B.E. DEGREE EXAMINATION, 2015

(CIVIL ENGINEERING)

(SIXTH SEMESTER)

CLEC-601 / PCLEC- 304. HYDROLOGY

May]

[Time : 3 Hours

Maximum : 75 Marks

(Maximum 60 Marks for those joined before 2011-12)

Answer any ONE FULL question from each unit.

ALL questions carry EQUAL marks.

UNIT – I

1. (a) Discuss the statement "hydrology is bounded above by meteorology, below by geology and at lands end by oceanography." (9)

   (b) Define 'front.' Bring out its types briefly. (6)

(OR)

2. Define 'drought.'. Explain about the different categories of drought. (15)

UNIT - II

3. (a) Explain Thiessan Polygon method of determining the mean depth of precipitation over a basin for a given rain-storm. What are the disadvantages of this method? (11)

   (b) What do you understand about "rainfall mass curve"? (4)

(OR)

4. (a) Compute the rainfall at the station X from the following data: (6)

Station	X	A	B	C
Storm rainfall (cm)	x	12·5	14·5	16·6
Annual rainfall (cm)	115	125	145	130

   (b) Enumerate the different types of rain gauges. (9)

UNIT - III

5. Estimate the evaporation for a month for a lake of 500 hetare surface area. The mean discharge from a lake is estimated to be $1 \cdot 00$ m^3/sec. The monthly rainfall is about 10 cm. A stream flows with an average discharge of $2 \cdot 00$ 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)

(OR)

6. (a) Describe the methods of determining the evapotranspiration. (8)

   (b) Elaborate the factors influencing the infiltration. (7)

UNIT - IV

7. (a) Describe the physical characteristics of a drainage basin. (5)

   (b) Bring out the methods of stream depth measurement. (10)

(OR)

8. (a) State the assumptions and limitations of unit hydrograph theory. (5)

   (b) The observed flows from a 6-hour duration storm on a stream with a drainage of 320 sq.km are given below :

Time in hours	0	6	12	18	24	30	36	42	48	54	60	66
Flow in m^3/sec.	15	113	220	150	115	90	70	62	55	32	22	15

Assuming a constant base flow of 15 m^3/sec, derive and plot a six-hour duration unit hydrograph. (10)

UNIT - V

9. Explain how maximum flood discharge can be estimated from:

   (a) Frequency analysis of stream flow data.

   (a) Concentration time method and rainfall data.

   Also, discuss the relative merits and demerits of these methods. (15)

(OR)

10. (a) Enumerate the non-structural methods of flood control. (5)

(b) Consider a river reach having the following characteristics :

The routing parameters $x = 0.2$, $k = 2$ days

and the time interval is 1 day.

Compute Muskingam co-efficients. Route the following flood hydrograph through the reach :

Time (days)	Discharge (m^3/sec)	Time (days)	Discharge (m^3/sec)
1	120	12	290
2	180	13	260
3	260	14	240
4	414	15	224
5	480	16	210
6	560	17	198
7	604	18	186
8	580	19	174
9	460	20	164
10	404	21	154
11	320	22	146

Plot the inflow and outflow hydrograph on the same sheet and determine the peak attenuation and peak time delay for this flow. (10)

B.E. DEGREE EXAMINATION, 2015

(CIVIL ENGINEERING)

(SIXTH SEMESTER)

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

May]   [Time : 3 Hours

Maximum : 75 Marks

(Maximum 60 Marks for those joined before 2011-12)

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

UNIT – I

1. Derive an expression for discharge through open channel by Chezy formula.   (15)

(OR)

2. (a) What do you understand by dimensionless numbers?   (3)

   (b) Derive an expression for Reynolds and Froude Number.   (12)

UNIT - II

3. A jet of water diameter 50 mm moving with a velocity of 40 m/s strikes a curved fixed symmetrical plate at centre. Find the force exerted by jet of water in the direction of jet, if the jet is deflected through an angle 120° at the outlet of curved plate.   (15)

(OR)

4. A jet of water having a velocity of 40 m/s strikes a curved vane moving with a velocity of 20 m/s. The jet makes an angle of 30° with the direction of motion of vane at outlet. Draw the velocity triangles at inlet and outlet without shock.   (15)

UNIT - III

5. A reaction turbine works at 450 *rpm* under a head of 120 m. Its diameter at inlet is 120 cm and flow area is 0.4 m^2. The angles made by absolute and relative velocities at inlet and outlet are 20° and 60° respectively with the tangential velocity. Determine the volume flow rate, power developed and hydraulic efficiency.   (15)

(OR)

6. A Kaplan turbine is to be designed to develop 9100 kW. The net available head is 5·6 m. If the speed ratio is 2·09, flow ratio = 0·68, overall efficiency 86% and diameter of boss is $\frac{1}{3}$ of diameter of runner, find the diameter of runner, speed and specific speed of turbine. (15)

UNIT - IV

7. Explain with a neat sketch, the main components of centrifugal pump. (15)

(OR)

8. The internal and external diameter of impeller of centrifugal pump are 200 mm and 400 mm respectively. The pump is running at 1200 *rpm*. The vane angle of impeller at inlet and outlet are 20° and 30° respectively. Water enter radially and velocity of flow constant. Determine the workdone by the impeller per unit weight of water. (15)

UNIT - V

9. Draw an indicator diagram and how will you prove that area of indicator diagram is proportional to the workdone by reciprocating pump. (15)

(OR)

10. A double acting reciprocating pump running at 40 *rpm* is discharging 1 m³ of water per minute. The pump has a stroke of 400 mm, diameter of piston 200 mm, delivery and suction heads are 20 m and 5 m respectively. Find the slip and power required to dirve the pump.(15)

B.E. DEGREE EXAMINATION, 2015

(CIVIL, CIVIL AND STRUCTURAL ENGINEERING)

(SIXTH SEMESTER)

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

STRUCTURAL MECHANICS - II

[Time : 3 Hours

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Maximum : 75 Marks

(*Maximum 60 Marks for those 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. Using slope deflection method, compute the end moments and plot the BMD for the beam shown in figure-1
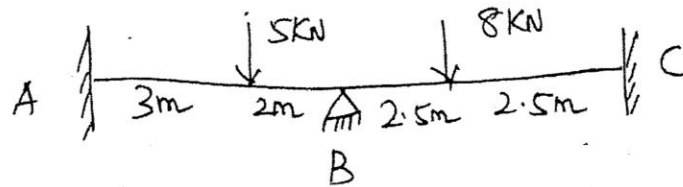
Figure-1

(OR)

2. Using slope deflection method, analyse the frame shown in figure-2 .
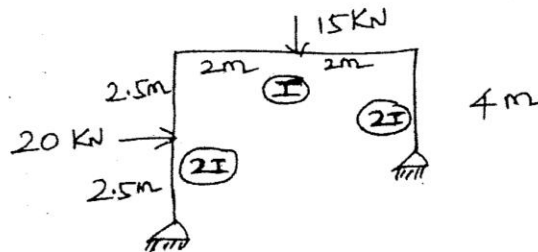

Figure-2

UNIT – II

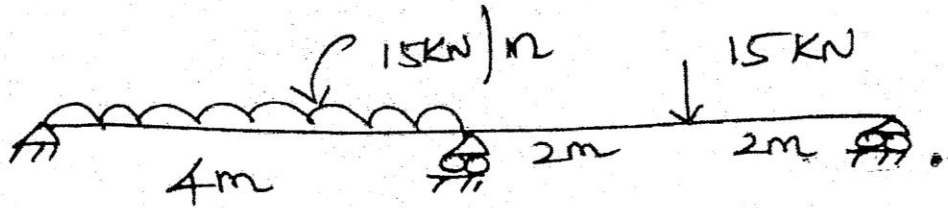3. Analyse the continuous beam shown in figure-3 by strain energy method.

Figure-3

(OR)

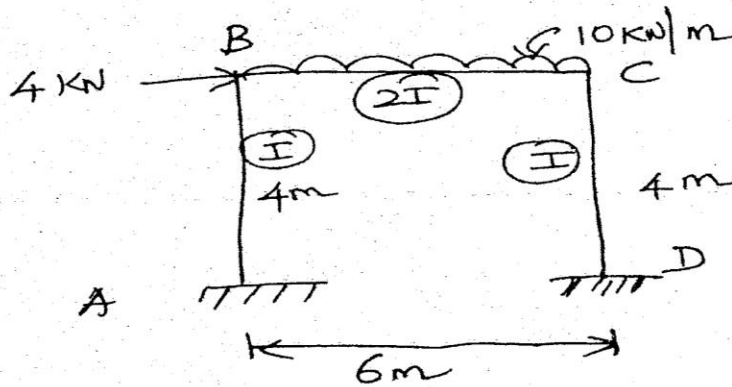4. Analyse the portal frame shown in figure-4 by strain energy method.

Figure-4

UNIT – III

5. Analyse the continuous beam shown in figure-5 by flexibility method.

Figure-5

(OR)

Analyse the pin-jointed plane frame shown in figure-6 by flexibility matrix method. The flexibility for each member is $0\cdot0025$ mm/kN.
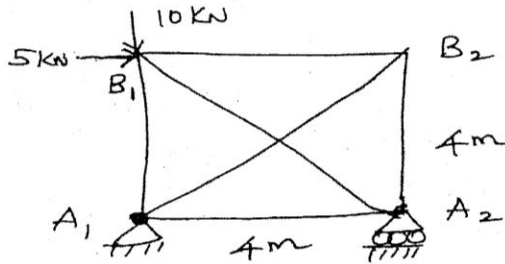

Figure-6

UNIT – IV

. Analyse the continuous beam ABC shown in figure-7 by stiffness method and also, sketch the BMD.
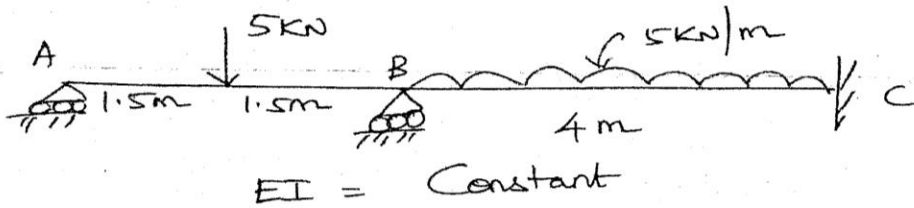

Figure-7

(OR)

8. Analyse the portal frame ABCD shown in figure-8 by stiffness method and also, sketch the BMD.

Figure-8

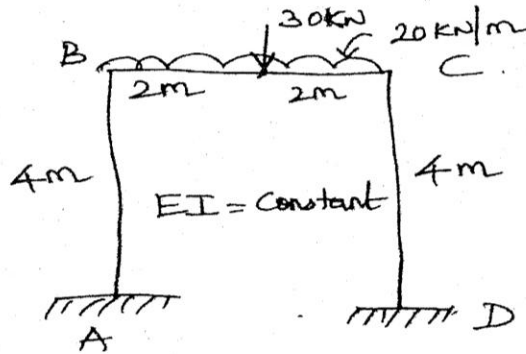## UNIT – V

9. Analyse the continuous beam shown in figure-9 by stiffness method . Take $I = 4 \times 10^6$ m and $E = 180,000$ N/mm^2.
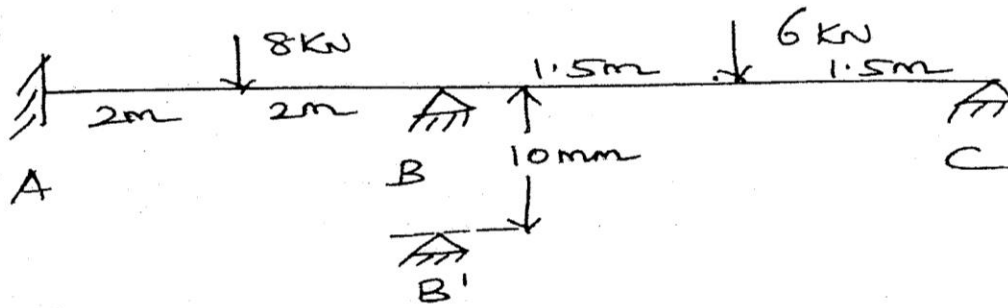

Figure-9

(OR)

10. Analyse the frame shown in figure-10 by stiffness method. EI = Constant.

Figure-10.

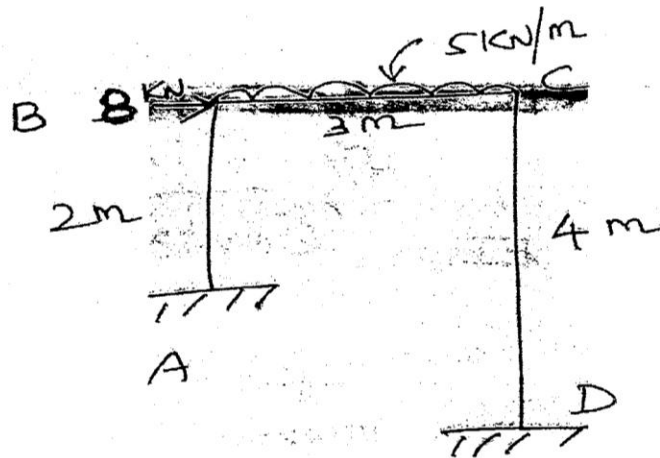## B.E. DEGREE EXAMINATION, 2015

(CIVIL ENGINEERING)

(SIXTH SEMESTER)

CLEC-604 / PCSEC-403. FOUNDATION ENGINEERING

May]   [Time : 3 Hours

Maximum : 75 Marks

(*Maximum 60 Marks for those joined before 2011-12*)

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

UNIT – I

1. (a) Name the different types of shallow foundaitons and explain them. Also, write about the choice of foundations. (10)

    (b) A soft normally consolidated clay layer is 6 m thick with a normal water content of 30 percent. The clay has a saturated unit weight of 17·4 kN/m^3, a specific gravity of 2·67 and a liquid limit of 40 percent. The ground water level is at the surface of the clay. Determine the settlement of foundation if the foundation load will subject the centre of the clay layer to a vertical stress increase of 8 kN/m^2. Take C = 1. (5)

(OR)

2. A footing 2 m square is laid at a depth of 1·3 m below the ground surface. Determine the net bearing capacity using I.S.code method.

    Take γ = 20 kN/m^3. ϕ = 30°.   C′ = 0. N_c = 30·14

    N_q = 18·40   and   Nr = 22·4

    S_c = 1·3 S_q = 1·2   and S_γ = 0·8   (15)

UNIT - II

3. (a) What are the objectives of soil exploration? (5)

    (b) What are the different methods of boring and explain them. (10)

(OR)

4. Compute the settlement of a rigid footing 3 m × 3 m carrying a load of 2000 kN, supported on a clayey soil, if plate load test gives a settlement of 10 mm under a load of 350 kN/m^2. Take the size of the plate as 4·45 m × 0·45 m. (15)

UNIT - III

5. A retaining wall is of 5m height with smooth vertical back side. The backfill is levelled horizontally with top of wall. The backfill material is of pure sand having unit weight of 20 kN/m^3 and friction angle of 32°. What is the value of active earth pressure per metre length and locate the position of the same from bottom of wall. (15)

(OR)

6. (a) Explain the Rankine's active earth pressure theory. (10)

(b) Compute the intensities of active and passive earth pressure at depth of 8 m in dry cohesionless sand with an angle of internal friction of 30° and unit weight of 18 kN/m^3. What will be the intensities of active and passive earth pressure if the water level rises to the ground level? Take saturated unit weight of sand as 22 kN/m^3. (5)

UNIT - IV

7. What are the various classifications of pile foundation? Explain the various piles with neat sketches. (15)

(OR)

8. (a) A pre-cast concrete pile was driven in sand using 40 kN hammer having a free fall of 1·0 m. If the penetration of the pile in the last blow of the hammer was noted as 8 mm, determine the load carrying capacity of the pile in kN using Engineering News formula.(7)

(b) A group of 9 piles with 3 piles in a row was driven into a soft clay extending from ground level to a great depth. The diameter and length of piles are 0·3 m and 12 m respectively. The unconfined compressive strength of the clay is 70 kPa. If the piles were placed 0·9 m centre to centre, compute the allowable load on the pile group on the basis of a shear failure criterion for a factor of safety of 2·5. (8)

UNIT - V

9. (a) With a neat sketch, explain the components of a well foundation. (8)

(b) Write a short note on coffer dam. (7)

(OR)

10. Explain : (3×5=15)

(a) Open Caisson.

(b) Box Caisson.

(c) Pneumatic Caisson.

B.E. DEGREE EXAMINATION, 2015

(CIVIL ENGINEERING)

(SIXTH SEMESTER)

CLEC-605. ENVIRONMENTAL ENGINEERING - I

May]

[Time : 3 Hours

Maximum : 75 Marks

(Maximum 60 Marks for those joined before 2011-12)

Answer any ONE FULL question from each unit.
EACH full question carries FIFTEEN marks.

UNIT – I

1. Explain in detail the public water schemes.

(OR)

2. Enumerate various population forecasting methods.

UNIT - II

3. Describe the characteristic impounded storage reservoirs.

(OR)

4. Examine sanitary protection of wells.

UNIT - III

5. Discuss the various pipes used for transmitting water.

(OR)

6. List out the pumps and explain the selection of pump for a pumping station.

UNIT - IV

7. Explain the principles, functions and design of mixing basins.

(OR)

8. Discuss in detail about the principles of disinfection.

UNIT - V

9. Explain in detail the analysis of distribution network using Hardy cross method of balancing.

(OR)

10. How will you estimate the leak detection and state the procedure to maintenance.

B.E. DEGREE EXAMINATION, 2015

(CIVIL ENGINEERING)

(SIXTH SEMESTER)

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

May]   [Time : 3 Hours

Maximum : 75 Marks

(Maximum 60 Marks for those joined before 2011-12)

Answer any ONE FULL question from each unit.
EACH full question carries FIFTEEN marks.

UNIT – I

1. Explain the various modern methods of onsite construction with suitable diagram.   (15)

(OR)

2. Explain the pre-fabrication techniques used in modern construction in detail.   (15)

UNIT - II

3. Explain the appropriate use of belt conveyors, cranes and hoist used in constructions.   (15)

(OR)

4. (a) Explain the modern construction techniques used in system housing.   (8)

   (b) Explain the uses of excavator with neat sketch.   (7)

UNIT - III

5. Explain the types of organization in detail.   (15)

(OR)

6. (a) Explain the objectives and functions of construction management.   (10)

   (b) Explain what is meant by contract agreement.   (5)

UNIT - IV

7. (a) Explain the concept of slack in PERT and Gantt Chart.   (8)

   (b) Define time estimate, frequency distribution and probability distribution.   (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	6	6	6
1-4	1	7	13
2-5	3	9	15
3-5	2	8	14
4-6	6	9	12
5-6	4	7	10

   (a) Find the expected duration of each activity and their variance. (5)

   (b) Draw the project network and expected duration of the project. (5)

   (c) Find the variances of activities on critical path and its standard deviation. (5)

UNIT - V

9. (a) Distinguish between CPM and PERT. (7)

   (b) Explain the concept of resource smoothing and levelling. (8)

(OR)

10. Draw the network diagram for the following problem and indicate a sequence of planes that the company should want to consider in making a time-cost trade-off. The company is not interested in reducing the project duration below 29 days. Start with the plan that has the longest duration. (15)

Activity	Preceding Activity	Time (days)		Cost (₹.)	
		Regular Program	Crash Program	Regular Program	Crash Program
A	--	10	9	5,000	5,200
B	--	14	11	3,500	3,950
C	A	8	7	4,000	4,100
D	A	7	2	2,100	3,600
E	B	5	3	2,500	3,000
F	B	10	7	2,250	3,750
G	C	9	9	5,000	5,000
H	D,E	11	9	3,850	5,250
I	G,H	5	3	2,375	3.575