G 1097 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2015

Seventh Semester

Branch : Civil Engineering

CE 010 706 L02—GROUND IMPROVEMENT TECHNIQUES (Elective—II) [CE]

(New Scheme – 2010 Admission onwards)

[Improvement/Supplementary]

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions.*

Each question carries 3 *marks.*

1. Explain the effect on engineering properties on soil due to mechanical stabilization.
2. Discuss thermal stabilization.
3. Discuss the properties of grouts.
4. Explain the factors affecting earth reinforcement.
5. Write the classifications of geotextiles.

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*

Each question carries 5 *marks.*

1. Write a note on well point system.
2. Explain the effect of lime on soil properties.
3. Define stability, rigidity, thixotropy.
4. Explain the mechanism of earth reinforcement.
5. Discuss geotextiles as reinforcement.

(5 × 5 = 25 marks)

Turn over

Part C

Answer **all** *questions.*

Each question carries 12 *marks.*

1. (a) Write a note on well point system and Electro Osmosis.

Or

(b) Discuss in brief selection improvement method.

2. (a) Write a brief note on thermal stabilization and Electrical Stabilization.

Or

(b) Discuss in detail the stabilization process of lime Soil.

3. (a) Explain the classification of suspension grout and solution grout.

Or

(b) Explain the stabilization of grouting for under pinning and other applications.

4. (a) Write a note on design theory of retaining Wall.

Or

(b) Explain the role of geotextiles as reinforcement and separators.

5. (a) Explain the role of geotextiles in Soil improvement.

Or

(b) Write a brief note on earth reinforcement and discuss its mechanism.

(5 × 12 = 60 marks)

G 1081 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2015

Seventh Semester

Branch : Civil Engineering

CE 010 705—TRANSPORTATION ENGINEERING II (CE)

(New Scheme—2010 Admission onwards)

[Improvement/Supplementary]

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions.*
Each question carries 3 *marks.*

1. Explain the term kerbs and write its classification.
2. Define the term super elevation.
3. Write down the types of traffic signal.
4. List the desirable properties of soil as a highway material.
5. What are the typical flexible pavement failures ?

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*
Each question carries 5 *marks.*

6. What are the various factors which control the highway alignment ? Explain any one.
7. Explain overtaking sight distance.
8. Explain Maximum and minimum super elevation.
9. Write the types of pavements and explain flexible pavements.
10. Write note on holding apron.

(5 × 5 = 25 marks)

Part C

Answer **all** *questions.*
Each question carries 12 *marks.*

11. Explain the Engineering surveys for highway location.

Or

Turn over

12. Calculate the safe stopping sight distance for design speed of 50 kmph for :

    (a) two way traffic on a two lane road ;

    (b) two way traffic on a single plane road.

13. The radius of a horizontal circular curve is 100 m. The design speed is 50 kmph and the design co-efficient of lateral friction is 0.15.

    (a) Calculate the super elevation required if full lateral friction is assumed to develop ;

    (b) Calculate the co-efficient of friction needed if no super elevation is provided ;

    (c) Calculate the equilibrium super elevation if the pressure on inner and outer wheels should be equal.

Or

14. Explain in detail about the widening of pavement on horizontal curves.

15. Explain the types of traffic signals.

Or

16. Explain in detail about the kerb parking.

17. Explain CBR test for evaluating the stability of soil subgrade.

Or

18. List out the typical rigid pavement failures and explain any three in detail.

19. Explain the factors which are considered in the geometric design of runways.

Or

20. Explain in detail about the aircraft parking system.

[5 × 12 = 60 marks]

G 1071 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2015

Seventh Semester

Branch : Civil Engineering

CE 010 704—ARCHITECTURE AND TOWN PLANNING (CE)

(New Scheme—2010 Admission onwards)

[Improvement/Supplementary]

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions.*
Each question carries 3 *marks.*

1. Define circulation space.
2. What are the occupancy classifications of buildings ?
3. What are the effects of Orientation ?
4. What are the objectives of town planning ?
5. Define master plan.

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*
Each question carries 5 *marks.*

6. Explain about analogic design theory in architecture.
7. Explain about licensing of building works.
8. What are the requirements of good ventilation ?
9. Explain in detail about garden city movement.
10. What are the design standards of parks and play ground.

(5 × 5 = 25 marks)

Part C

Answer **all** *questions.*
Each question carries 12 *marks.*

11. Explain the factors influencing Architectural development.

Or

12. Explain in detail about characteristics of form in Architecture.

Turn over

13. Explain the functional planning of a residential building with circulation diagram.

Or

14. What are the general requirements of site and buildings ? Explain in detail.

15. What are the factors to be considered when designing the passenger elevator ? Explain.

Or

16. Explain in detail about sewage disposal arrangement for hostel buildings.

17. Explain the problems involved in urban growth.

Or

18. Explain the planning of transportation network for a new town.

19. Explain the process of implementing the development plans.

Or

20. Explain the planning stands for industries.

[5 × 12 = 60 marks]

G 1036 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2015

Seventh Semester

Branch : Civil Engineering

CE 010 701—DESIGN OF HYDRAULIC STRUCTURES (CE)

(New Scheme—2010 Admission onwards)

[Improvement/Supplementary]

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions.*
Each question carries 3 *marks.*

1. What are solid masonry gravity dams ?
2. List out the types of Arch dam based on its shape.
3. Explain about Weir.
4. Define canal Regulation.
5. Define load factor.

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*
Each question carries 5 *marks.*

6. Explain the failure of gravity dam by means of tension.
7. What are the limitations of thin cylinder theory ?
8. Explain about gravity and non gravity weirs.
9. What are the main functions of head regulator ?
10. Explain in detail about intake structure.

(5 × 5 = 25 marks)

Part C

Each question carries 12 *marks.*

11. Explain in detail about the water pressure acting in the gravity dam. Draw neat sketches.

Or

12. What are the types of spillway ? Explain any *one* in detail with neat sketch.

Turn over

13. Explain in detail about multiple arch Buttress dam.

Or

14. Explain about arch dam. What are the types of arch dam ? List out ?

15. Explain masonry weir with vertical drop in detail.

Or

16. Explain Bligh's creep theory for seepage flow in detail.

17. Design an irrigation outlet for the following data :—

FSQ of outlet	=	50 lit/sec
FSL in distributary on u/s side of outlet	=	200.00 m
FSL in water course on d/s side of outlet	=	199.92 m
FSD in distributary on u/s side of outlet	=	1.05 m

Or

18. Design a 1.5 metres Sarda Type fall for a canal carrying a discharge of 40 cumecs with the following data :—

Bed level upstream	=	105.0 m
Bed level downstream	=	103.5 m
Side slopes of channel	=	1 : 1
Full supply level of upstream	=	106.8 m
Full supply level of downstream	=	105.3 m
Berm level u/s	=	107.4 m
Bed level width u/s and d/s	=	30 m
Safe exit gradient for Khosla's Theory	=	1/5

19. What are the classifications of hydro plant ? Explain any *one*.

Or

20. Explain in detail about surge tank.

(5 × 12 = 60 marks)

G 1098 (Pages : 3) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2015

Seventh Semester

Branch : Civil Engineering

CE 010 706 L03—PRESTRESSED CONCRETE (Elective II) (CE)

(New Scheme—2010 Admission onwards)

[Improvement/Supplementary]

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions.*
Each question carries 3 *marks.*

1. Define post tensioning.
2. What are the assumptions made on analysis of stress in PC structural member ?
3. What are the types of losses in post-tensions ?
4. What are the types of flexural failure ?
5. What is meant by secondary moment in continuous pre-stressed concrete member ?

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*
Each question carries 5 *marks.*

6. What are the advantages of pre-stressed concrete ?
7. Explain the factors influencing deflections.
8. Explain in detail about loss due to shrinkage of concrete.
9. Explain about shear stress in pre-stressed members.
10. Write in detail about Guyon's theorem.

(5 × 5 = 25 marks)

Part C

Answer **all** *questions.*
Each question carries 12 *marks.*

11. Explain the principles of pre-tensioning system with neat sketches. (12 marks)

Or

Turn over

12. Explain in detail about :

    (i) Thermo electric pre-stressing ;

    (ii) Chemical pre-stressing.

(12 marks)

13. A rectangular concrete beam of cross-section 30 cm deep and 20 cm wide is pre-stressed by means of 15 wires of 5 mm diameter located 6.5 cm from the bottom of the beam and 3 wires of diameter of 5 mm, 2.5 cm from the top. Assuming the pre-stress in the steel as 840 N/mm^2, calculate the stresses at the extreme fibres of the mid-span section when the beam is supporting its own weight over a span of 6 m. If a uniformly distributed live load of 6 kN/m is imposed, evaluate the maximum working stress in concrete. The density of concrete is 24 kN/m^3.

(12 marks)

Or

14. A concrete beam having a rectangular cross-section 100 mm wide and 300 mm deep is pre-stressed by a parabolic cable carrying an initial force of 240 kN. The cable has an eccentricity of 50 mm at the centre of span and is concentric at the supports. If the span of the beam is 10 m and the live load is 2 kN/m, estimate the short time deflection at the centre of the span.

    Assuming E = 38 kN/mm^2 and creep coefficient $\varnothing = 2.0$, loss of pre-stress = 20 percent of the initial stress after 6 months. Estimate the long time deflection at the centre of span at this stage, assuming that the dead and live loads are simultaneously applied after release of pre-stress.

(12 marks)

15. A pre-stressed concrete pile, 250 mm square, contains 60 pre-tensioned wires, each of 2 mm diameter, uniformly distributed over the section. The wires are initially tensioned on the pre-stressing bed with a total force of 300 kN. Calculate the final stress in concrete and the percentage loss of stress in steel after all losses, given the following data :—

    $E_s = 210$ kN/mm^2

    $E_c = 32$ kN/mm^2

    Shortening due to creep = 30×10^{-6} mm/mm per N/mm^2 of stress

    Total shrinkage = 200×10^{-6} per unit length

    Relaxation of steel stress = 5 percent of initial stress.

(12 marks)

Or

16. Design a suitable section for the tie member of a truss to support a maximum design tensile force of 500 kN. The permissible compressive stress in concrete at transfer is 15 N/mm^2 and no tension is permitted under working loads. The loss ratio is 0.8. 7 mm diameter wires of ultimate tensile strength of 1700 N/mm^2 with an initial stress of 950 N/mm^2 may be used. The direct tensile strength of concrete is 3 N/mm^2. A load factor of 2 at the limit state of collapse and 1.25 against cracking is required.

(12 marks)

17. A pre-tensioned, T-section has a flange which is 300 mm wide 200 mm thick. The rib is 150 mm wide by 350 mm deep. The effective depth of the cross-section is 500 mm. Given $A_p = 200$ mm^2, $f_{ck} = 50$ N/mm^2 and $f_p = 1600$ N/mm^2, estimate the ultimate moment capacity of the T-section using the Indian standard code regulations.

(12 marks)

Or

18. The support section of a pre-stressed concrete beam, 100 mm wide and 250 mm deep, is required to support an ultimate shear force of 60 kN. The compressive pre-stress at the centroidal axis is 5 N/mm^2. The characteristic cube strength of concrete is 40 N/mm^2. The cover to the tension reinforcement is 50 mm. if the characteristic tensile strength of steel in stirrups is 250 N/mm^2, design suitable reinforcements at the section using the Indian standard code IS: 1343 recommendations.

(12 marks)

19. The end block of a post-tensioned pre-stressed member is 550 mm wide and 550 mm deep. Four cables, each made up of 7 wires of 12 mm diameter strands and carrying a force of 1000 kN, are anchored by plate anchorages, 150 mm by 150 mm, located with their centres at 125 mm from the edges of the end block. The cable duct is of 50 mm diameter. The 28-day cube strength of concrete f_{cu} is 45 N/mm^2. The cube strength of concrete at transfer f_{ci}, is 25 N/mm^2. Permissible bearing stresses behind anchorages should conform with IS: 1343. The characteristic yield stress in mild steel anchorage reinforcement is 260 N/mm^2. Design suitable anchorages for the end block.

(12 marks)

Or

20. A pre-stressed beam having a rectangular cross-section with a width of 120 mm and a depth of 300 mm is continuous over two spans, AB = BC = 8 m. The cable with zero eccentricity at the ends and an eccentricity of 50 mm towards the top fibres of the beam over the central support, carries an effective force of 500 kN :

    (a) Calculate the secondary moment developed at B.

    (b) If the beam supports concentrated loads of 20 kN each at midpoints of span, evaluate the resultant stresses at the central support section B.

    (c) Locate also the position of the pressure line at section.

(12 marks)

[5 × 12 = 60 marks]

19. Design a circular tank to the following particulars :

(a) Diameter of tank = 3.50 metre

(b) Depth of water = 3 metre

(c) The tank rests on ground.

(d) The walls and base slab are not monolithic with each other.

(e) Specific weight of water = 9810 N/metre^3.

Use M 20 concrete and Grade 1 Mild steel

Or

20. An open tank 4 m. × 3 m. × 2.5 m. deep rests on firm ground. Design the tank. Use M 200 concrete and mild steel reinforcement.

(5 × 12 = 60 marks)

G 1060 **(Pages : 4)** **Reg. No.....**

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2015

Seventh Semester

Branch : Civil Engineering

CE 010 703—DESIGN OF CONCRETE STRUCTURE—II (CE)

(New Scheme—2010 Admission onwards)

[Improvement/Supplementary]

Time : Three Hours Maximum : 100 Marks

Use of IS codes permitted, missing data may be assumed suitably

Part A

Answer **all** *questions.*
Each question carries 3 *marks.*

1. Explain basic concept of pre-stressing.
2. What is Cantilever Retaining wall ?
3. What are circular beams ?
4. What are conical domes ?
5. What are rigid joints in water tanks ?

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*
Each question carries 5 *marks.*

6. Explain the principle of post tensioning.
7. Explain in detail about counter fort Retaining wall.
8. Give load calculation for circular beam with UDL when symmetrically supported as per IS codes.
9. Explain about membrane stresses in domes.
10. How is the bending moment for the base slab of elevated water tank calculated ?

(5 × 5 = 25 marks)

Part C

Answer **all** *questions.*
Each question carries 12 *marks.*

11. A pre-stressed concrete beam 400 mm. × 600 mm. in section has a span of 6 metre and is subjected to a uniformly distributed load of 16 kN/metre including the self-weight of the beam. The pre-stressing tendons which are located along the longitudinal centroidal axis provide an effective pre-stressing force of 960 kN. Determine the extreme fibre stresses in concrete at the mid span section.

Or

12. A pre-stressed concrete pile is 300 mm. × 300 mm. in section and is provided with 40 wires of 3 mm. diameter distributed uniformly over the section. Initially the wires are tensioned in the prestressing beds with a total pull of 450 kN. Determine the final stress in concrete and the percentage loss of stress in the wires. Take $E_s = 2.08 \times 10^5$ N/mm^2., $E_c = 3.20 \times 10^4$ N/mm^2.

    Creep shortening = 32×10^{-6} mm. / mm. per N /mm.^{2} of stress

    Total shrinkage strain = 200×10^{-6}

    Relaxation loss of stress in steel = 4.50 % of the initial stress.

13. Design a reinforced concrete cantilever type retaining wall having a 5 m. tall stem. The wall retains soil level with its top. The soil weighs 18000 N/m.^{3} and has an angle of repose of 30°. The safe bearing capacity of the soil is 200 kN/m^2. Use M20 concrete and Fe 415 steel.

Or

14. Design a counter fort type retaining wall to the following particulars :

    (a) Height of wall above G.L. = 5.50 metre.

    (b) Safe bearing capacity of the soil = 160 kN/metre^2.

    (c) Angle of repose = 30°

    (d) Weight of soil = 16000 N/metre^3.

    (e) Spacing of counter forts = 3 metres centres.

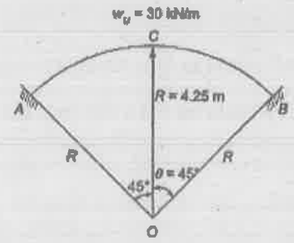
    (d) Weight of R.C.C. = 25000 N/metre^3.

    Use M 20 concrete and Fe 415 steel.

15. Explain the design procedure of a three span continuous beam symmetrically supported and carrying UDL. Design as per IS specifications.

Or

16. A beam curved in plan in the form of segment of a circle of radius 4.25 m. and central angle of 90° fixed at the ends as shown in figure supports a uniformly distributed service load 20 kN/m. For preliminary analysis consider rectangular section of size 300 × 600 mm. overall for the beam. Design the curved beam using concrete of grade M25 and HYSD steel bars of grade Fe 415.



17. Design a conical roof for a hall having a diameter of 20 m. The rise of the dome has to be 4 m. Assume the live and other loads as 1500 N/m^2.

Or

18. Design a spherical dome over a circular room for the following data :

    (a) Inside diameter of room = 12 m.

    (b) Rise of dome = 4 m.

    (c) Live load due to wind, ice, snow etc. = 1.5 kN/m^2.

The dome has an opening of 1.6 m diameter at its crown. A lantern is provided at its top, which causes a dead load of 22 kN acting along the circumference of the opening.