding Activity	Time (weeks)		Cost (₹.000s.)	
		Normal Program	Crash Program	Normal Program	Crash Program
A	--	2	2	5	5
B	A	5	3	11	21
C	A	2	1	7	16
D	B,C	4	2	8	22
E	B	3	2	9	18
F	D,E	3	3	9	9