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B.E. DEGREE EXAMINATION, 2013

(CIVIL ENGINEERING)

(EIGHTH SEMESTER)

CLEC-801. PRE-STRESSED CONCRETE

November]

[Time : 3 Hours

Maximum : 60 Marks

Answer any ONE FULL question from each unit.

Use of IS 1343-1980 is permitted.

ALL questions carry EQUAL marks.

UNIT - I

1. A rectangular beam 230 mm wide and 450 mm deep and 4 m span is pre-stressed by 650 kN force at a constant eccentricity of 75 mm. The beam supports three concentrated loads of 25 kN at the each quarter span points. Determine the location of the pressure line at the centre, quarter span and support sections of the beam. Neglect the moment due to self-weight of the beam. (12)

(OR)

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2. A pre-stressed concrete beam 250 mm wide and 350 mm deep is used over an effective span of 6 m to support an imposed load of 4 kN/m. The density of concrete is 24 kN/m^3 . Find the magnitude of the eccentric pre-stressing force located at 100 mm from the bottom of the beam which would nullify the bottom fibre stress due to loading. (12)

UNIT - II

3. A pre-tensioned pre-stressed concrete beam having a rectangular section, 150 mm wide and 350 mm deep, has an effective span of 50 mm. If $f_{ck} = 40 \text{ N/mm}^2$, $f_p = 1,600 \text{ N/mm}^2$, and the area of pre-stressing steel $A_p = 461 \text{ mm}^2$, calculate the flexural strength at the section using IS-1343 code provision. (12)

(OR)

4. The end block of a post-tensioned pre-stressed concrete beam, 300 mm wide and 300 mm deep, is subjected to a concentric anchorage force of 8,32,800 N by a freyssinet anchorage of area $11,720 \text{ mm}^2$. Design and detail the anchorage reinforcement for the end block. (12)

UNIT - III

5. (a) Explain the various types of composite construction.
- (b) What are the advantages of composite construction? (12)

(OR)

6. A composite beam of rectangular section is made of inverted T-beam having a slab thickness of 120 mm and width of 1,200 mm. The rib size is 150 mm \times 750 mm. The insitu concrete slab has $E_c = 30 \text{ kN/mm}^2$. If the differential shrinkage is 100×10^{-6} units, estimate the shrinkage stress developed in the pre-cast and cast *in-situ* units. (12)

UNIT - IV

7. A continuous beam ABC (AB = BC = 10m) has a rectangular section, 400 mm wide and 650 mm deep. The beam is pre-stressed by a concordant cable having a cross sectional area of $1,200 \text{ mm}^2$, located 50 mm from the soffit at mid-span points and 50 mm from the top of beam at B. If the beam supports two

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concentrated loads of 200 kN each at mid-span points, determine the load factor against collapse assuming,

(a) Elastic distribution of moments

and (b) Complete redistribution of moments.

Assume $f_p = 1,600 \text{ N/mm}^2$,

$$f_{ck} = 40 \text{ N/mm}^2. \quad (12)$$

(OR)

8. A continuous concrete beam ABC (AB = BC = 10 m) has a uniform rectangular cross section, 100 mm wide and 300 mm deep. A cable carrying an effective pre-stressing force of 360 kN varies linearly with an eccentricity of 50 mm towards the soffit at the end supports to 50 mm towards the top of the beam at mid support B.

(a) Determine the resultant moment at B due to pre-stressing only.

(b) If the eccentricity of the cable at B is + 25 mm, show that the cable is concordant. (12)

UNIT - V

9. What are the advantages of PSC poles? Give typical corss sections suitable for pre-stressed concrete poles. Briefly explain the design procedure for pre-stressed concrete poles.
- (12)

(OR)

10. Explain the step-by-step design procedure of PSC circular water tank.
- (12)

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**CLEC-802. MAINTENANCE
AND REHABILITATION OF STRUCTURES**

November]

[Time : 3 Hours

Maximum : 60 Marks

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

UNIT - I

1. (a) Discuss the importance of maintenance. (6)
- (b) Explain all the facets of maintenance. (6)

(OR)

2. (a) What are the various causes of deterioration? Explain. (6)

Turn Over

- (b) What are the various aspects of inspection? Discuss any one. (6)

UNIT - II

3. Write critical notes on :

- (a) The effect on durability and strength of concrete due to climate. (6)
- (b) The effect on durability and strength of concrete due to chemicals. (6)

(OR)

4. Explain the procedure of quality assurance of concrete construction. (12)

UNIT - III

5. (a) What is fibre reinforced concrete? Explain the uses and properties. (6)
- (b) Explain vacuum concrete and sulphur infiltrated concrete. (6)

(OR)

6. Evaluate the various methods of repair techniques in concrete with critical notes. (12)

UNIT - IV

7. How do you repair a structure distressed due to corrosion? Describe in detail. (12)

(OR)

8. (a) Explain the various techniques used in repair of cracks. (6)
- (b) Explain the procedure of epoxy coating of rebars. (6)

UNIT - V

9. Discuss the demolition techniques to dilapidated structure. (12)

(OR)

10. Write a note on :

- (a) Plate bonding technique in RC structure. (6)
- (b) Grouting of concrete structures. (6)

Register Number :

Name of the Candidate :

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B.E. DEGREE EXAMINATION, 2013

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CLEC-804. ETHICS IN ENGINEERING

(*Common to all branches*)

November]

[Time : 3 Hours

Maximum : 60 Marks

Answer any ONE FULL question from each unit.

ALL questions carry EQUAL marks.

UNIT – I

1. Explain the types of inquiries associated with engineering ethics. (12)

(OR)

2. Explain moral dilemmas and autonomy in detail. (12)

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UNIT – II

3. Explain how safety and risk is assessed in detail. (12)

(OR)

4. Explain the concept of risk in detail. (12)

UNIT – III

5. Explain collective bargaining in detail. (12)

(OR)

6. What is meant by occupational crime. Explain in detail. (12)

UNIT – IV

7. What is meant by professional rights? Explain recognition and conscientious right in detail. (12)

(OR)

8. What is discrimination? Explain briefly the anti discrimination laws. (12)

UNIT – V

9. Explain the concept engineers as expert witnesses and advisers. (12)

(OR)

10. Differentiate between integrity and ingenuity.

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CLEC-805. HYDRO POWER ENGINEERING

November]

[Time : 3 Hours

Maximum : 60 Marks

Answer any ONE FULL question from each unit.

ALL questions carry EQUAL marks.

UNIT – I

1. At a sudden enlargement of a water main from 240 mm to 480 mm diameter the hydraulic gradient rises by 10 mm. Estimate the rate of flow. (12)
2. Explain transient control using surge tank and control valves. (12)

UNIT - II

3. A sluice gate discharges water into a horizontal rectangular channel with a velocity of 6 m/s and depth of flow is 0.4 m. The width of the channel is 8m. Determine whether a hydraulic jump will occur, and if so, find its height and loss of energy per kg of water. Also, determine the power lost in the hydraulic jump. (12)
4. Write the derivation for depth of hydraulic jump. (12)

UNIT - III

5. Write the design of any one type of power plant. (12)
6. Explain with neat sketches the natural draught cooling towers. (12)

UNIT - IV

7. Explain with neat sketches, the various in take towers. (12)
8. Explain the turbo generator foundation. (12)

UNIT - V

9. Write short notes on underground power houses. (12)
10. Explain with neat sketches the hydro power plants. (12)

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**CLEE-806. INDUSTRIAL WASTE-WATER
TREATMENT AND DISPOSAL**

November]

[Time : 3 Hours

Maximum : 60 Marks

Answer any ONE FULL question from each unit.

Assume any other data, if necessary.

ALL questions carry EQUAL marks.

UNIT – I

1. What is effluent standards? Give effluent standards as per EPA regulations for at least four major industries. (12)

(OR)

2. Explain how industrial house-keeping can be achieved through volume and strength reduction of wastes? (12)

UNIT - II

3. Discuss the characteristics of waste from distillery industry. (12)

(OR)

4. Explain the characteristics of waste-water from a fertilizer industry. (12)

UNIT - III

5. Briefly explain the objectives of various conventional methods for treatment and disposal of sludge from industrial waste treatment plants. (12)

(OR)

6. Write short notes on the following methods:

(a) Ponding. (6)

(b) Filtration. (6)

UNIT - IV

7. Describe the aerobic biological treatment methods of waste-water treatment. (12)

(OR)

8. "Say yes to waste." - Discuss with reference to industrial waste disposal. (12)

UNIT - V

9. Explain in detail the significance of "Neutralisation" in industrial waste treatment. What are the methods adopted? (12)

(OR)

10. Write short notes on the following physicochemical treatment methods :

(a) Coagulation. (6)

(b) Flocculation. (6)

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CSEE-803. TALL BUILDINGS

November]

[Time : 3 Hours

Maximum : 60 Marks

Answer any ONE FULL question from each unit.

ALL questions carry EQUAL marks.

UNIT - I

1. Explain in detail the approximate analysis of modelling in tall structures.
2. Explain the concrete floor systems.

UNIT - II

3. Explain the step-by-step design procedure for infilled frame structures.

Turn Over

4. Explain the structural behaviour of rigid frame structure.

UNIT - III

5. Explain the structural behaviour of core structures and braced structures.
6. Explain the structural behaviour of coupled shear wall structures.

UNIT - IV

7. Explain in detail the second order effect of gravity loading.
8. Explain the methods of overall buckling analysis of frames.

UNIT - V

9. Write a detailed note on human response to building motions.
10. Explain in detail the response to ground acceleration.

