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Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2015

Seventh Semester

Branch : Civil Engineering

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

(New Scheme—2010 Admission onwards)

[Regular/Supplementary]

Time : Three Hours

Maximum : 100 Marks

Part A

Answer all questions.

Each question carries 3 marks.

1. Explain Dewatering.
2. What do you mean by electrical stabilization ?
3. Explain grouting applications.
4. What are the advantages of reinforced earth ?
5. Write a note on separators.

(5 × 3 = 15 marks)

Part B

Answer all questions.

Each question carries 5 marks.

6. Explain Vibroflotation.
7. What are the factors affecting soil-cement mixing ?
8. Write a note on properties of grouts.
9. Discuss the effect of reinforcement in sand.
10. What are the functions of geosynthetics ?

(5 × 5 = 25 marks)

Part C

Answer all questions.

Each question carries 12 marks.

11. (a) Discuss the use of well point system in soil stabilization.

Or

- (b) Explain Pre-loading. Compare various pre-loading methods.

Turn over

12. (a) Write in detail about electrical stabilization.

Or

(b) Write about chemical stabilization.

13. (a) How is ground freezing carried out in the field ?

Or

(b) What is grouting ? Discuss various grouting materials adopted. State their suitability.

14. (a) Explain about tie back analysis.

Or

(b) Explain the design procedure of a reinforced earthwall.

15. (a) Explain the role of geotextile as filters and separators.

Or

(b) Differentiate between Geomembrane, Geotextile and Geogrid.

(5 × 12 = 60 marks)

B.TECH. DEGREE EXAMINATION, NOVEMBER 2015**Seventh Semester**

Branch : Civil Engineering

CE 010 705—TRANSPORTATION ENGINEERING—II (CE)

(New Scheme—2010 Admission onwards)

[Regular/Supplementary]

Time : Three Hours

Maximum : 100 Marks

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

1. Define right of way, kerbs, shoulders.
2. Define superelevation. List the two methods for attainment of superelevation.
3. Define spotspeed, running speed and overall speed.
4. List out the desirable properties of bitumen.
5. List out any three factors to be considered for the selection of site for airport.

(5 × 3 = 15 marks)

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

6. Why are overtaking zones provided ? What is the basis of deciding its length ? Draw a neat sketch and show the signs to be installed and their positions.
7. Derive an expression for finding the extra widening required on horizontal curve.
8. Briefly explain spot speed studies.
9. Explain equivalent single wheel load with neat sketch.
10. Explain zoning laws.

(5 × 5 = 25 marks)

Part C*Answer all questions.**Each full question carries 12 marks.*

11. Derive an expression for finding the overtaking sight distance with a neat sketch.

Or

Turn over

12. (a) Calculate stopping sight distance for a design speed of 80 kmph. Take the total reaction time as 2.5 seconds and coefficient of friction as 0.35. (6 marks)
- (b) Explain total reaction time of drivers and factors on which it depends. Explain "MEV" theory. (6 marks)
13. Derive an expression for finding length of transition curve on horizontal alignment of highways. Or
14. A valley curve is formed by descending gradient of 1 in 15 meeting an ascending gradient of 1 in 20. Design the length of valley curve to fulfill comfort condition and head light sight distance for design speed of 100 kmph. Assume allowable rate of change of centrifugal acceleration $C = 0.5 \text{ m/s}^3$
15. Explain road side interview method, license plate method and home interview method. Or
16. Explain in detail various traffic characteristics.
17. Explain desirable properties of road, aggregates. Or
18. Explain difference between flexible pavements and rigid pavements. Also explain the failures in rigid pavements.
19. Explain in detail about aircraft characteristics, airport classification, approach zone and turning zone. Or
20. Explain in detail about air traffic control.

[5 × 12 = 60 marks]

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Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2015**Seventh Semester**

Branch : Civil Engineering

CE 010 705—DESIGN OF CONCRETE STRUCTURE—II (CE)

(New Scheme—2010 Admission onwards)

[Regular/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. What is relaxation of stress in steel ?
2. List out types of retaining walls.
3. List notes on singly reinforced and doubly reinforced beams.
4. Write notes on ring beams.
5. Explain importance of providing pedestals to columns.

(5 × 3 = 15 marks)

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

6. Explain general principles of prestressed concrete.
7. Explain about earth pressure diagrams in retaining walls.
8. Determine ultimate moment of resistance of a 120 mm. thick slab, reinforced with 10 mm ϕ at 150 mm. spacing located at an effective depth of 80 mm.
9. Explain about openings in domes.
10. Explain about design of stagings as per IS code method.

(5 × 5 = 25 marks)

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

11. Explain in detail about systems of prestressing.

Or

Turn over

12. A pretensioned beam 250 mm. wide and 300 mm. deep is prestressed by 12 wires each of 7 mm. dia. initially stressed to 1200 N/mm^2 with their centroids located 100 mm. from Soffit. Estimate final percentage loss of stress due to elastic deformation, creep, shrinkage and relaxation using IS 1343 code and following data :

Relaxation of steel stress = 90 N/mm^2 , $E_s = 210 \text{ kN/mm}^2$, $E_c = 35 \text{ kN/mm}^2$. Creep coefficient = 1.6. Residual shrinkage strain = 3×10^{-4} .

13. Design a cantilever retaining wall for following data :

- (i) Height of earth to be retained is 6 m. above bottom base with level top and surcharge of 1800 kg./m^2
- (ii) Angle of repose of soil, $\phi = 32^\circ$.
- (iii) Bearing pressure of soil = 160 kN/m^2
- (iv) Coefficient of friction between soil and base slab = 0.5.

Or

14. Design a counterfort retaining wall to retain earth 6.0 m. above basement level. The density of earth is 16500 N/m^2 and angle of repose of soil is 26° . The bearing capacity of soil is 130 kN/m^2

15. Explain in detail about membrane stresses in spherical domes.

Or

16. Explain in detail about design of domes with uniformly distributed loads.

17. Design a RC beam supported on two walls, 450 mm. thick over a clear span of 8 m. The beam carries a super imposed load of 15 kN/m . use M_{20} and Fe_{415} steel.

Or

18. Explain design of circular beam with udl and supported on symmetrically placed columns.

19. Design a circular tank with fixed base for capacity of 400,000 litres. The depth of water is to be 4 m., including free board of 0.25 m.

Or

20. Explain in brief about design of columns and bracings as per IS code method.

(5 × 12 = 60 marks)

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Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2015

Seventh Semester

Branch : Civil Engineering

CE 010 704—ARCHITECTURE AND TOWN PLANNING (CE)

(New Scheme—2010 Admission onwards)

[Regular/Supplementary]

Time : Three Hours

Maximum : 100 Marks

Part A

Answer all questions.

Each question carries 3 marks.

1. Canonic theory of architectural design.
2. Licensing of building works.
3. Escalators.
4. Town planning principles.
5. Master plan.

(5 × 3 = 15 marks)

Part B

Answer all questions.

Each question carries 5 marks.

6. What are factors influencing architectural development ?
7. List occupancy classification of buildings.
8. Sketch lay out and classification of a timber stair.
9. Explain land use planning.
10. Explain causes of slums.

(5 × 5 = 25 marks)

Part C

Answer all questions.

Each question carries 12 marks.

11. Explain briefly creative principles in architectural design.

Or

12. Explain briefly (i) Form and Form expressive of function ; (ii) Concept of space.

Turn over

13. Explain functional planning of commercial building with circulation diagrams.

Or

14. Explain general requirements of site and building.

15. Explain passenger and service goods elevators.

Or

16. Explain (i) natural and mechanical ventilation ; (ii) Summer air-conditioning.

17. Explain in details about problem of urban growth.

Or

18. Explain (i) legislation on environmental planning ; (ii) transportation network and planning.

19. Explain preparation and execution of master plan.

Or

20. Explain planning standards for different land use allocation for buildings.

(5 × 12 = 60 marks)

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Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2015

Seventh Semester

Branch : Civil Engineering

CE 010 702—ENVIRONMENTAL ENGINEERING—I (CE)

(New Scheme—2010 Admission onwards)

[Regular/Supplementary]

Time : Three Hours

Maximum : 100 Marks

Part A

Answer all questions.

Each question carries 3 marks.

1. Fire demand.
2. Location of pumping stations.
3. Plain sedimentation.
4. Pressure filters.
5. Desalination.

(5 × 3 = 15 marks)

Part B

Answer all questions.

Each question carries 5 marks.

6. Factors affecting percapita demand.
7. Effect of storage on quality of water.
8. Break point chlorination.
9. Clariflocculators.
10. Various types of joints used in cast iron pipes.

(5 × 5 = 25 marks)

Part C

Answer all questions.

Each question carries 12 marks.

11. Explain (i) Rural and Urban water supply systems ; (ii) Threshold odour number and coliform index.

Or

12. Explain (i) Water borne diseases ; (ii) Physical and chemical test on water.

Turn over

13. Estimate hydraulic gradient in a 2 m. diameter smooth concrete pipe carrying a discharge of $3 \text{ m}^3/\text{s}$ at 10°C .

Or

14. Explain various appurtenances in distribution system.

15. Explain (i) Aeration and purpose of aeration ; (ii) Surface water and ground water.

Or

16. Explain with figures, different units of a coagulation sedimentation plant.

17. Design a rapid sand filter for 6.5 million litres per day of supply, with all its principal components.

Or

18. Explain :

(a) Chlorination-action and application.

(b) Filter media.

19. Explain treatment methods for (i) odour and taste removal ; (ii) hardness removal.

Or

20. Explain (i) Pumping and storage system ; (ii) Cleaning and maintenance of distribution system.

(5 × 12 = 60 marks)

F 4621

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Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2015

Seventh Semester

Branch : Civil Engineering

CE 010 701—DESIGN OF HYDRAULIC STRUCTURES (CE)

(New Scheme—2010 Admission onwards)

[Regular/Supplementary]

Time : Three Hours

Maximum : 100 Marks

Part A

Answer all questions.
Each question carries 3 marks.

1. How does the drainage galleries affect uplift pressure in gravity dam ?
2. Write a short note on buttress dams.
3. Define Afflux, pond level and retrogression.
4. Describe about ogee falls.
5. What is meant by a cross drainage works ? List out different types of cross drainage works.

(5 × 3 = 15 marks)

Part B

Answer all questions.
Each question carries 5 marks.

6. How does the practical profile of a low gravity dam differs from that of the theoretical one, and why ?
7. Explain briefly the design criteria of earthen dams.
8. What are under sluices and what are their functions in a river regulator ?
9. Briefly explain about location of canal falls.
10. Write short notes on :
 - (a) Aqueduct.
 - (b) Level crossing.

(5 × 5 = 25 marks)

Turn over

Part C

Answer all questions.

Each question carries 12 marks.

11. Explain briefly with neat sketches various forces acting on gravity dam.

Or

12. (a) What are the different ways by which a concrete gravity dam may fail and how will you ensure its safety against each type of failure ?

(8 marks)

(b) Differentiate between a low gravity dam and a high gravity dam. (4 marks)

13. (a) Explain with neat sketches types of earthen dams. (8 marks)

(b) What are rockfill dams and what are their advantages over earthen dams ? (4 marks)

Or

14. Write short note on the following :—

(i) Massive head type buttress dam. (3 marks)

(ii) Most economical spacing of buttress. (3 marks)

(iii) Best central angle for an arch dam. (3 marks)

(iv) Double curvature arch dam. (3 marks)

15. (a) Explain Bligh's creep theory and its limitations. (7 marks)

(b) How does Lane's weighted creep theory differ from Bligh's creep theory ? (5 marks)

Or

16. (a) Differentiate between the following :—

(i) Weir and barrage. (3 marks)

(ii) Silt excluders and silt ejectors. (3 marks)

(b) Why is it necessary to provide a fish ladder on large rivers ? How does it help in achieving the required objective ?

(6 marks)

17. Design the salient dimensions of a syphon well drop for the following particulars :

Fall = 1 m.

General ground level = 20.50

Bed width u/s and d/s = 1.25 m.

Bed level u/s = 20

Discharge = 0.3 m³/s

Full supply depth = 0.60 m.

Or

18. Design a 1.5 m. Sarda type fall for a canal carrying a discharge of 40 cumecs with the following data :

Bed level u/s = 105

Bed level d/s = 103.5

Full supply level, u/s = 106.8

Side slopes = 1 : 1

Bed width u/s and d/s = 30 m.

Soil = good loam

Bligh's coefficient = 10.

19. A common load is shared by two hydel stations, one being a base load station with 20 MW installed capacity, and the other being a stand by station with 25 MW capacity. The yearly output of the stand by station is 10×10^6 kWh and that of the base land plant as 110×10^6 kWh. The peak load taken by stand by station is 12 MW and this station works for 2500 hours during the year. The base load station takes a peak of 18 MW, find out :

(i) Annual load factors for both stations.

(ii) Plant use factors for both stations.

(iii) Capacity factors for both stations.

Or

20. (a) What is a draft tube and what are its uses ? (4 marks)

(b) Explain classification of hydel plants. (8 marks)

[5 × 12 = 60 marks]

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Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2015

Seventh Semester

Branch : Civil Engineering

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

(New Scheme—2010 Admission onwards)

[Regular/Supplementary]

Maximum : 100 Marks

Time : Three Hours

Use of IS : 1343 is permitted.

Part A

Answer all questions.
Each question carries 3 marks.

1. Define post tensioning.
2. Explain thrust line.
3. Explain loss due to successive tensioning of curved cables.
4. List the types of flexural failure.
5. Explain primary moment.

(5 × 3 = 15 marks)

Part B

Answer all questions.
Each question carries 5 marks.

6. Write a note on chemical prestressing.
7. Draw the stress distribution due to eccentric prestressing, dead and live load.
8. Explain loss due to creep of concrete.
9. Explain limiting zone for the prestressing force.
10. Explain Magnel's method.

(5 × 5 = 25 marks)

Part C

Answer all questions.
Each question carries 12 marks.

11. (i) Explain post tensioning system.
(ii) Explain Lee-Mc Call System.

Or

Turn over

12. (i) Explain why high strength concrete and high tensile steel are used for prestressed concrete construction.
- (ii) Explain the IS classification of type I, II and III prestressed concrete members.
13. A rectangular concrete beam 250 mm wide by 300 mm deep is prestressed by a force of 540 kN at a constant eccentricity of 60 mm. the beam supports a concentrated load of 68 kN at the center of a span of 3 m determine the location of the pressure line at the center, quarter span and support sections of the beam. Neglect the self-weight of the beam.

Or

14. The cross-section of a prestressed concrete beam used over a span of 6 m is 100 mm wide and 300 mm deep. The initial stress in the tendons located at a constant eccentricity of 50 mm is 1000 N/mm. The sectional area of the tendon is 100 mm². Find the percentage increase in stress in the wires when the beam supports a live load of 4 kN/m. the density of concrete is 24 kN/m³.
15. A rectangular concrete beam, 300 mm deep and 200 mm wide is prestressed by means of fifteen 5 mm diameter wires located 65 mm from the bottom of the beam and three 5 mm wire, located 25 mm from the top of the beam. If the wire are initially tensioned to a stress of 840 N/mm², calculate the percentage loss of stress due to elastic deformation of concrete only. $E_s = 210 \text{ kN/mm}^2$ $E_c = 31.5 \text{ N/mm}^2$.

Or

16. A post tensioned cable of beam 10m long is initially tensioned to a stress of 1000 N/mm² at one end. If the tendons are curved so that the slope is 1 in 24 at each end, with an area of 600 mm², calculate the loss of prestress due to friction given the following data. Coefficient of friction between duct and cable is 0.55 ; friction coefficient for wave effect is 0.0015 per m. during anchoring , if there is a slip of 3 mm at the jacket end-, calculate the final force in the cable and the percentage loss of prestress due to friction and slip $E_s = 210 \text{ kN/mm}^2$.
17. A prestressed road bridge of span 10 m consists of a concrete slab 380 mm thick with parallel post tensioned cables, in each of which the force at transfer is 360 kN. If the bridge is required to support an uniformly distributed applied load of 25 kN/m², with tensile stress in the concrete not exceeding 0.7 N/mm² at any time, calculate the maximum horizontal spacing of the cables, their distance from the soffit of the slab at mid span and their lowest possible position at the support. Assume 20 percent loss of prestress after transfer.

Or

18. A prestressed I- section of minimum overall depth 300 mm is required to have an ultimate flexural strength of 86 kN-m. Find :
- (a) Suitable minimum dimension of the top flange ; and
- (b) The total number of 5 mm wires required in the bottom flange. The cube strength of concrete is 60 N/mm² and the tensile strength of steel is 1600 N/mm².

19. The end block of a prestressed concrete beam. 200 mm wide and 400 mm deep, has two anchor plates, 200 × 50 mm deep, at 80 mm from the top and 200 × 80 mm deep located 100 mm from the bottom of the beam, transmitting force of 250 and 300 kN respectively. Find the position and magnitude of the maximum tensile stress on a horizontal section passing through the center of the beam using Guyon's method.

Or

20. Explained the steps involved in the design of continuous prestressed structure.

(5 × 12 = 60 marks)