

Register Number :

Name of the Candidate :

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B.E. DEGREE EXAMINATION, 2013

(CIVIL ENGINEERING)

(SIXTH SEMESTER)

CLEC-601. HYDROLOGY

May]

[Time : 3 Hours

Maximum : 60 Marks

Answer any ONE FULL question from each unit.

ALL question carry EQUAL marks.

UNIT – I

1. Define hydrometeorology. Mention some of the hydrological problems in which meteorology plays an important role. (12)

(OR)

2. What are the significant features of global water balance studies? (12)

Turn Over

UNIT - II

3. Explain any three methods of determining average rainfall over a catchment area. State their advantages and disadvantages. (12)

(OR)

4. A catchment area has 5 rain-gauge stations. These gauges recorded the annual rainfall as

Station	A	B	C	D	E
Rainfall (mm)	1300	1420	1180	1080	1650

For 5% error is estimation of average rainfall, determine the minimum number of additional rain-gauge stations require to be established in the catchment. (12)

UNIT - III

5. State the Horton's equation for infiltration capacity curve and sketch with salient components of the curve. (12)

(OR)

6. Explain with neat sketch, the various methods of estimation of evaporation. (12)

UNIT - IV

7. Explain the concept of synthetic unit hydrograph. State its advantages. (12)

(OR)

8. Describe the factors influencing run-off over a longer period, say several years and over a short period of one year or less. (12)

UNIT - V

9. Define flood routing. State how flood routing is done in a reservoir. (12)

(OR)

10. Explain briefly : (4 × 3 = 12)

- (i) Maximum Probable flood.
- (ii) Design flood.
- (iii) Causes of flood.
- (iv) Factors affecting flood.

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

May] [Time : 3 Hours

Maximum : 60 Marks

(For students joined during 2007-08 and later)

Answer any ONE FULL question from each unit.

Each FULL question carries 12 marks.

UNIT - I

1. A 3 m wide rectangular channel discharges $5 \cdot 10 \text{ m}^3/\text{sec}$, the depth of flow being 0.75 m. If a sudden release of flow the upstream discharge rate is doubled, find the velocity of the constant surge. Find also the new depth of flow. (12)

(OR)

Turn Over

2. A 7.2 m height and 15 m long spillway discharges $94 \text{ m}^3/\text{sec}$ under a head of 2 m. If 1:9 scale model of this spillway is to be constructed, determine model dimensions, head over spillway model and the model discharge. If model experiences a force of 7500N, determine force on prototype. (12)

UNIT - II

3. A jet of water from a nozzle is deflected through an angle of 60° from its original and direction a curved plate which it enters tangentially without shock with a velocity of 30m/s and leaves with a mean velocity of 25m/s. If the discharge from the nozzle is 0.8 kg/s, calculate the magnitude and direction of the resultant force on the vane, if the vane is stationary. (12)

(OR)

4. A jet of water moving at 12m/s impinges on vane shaped to deflect the jet through 120° when stationary. If the vane is moving at 5m/s, find the angle of the jet so that there is no shock at the

inlet. What is the absolute velocity of the jet at exit in magnitude and direction and the work done per second per unit weight of water striking per second? Assume that the vane is smooth. (12)

UNIT - III

5. A Pelton wheel is to be designed for a head of 60 m when running at 200 rpm. The Pelton wheel develops 95.6475 kW shaft power. The velocity of the buckets is 0.45 times the velocity of the jet, overall efficiency is 0.85 and coefficient of velocity is 0.98. (12)

(OR)

6. Explain the various characteristic curves of hydraulic turbine in detail. (12)

UNIT - IV

7. (a) Explain multistage centrifugal pump with neat sketch. (6)
 (b) Derive an expression for minimum starting speed of a centrifugal pump. (6)

(OR)

Turn Over

8. A centrifugal pump having outer diameter equal to two times the inner diameter and running at 1000 rpm works against a total head of 40 m. The velocity of flow through the impeller is constant and equal to 2.5 m/s. The vanes are set back at an angle of 40° at outlet. If the outer diameter of impeller is 500 mm and width at outlet is 50 mm.

Determine :

- (a) Vane angle at inlet.
 (b) Work done by impeller on water per second
 and (c) manometric efficiency. (12)

UNIT - V

9. Explain the combined effect of acceleration and friction on the indicator diagram. (12)

(OR)

10. The cylindrical bore diameter of a single acting reciprocating pump is 150 mm and its stroke is 300 mm. The pump runs at 50 rpm and lifts

water through a height of 25 m. The delivery is 22 m long and 100 mm in diameter. Find the theoretical power required to run the pump. If the actual discharge is 4.2 litres/s, find the percentage slip. Also, determine the acceleration head at the beginning and middle of the delivery stroke. (12)

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B.E. DEGREE EXAMINATION, 2013

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(SIXTH SEMESTER)

CLEC-604 / PCLEC-503

SUBSTRUCTURE DESIGN

May]

[Time : 3 Hours

Maximum : 60 Marks

Answer any ONE FULL question from each unit.

ALL questions carry EQUAL marks.

UNIT - I

1. Distinguish between

(a) Spread footing and Raft footing. (6)

(b) Gross bearing capacity and Net bearing capacity. (6)

(OR)

Turn Over

2. (a) Explain briefly the general design principles of shallow foundation. (6)
- (b) What is bearing capacity of soil? What are the factors influencing bearing capacity of soil? (6)

UNIT - II

3. (a) Discuss different methods of site exploration. (6)
- (b) Distinguish between disturbed sample and undisturbed sample of soil. (6)

(OR)

4. (a) Distinguish between uniform settlement and differential settlement. (6)
- (b) Explain and derive the expression for settlement of Sandy soil by Plate load test? (6)

UNIT - III

5. A retaining wall 4 m high supports a backfill and is uniformly distributed surcharge load of 20 kN/m^2 . The unit weight of the backfill is

20 kN/m^3 , its angle of shearing resistance is 30° . The backfill has a horizontal top, flush with the top of the wall. If the wall is pushed towards the backfill, compute the total passive pressure on the wall. Take $C = 20 \text{ kN/m}^2$.

(12)

(OR)

6. Compute the intensities of active and passive earth pressure at a depth of 10m of wall retaining 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 is 22 kN/m^3 . (12)

UNIT - IV

7. (a) Discuss in what condition a pile foundation is more suitable than shallow foundation? (6)
- (b) A reinforced concrete pile weighing 30 kN is driven by a drop hammer weighing 40 kN and having an effective fall of

Turn Over

0.8 m. The average set per blow is 1.4cm. The total temporary elastic compression is 1.8cm. Assume the co-efficient of restitution as 0.25 and a factor of safety of 2, determine the ultimate bearing capacity and the allowable load for the pile.

(6)

(OR)

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

(b) Explain group efficiency factor of a pile group. (6)

UNIT - V

9. (a) Explain with neat sketches about coffer dams. (6)

(b) Discuss swelling of soil. (6)

(OR)

10. (a) Explain with neat sketches about well foundation. (6)

(b) Explain the load test on under reamed piles. (6)

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B.E. DEGREE EXAMINATION, 2013

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(SIXTH SEMESTER)

**CLEC-605. ENVIRONMENTAL
ENGINEERING**

May]

[Time : 3 Hours

Maximum : 60 Marks

Answer any ONE FULL question from each unit.

ALL questions carry EQUAL marks.

UNIT - I

1. Write short notes on :

(a) Objectives of public water supply schemes.

(6)

(b) The effects of variation in the rate of demand.

(6)

(OR)

Turn Over

2. Name the different methods used to forecast population and explain. (12)

UNIT - II

3. Differentiate between deep tube well and shallow wells in respect of yield of well. (12)

(OR)

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

UNIT - III

5. Discuss briefly various types of pumps. (12)

(OR)

6. Discuss briefly the procedure followed in Laying, jointing and testing of pipes. (12)

UNIT - IV

7. With a neat sketch, explain the construction and operation of a slow sand filter and indicate its merits and demerits. (12)

(OR)

8. Discuss the construction procedure of the following:

(a) Flocculation tank. (6)

(b) Sedimentation tank. (6)

UNIT - V

9. Explain the Hardy-cross method of pipe network analysis in water distribution system. (12)

(OR)

10. Write short notes on :

(a) Service reservoir. (6)

(b) Intermittent supplies. (6)

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B.E. DEGREE EXAMINATION, 2013

(CIVIL ENGINEERING)

(SIXTH SEMESTER)

**CLEC-606 / PCEC-601, CONSTRUCTION
TECHNIQUES AND MANAGEMENT**

May] [Time : 3 Hours

Maximum : 60 Marks

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

UNIT - I

1. Explain in detail various modern methods of off-site construction.

(OR)

2. Enumerate the Joints and Connections of precast units.

Turn Over

UNIT - II

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

(OR)

4. List out the construction equipments and explain them in detail.

UNIT - III

5. Explain the various types of organisations suitable for construction firms.

(OR)

6. Criticize the method of executing work.

UNIT - IV

7. Explain briefly Bar Charts and Gantt Charts.

(OR)

8. Outline the frequency distribution.

UNIT - V

9. The activities with their time duration for a project are given below.

Activity	t_o	t_l	t_p
1 - 2	2	5	14
1 - 3	3	12	21
2 - 4	5	14	17
3 - 4	2	5	8
3 - 5	6	15	30
4 - 5	1	4	7

Draw a network diagram and find the project duration. If the scheduled time is 27 days, find the probability of its completion.

Turn Over

10. The various activities of network are shown in figure-1 and the table represents the information.

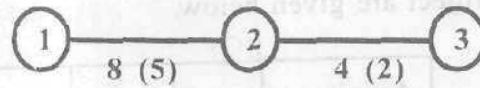


Figure-1

Activity	Normal duration (Days)	Normal Cost (₹)	Crash duration (Days)	Crash cost (₹)
1 - 2	8	7,000	5	8,500
2 - 3	4	4,000	2	4,500

The project overhead costs are ₹ 350 per day.

Determine.

- Direct Cost - duration relationship.
- Total cost - duration relationship.