Register Number :

Name of the Candidate :

B.E. DEGREE EXAMINATION, 2014

(CIVIL ENGINEERING)

(EIGHTH SEMESTER)

CLEC - 801. PRESTRESSED CONCRETE

May]

[Time : 3 Hours.

Maximum : 60 Marks

(For students joined during 2007-08)

Answer any ONE FULL question from each unit.
Use of IS 1343-1980 is permitted.
ALL questions carry EQUAL marks.

UNIT - I

1. Explain the types of prestressing in detail. (12)

(OR)

2. A pretensioned beam 250 mm wide and 300 mm deep is prestressed by 12 wires each 7 mm diameter initially stressed to 1200 N/mm^2 with their centroids located 100 mm from the soffit. Estimate the final percentage of loss of stress due to elastic deformation, creep shrinkage and relaxation using the data : Relaxation of steel stress is 90 N/mm^2 ; $E_s = 210 \text{ kN/mm}^2$; $E_c = 35 \text{ N/mm}^2$; Creep co-efficient is 1·6 ; residual shrinkage strain is 3×10^{-4}. (12)

UNIT - II

3. A double Tee section having a flange 1,200 mm wide and 150 mm thick is prestressed by $4,700 \text{ m}^2$ of high tensile steel located at an effective depth of 1,600 mm. The ribs have a thickness of 150 mm each. If the cube strength of concrete is 40 N/mm^2 and tensile strength of steel is $1,600 \text{ N/mm}^2$, determine the flexural strength of the double Tee grider using IS : 1343 code provisions. (12)

(OR)

Turn Over

4. The end block of a post-tensioned beam is 300 mm wide deep and is prestressed concentrically by a Freyssinet cylindrical anchorage of 150 mm diameter with a jacking force of 800 kN. Design suitable anchorage reinforcement and sketch the details. (12)

UNIT - III

5. A prestressed concrete beam of rectangular section 90 mm wide and 180 mm deep, is to be designed to support two imposed loads of 3·5 kN located at one-third points over a span of 3 m. If there is to be no tensile stress in the concrete at transfer and service loads, calculate the minimum prestressing force and the corresponding eccentricity. $D_c = 24$ kN/m^3, loss ratio = 0·8. (12)

(OR)

6. The deck of a prestressed concrete bridge with an overall depth of 300 mm is made up of an inverted T-section, with *in-situ* concrete laid over it. The present prestressed T-section has the following dimensions and properties : Width and depth of slab = 300 and 80 mm ; Width and depth of stem = 70 and 160 mm ; Height of centroid from soffit = 80 mm ; Pre-stress at bottom is 11 N/mm^2 (Compression) ; Second moment of area = 1472×10^5 mm^4 ; Prestress at top = 1 N/mm^2 Modulus of elasticity of concrete is 35 kN/mm^2. The bridge has a span of 6 m and the precast beams are required to support the weight of the web concrete infill without any propping. When the infill, which may be assumed to have a modulus of elasticity of 28 kN/mm^2, has hardened a uniformly distributed live load of 13 kN/mm^2 is applied, calculate

    (a)   The top and bottom of the precast beam

and (b)   The highest and lowest points in the concrete infill. (12)

UNIT - IV

7. A two span continuous concrete beam ABC (AB = BC = 12 m) has a rectangular section 300 mm wide and 800 mm deep. The beam is prestressed by a cable carrying an effective force of 700 kN. The cable has a linear profile in the span AB and parabolic profile in span BC. The eccentricities of the cable are + 50 mm at A, –100 mm at a distance of 7 m from A and +200 mm at support B and –200mm at mid span of BC (–below and + above centroid axis)

(a) Evaluate the resultant moment developed at B due to the prestressing force.

(b) Sketch the line of thrust in the beam if it supports a *udl* of 5 kN/m which includes the self weight of beam. (12)

(OR)

8. Design a prestressed concrete beam continuous over two spans of 9 m to support live loads of 30 kN each at the centre of spans. The load may be applied independently or jointly. Permissible stresses being zero in tension and 15 N/mm^2 in compression. Loss ratio is 0·85. Determine a concordant profile and show it on an elevation of the beam. Allowing for a minimum cover of 100 mm, sketch a suitable transformed profile to reduce the slope of the tendons at the central support to a minimum. Check for limit states stress of serviceability and collapse. (12)

UNIT - V

9. A prestressed concrete pole is to be designed to suit the following data : Height of pole above ground is 12 m ; Wind force on wires acting at 2 m from top is 1·5 kN ; Wind force on pole acting at mid height is 2·5kN ; Permissible stresses in concrete in compression and tension are 16 N/mm^2 and 4 N/mm^2 ; loss ratio is 0·8 ; high tensile wire of 8 mm diameter initially stressed 12000 N/mm^2 are available for use. Design a suitable rectangular section for the pole and the number of high tensile wires at the base section. (12)

(OR)

10. A prestressed concrete pipe of 1·2m diameter, having a core thickness of 75 mm is required to withstand a service pressure intensity of 1·2 N/mm^2. Estimate the pitch of 5 mm diameter hightensile wire winding of the initial stress is limited to 1000 N/mm^2. Permissible stresses in concrete being 12·5 N/mm^2 in compression and zero in tension. The loss ratio is 0·8, if the direct tensile strength of concrete is 2·5 N/mm^2, estimate the load factor against cracking. (12)

B.E. DEGREE EXAMINATION, 2014

(CIVIL ENGINEERING)

(EIGHTH SEMESTER)

CLEC-802. MAINTENANCE AND REHABILITATION OF STRUCTURES

(For the candidates of 2007-08 Batch and later)

May]   [Time : 3 Hours

Maximum : 60 Marks

Answer any ONE FULL question from each unit   (5 × 12= 60)

UNIT-I

1. (a) List out and explain the various stages of Repair work.   (6)

    (b) Describe in detail about the prevention aspect of maintenance.   (6)

2. Describe the steps in the assessment procedure for evaluate damages in a structure.   (12)

UNIT-II

3. Discuss in detail about the permeability and thermal properties of concrete.   (12)

4. How do design and construction errors influence the serviceability and durability of   (12)
    concrete structures? Elaborate.

UNIT-III

5. What are the different types of polymer concrete and their properties?   (12)

6. Explain the following corrosion protection methods: Corrosion inhibitors and Cathodic   (12)
    protection.

UNIT-IV

7. Describe the techniques for strengthening the existing structures with suitable examples   (12)
    and sketches.

8.   a) What type of the repair techniques involved for the structure which is distressed   (6)
            due to chloride disruption?

        b) Explain how to rectify the leakage in the terrace slab due to weathering?   (6)

UNIT-V

9. Describe the preliminary procedures in demolition of a structure.   (12)

10. Explain in detail about controlled demolition techniques.   (12)

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CLEE-805/PCLEC-404. ARCHITECTURE

May]

[Time : 3 Hours

Maximum : 75 Marks

(Max: 60 marks for those who joined before 2011-2012)

Answer One Full Question from each Unit.
All questions carry equal marks (5 × 15 =75)

UNIT – I

1. Explain in detail the influence on architecture in commercial buildings.

2. Discuss the residential architecture in the traditional style.

UNIT – II

3. Describe the utilization of space in view of architecture.

4. Enumerate the principles and objectives of composition in architecture.

UNIT – III

5. Review the ancient Egyptian architecture in detail.

6. Classify the Indian architectural elements with neat sketches.

UNIT – IV

7. Discuss the need for orientation of buildings.

8. What are the principles to be adopted while designing of auditorium?

UNIT – V

9. Draw a neat line sketch representing the various features of community hall.

10. List the general idea of perspective drawing.

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CLEE- 805 / 806. HYDRO-POWER ENGINEERING

May]

[Time : 3 Hours

Maximum : 60 Marks

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

UNIT - I

1. Explain the transient control using surge tank and control valves.

(12)

(OR)

2. Write short notes on :

   (a) Air chambers.   (b) Control valves.

(6 + 6)

UNIT - II

3. Explain briefly about energy dissipators.

(12)

(OR)

4. Write the derivation for depth of hydraulic jump.

(12)

UNIT - III

5. Discuss in detail about chimneys.

(12)

(OR)

6. Explain with neat sketches, the natural draught cooling towers.

(12)

Turn Over

UNIT - IV

7. Explain storage structures with neat sketch. (12)

(OR)

8. Discuss about the materials handling structures. (12)

UNIT - V

9. Write short notes on :

    (a) Sizing of a power house. (6)

    (b) Joints in hydro-power plants. (6)

(OR)

10. Discuss briefly about the safety requirements in a hydro-power plant. (12)

B.E. DEGREE EXAMINATION, 2014

(CIVIL ENGINEERING)

(EIGHTH SEMESTER)

CLEE-806. INDUSTRIAL WASTE-WATER TREATMENT AND DISPOSAL

May]

[Time: 3 Hours

Maximum: 60 Marks

Answer one FULL question from each unit
All questions carry equal marks

UNIT – I

1. Explain the effects of industrial waste on streams, land and air. (12)

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

UNIT – II

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

4. Discuss the characteristics of waste from fertilizer industry. (12)

UNIT – III

5. Describe the sedimentation method with neat sketch. (12)

6. Write short notes on the following methods:
   a) Ponding (6)
   b) Filtration. (6)

UNIT – IV

7. What are the objectives of biological treatment method? Explain briefly about the (12) activated sludge process.

8. Write short notes on the following:
   a) Anaerobic digestion (6)
   b) Oxidation ditch. (6)

UNIT – V

9. Explain the role of Chemical Unit Process in waste water treatment. (12)

10. What are the various methods of neutralization? Explain the significance of (12) neutralization in waste-water treatment method.

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B.E. DEGREE EXAMINATION, 2014

(CIVIL ENGINEERING)

(EIGHTH SEMESTER)

CLEE- 805 / 806. SOLID STATE AND HAZARDOUS WASTE MANAGEMENT

May]   [Time : 3 Hours

Maximum : 60 Marks

Answer any ONE FULL question from each unit.
Assume the necessary data.
ALL questions carry EQUAL marks.

UNIT – I

1. Describe the goals and objectives of solid waste management in detail.   (12)

(OR)

2. Dicsuss the various methods of disposals that are normally followed for the disposal of waste.   (12)

UNIT - II

3 Explain the various methods of collection and transport of solid waste generated in Chidambaram City.   (12)

(OR)

4. Describe the role of incinerators in solid waste disposal in detail.   (12)

UNIT - III

5. Define sanitary land filling and explain the selection of suitable site for a sanitary land fill.   (12)

(OR)

6. Describe the impact of sanitary land fill on ground water.   (12)

Turn Over

UNIT - IV

7. Explain in detail about the recovery and reuse of solid waste. (12)

(OR)

8. Discuss in detail about the various precautions to be followed in solid waste management project. (12)

UNIT - V

9. Explain the procedures for composting of solid waste. (12)

(OR)

10. Write short notes on the following :

(a) Environmental impact assessment.

(b) Hazardous waste from industry. (6+6)

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CSEE - 804. SERVICES IN HIGHRISE BUILDINGS

May]   [Time : 3 Hours

Maximum : 60 Marks

Answer any FIVE questions, choosing one from each unit.
ALL questions carry EQUAL marks.

UNIT – I

1. Discuss in detail the materials of construction for multi-storeyed building.   (12)

(OR)

2. What are the important consideration for planning of building services ?   (12)

UNIT - II

3. Mention the different types of pumps used in water works practice and explain their merits and demerits.   (12)

(OR)

4. Explain the process of bulk water supply.   (12)

UNIT - III

5. Describe with the help of a neat sketch the components of a septic tank along with the function of each.   (12)

(OR)

6. Explain about sewerage collection and disposal.   (12)

UNIT - IV

7. Discuss the provisions of elevator system for a multi-storey building. (12)

(OR)

8. Explain the safety precautions to be followed in high rise building. (12)

UNIT - V

9. State the characteristics of ideal fire resisting material. Also, discuss the general guidelines for fire resistance of the buildings. (12)

(OR)

10. Enumerate the codes and rules for fire safety in buildings. (12)