F 3364 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2014

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 stopping sight distance. Express intermediate sight distance and headlight sight distance in terms of stopping sight distance.
2. Explain briefly grade compensation.
3. List out any three types of traffic signal system.
4. List out the factors to be considered for the design of pavements.
5. Define apron, stopway, taxiway.

(5 × 3 = 15 marks)

Part B

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

6. List out the various factors on which stopping sight distance depends. Explain PIEV theory.
7. Explain extrawidening and factors on which extrawidening depends.
8. List out the advantages and disadvantages of grade separated intersection.
9. Explain the shape tests conducted on aggregates.
10. Write a brief note on aircraft characteristics.

(5 × 5 = 25 marks)

Part C

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

11. Explain basic requirements and factors controlling alignment of roads.

Or

Turn over

12. (a) The design speed on a road is 60 kmph. What is the required stopping sight distance for 2 way traffic on a single lane road if the coefficient of friction of pavement surface is 0.35 and driver reaction time is 2.5 seconds.

(6 marks)

(b) Write short notes on right of way, kerbs, shoulders. (6 marks)

13. (a) The design speed on a curve is 65 kmph and radius is 325 m. What is the length of the transition curve on a plain terrain as per IRC empirical formula. Also determine the shift for this transition curve.

(6 marks)

(b) What is the length of summit curve required for a stopping sight distance of 160 m. on a National Highway at the junction of a rising gradient of 1.5 % and a falling gradient of 2 %.

(6 marks)

Or

14. (a) What is the extrawidening required for a pavement of width 7 m. on a horizontal curve of radius 250 m. and design speed of 80 kmph. The longest wheelbase of vehicle expected on the road is 7.0 m.

(8 marks)

(b) Define ruling gradient, limiting gradient, exceptional gradient and minimum gradient.

(4 marks)

15. Explain various tests conducted on bitumen.

Or

16. Explain typical flexible pavement failures with neat sketches.

17. Write a note on airport lighting.

Or

18. (a) Write brief notes on approach zone, turning zone, wind rose diagram. (6 marks)

(b) Explain zoning laws. (6 marks)

19. Explain the term traffic volume. Explain the different methods of carrying out traffic volume studies.

Or

20. (a) Explain the home interview method for collecting origin and destination data. (6 marks)

(b) Write short notes on PCU, Thirtieth highest hourly volume, 85th percentile speed. (6 marks)

[5 × 12 = 60 marks]

F 3379 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2014

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. What is the necessity of soil improvement ?
2. What are the factors affecting soil cement mixing ?
3. Explain rigidity and thixotropy.
4. Explain the mechanism of earth reinforcement.
5. Compare geotextile with geogrid.

(5 × 3 = 15 marks)

Part B

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

6. What is Preloading ? Explain suitability of preloading technique with illustration.
7. Explain various stabilization methods.
8. Explain jet grouting process.
9. Explain about application areas of earth reinforcement.
10. What are the advantages of geotextiles in the construction of pavements ?

(5 × 5 = 25 marks)

Part C

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

11. (a) Explain vibratory compaction in sand. Enumerate the factors to be considered while selecting an insitu densification technique for loose sand.

Or

Turn over

(b) What are the different types of surface compaction equipments ? Explain its suitability for different soils.

12. (a) Explain crone stabilization, bituminous stabilization and thermal stabilization.

Or

(b) Critically discuss various stabilization process with their relative merits and demerits.

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

Or

(b) With suitable sketch, explain the functioning of a cement grouting plant.

14. (a) Write a note on soil reinforcement interaction.

Or

(b) How soil beneath footing can be improved by reinforcement ?

15. (a) Differentiate between geomembrane, geotextile and geogrid.

Or

(b) What are the parameters that indicate the physical and strength properties of Geosynthetics ?

(5 × 12 = 60 marks)

F 3331 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2014

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. List notes on urban water supply systems.
2. Explain about classification of pumps.
3. Explain about purpose of aeration.
4. List out requirements of a good disinfectant.
5. Briefly explain pipe corrosion.

(5 × 3 = 15 marks)

Part B

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

6. Explain (a) Percapita demand ; (b) Coliform index.
7. Explain about effect of storage on quality of water.
8. Explain about coagulants and dosage of coagulants.
9. Explain about theory of filtration.
10. Explain about storage capacity of balancing reservoir.

(5 × 5 = 25 marks)

Part C

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

11. The population figures of a town during four decades in 1960, 1970, 1980 and 1990 are 39,500, 48,000, 60,000 and 69,000 respectively. Predict its population in year 2010 by geometrical progression and incremental increase method.

Or

Turn over

12. Explain :

    (a) Impurities in water and their importance.

    (b) Turbidity and its measurement in laboratory.

13. Explain about various appurtenances in the distribution system.

Or

14. Estimate hydraulic gradient in a 2 m. diameter smooth concrete pipe carrying a discharge of 4 m^3/s at 12° C.

15. Explain about plain sedimentation and theory of sedimentation.

Or

16. Explain (a) Theory of flocculation ; (b) Clariflocculations.

17. Explain operation of rapid sand filters and slow sand filters.

Or

18. List notes on :

    (a) Chlorination and its action.

    (b) Super chlorination and break point chlorination.

19. Explain following treatment methods (a) Deflouridation ; (b) Iron and manganese removal ; (c) Removal of hardness.

Or

20. Explain about detection and prevention of leaks in distribution system.

(5 × 12 = 60 marks)

F 3343 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2014

Seventh Semester

Branch : Civil Engineering

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

(New Scheme—2010 Admission onwards—Regular/Supplementary)

Time : Three Hours Maximum : 100 Marks

Relevant IS Codes are permitted.

Part A

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

1. Explain basic principle of prestressed concrete.
2. List notes on counterfort retaining walls.
3. Write notes on development length requirements at supports for beams.
4. List notes on nature of stresses in spherical domes.
5. Explain in general about stagings and bracings in water tanks.

(5 × 3 = 15 marks)

Part B

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

6. Explain about pretensioning and post-tensioning systems in prestressing.
7. Explain active earth pressure and passive earth pressure.
8. Find the ultimate moment of resistance of a 120 mm. thick slab, reinforced with 8 mm. ϕ bars at 180 mm. spacing located at an effective depth of 80 mm. Assume M20 concrete and Fe 415 steel.
9. Explain about analysis of stresses in a spherical dome of uniform thickness under a concentrated load at crown.
10. Explain about flexible and rigid joints in water tanks.

(5 × 5 = 25 marks)

Turn over

Part C

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

11. (a) Explain in detail about various losses in prestress.

Or

(b) A RC beam, 120 mm. wide by 250 mm. deep spanning over 9 m. is prestressed by a straight cable carrying an effective prestressing force of 250 kN located at an eccentricity of 45 mm. The beam supports a live load of 1.5 kN/m. Calculate the resultant stress distribution for central cross-section of beam. The density of concrete is 25 kN/m.^{3}

12. (a) Design a cantilever retaining wall for following data :

(i) Height of earth to be retained is 7 m. above bottom base with level top and surcharge of 1850 kg./m.^{2}

(ii) Angle of repose of soil $\phi = 28°$.

(iii) Bearing pressure of soil = 160 kN/m.^{2}

(iv) Coefficient of friction between soil and base slab = 0.50.

Or

(b) Design a counterfort retaining wall to retain earth 6.0 above basement level. The density of earth is 17,000 N/m^3 and $\phi = 27°$. The bearing capacity of soil is 130 kN/m^2.

13. (a) Design a simply supported slab for a room of dimensions 3 × 4 m. and 240 mm. thick brick wall around. Assume slab corners are free to lift up. Take live-load of 3.5 kN/m^2 and finish load of 1 kN/m.^{2}

Or

(b) Explain in detail about circular beams with u.d.l. on symmetrically placed columns.

14. (a) Design a short square column, with effective length 3.5 m. of resisting a P_u = 1500 kN and M_u = 80 kNm under uniaxial eccentricity. Assume M25 concrete and Fe 415 steel.

Or

(b) Design a short circular column with spiral reinforcement having effective length, 2.5 m. capable of resisting P_u = 1000 kN and M_u = 50 kNm under uniaxial eccentricity.

15. (a) Explain in detail about design of ground supported and overhead water tank in detail.

Or

(b) Explain in detail about design of circular water tanks with flat bottom.

(5 × 12 = 60 marks)

F 3354 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2014

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. Explain canonic theory of design in architecture.
2. List out occupancy classification of buildings.
3. List notes on passenger elevators.
4. Explain objectives of town planning.
5. List notes on land acquisitions.

(5 × 3 = 15 marks)

Part B

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

6. Explain about factors influencing architectural developments.
7. Explain about general requirements of site.
8. Explain in detail about cross ventilation.
9. Explain garden city movement.
10. Explain about master plan.

(5 × 5 = 25 marks)

Part C

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

11. Explain in detail about creative principles of architectural design.

Or

12. Explain concept of activity space, circulation space and tolerance space.

Turn over

13. Explain and sketch about circulation diagrams of school building.

Or

14. Briefly explain about functional planning of residential and commercial building.

15. Explain (a) Metal, concrete stairs ; (b) Drum and traction type elevators.

Or

16. Briefly explain :

    (i) Ventilation requirements.

    (ii) Natural and mechanical ventilation.

17. (a) Discuss principles of town planning.

    (b) Explain comprehensive planning.

Or

18. Explain (a) Radburn plan ; (b) Legislation on environmental pollution.

19. Explain planning standards for (a) Public buildings ; (b) Play grounds.

Or

20. Briefly explain causes and clearance schemes for slums.

(5 × 12 = 60 marks)

F 3319 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2014

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. What is a spillway ? What are its functions ?
2. What is meant by economic buttress spacing and best central angle of an arch dam ?
3. Differentiate between weir and barrage.
4. Write a note on notch type fall.
5. List out the different types of hydel plants and briefly describe the storage plant.

(5 × 3 = 15 marks)

Part B

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

6. Explain practical profile of a gravity dam.
7. Define and explain phreatic line in earthen dam.
8. Describe with the help of sketch, the working of a silt excluder.
9. What is meant by canal falls ? Where are they located ?
10. Define and differentiate between Load factor, Utilization factor and Capacity factor.

(5 × 5 = 25 marks)

Part C

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

11. Enumerate the classification of dams. Discuss in brief merits and demerits of various types of dam.

Or

Turn over

12. (a) Explain physical factors governing selection of type of a dam. (5 marks)

(b) Explain elementary profile of a gravity dam. Derive an expression for determining base width of such a dam based on stress criterion and sliding criterion. (7 marks)

13. Enumerate the design methods used in the design of arch dams. Explain thin cylinder theory in detail.

Or

14. (a) What are earthen dams and under what circumstances are they preferred ? (5 marks)

(b) What are the causes of failure of earth dam ? (7 marks)

15. Explain with help of a diagram, the various component parts along with their functions of a diversion head work.

Or

16. Discuss the main causes of failure of weirs founded on previous foundations. Briefly explain the salient features of Khosla's theory and how it is used in the design of permeable foundations.

17. Design a 1 m. sarda type fall for a canal carrying a discharge of 15 cumecs with the following data :

Bed level (up stream) — + 99.20
Bed level (down stream) — + 98.20
Side slopes of channel — 1 : 1
Full supply level upstream — + 101
Bed width (upstream and down stream) — 10 m.
Soil — Good loam
Bligh's coefficient — 10.

Or

18. Design the salient dimensions of a syphon well deep for the following particulars :—

Fall — 4 m.
General ground level — + 99.
Full supply depth 0.8 m.
Bed level (upstream) — + 99.2
Discharge — 0.5 $m.^3/s$
Bed width (upstream and down stream) — 2.7 m.

19. (a) Describe with the help of sketches various types of cross drainage works. (8 marks)

(b) What are cross drainage works ? What is the necessity of such a work in a canal project ? (4 marks)

Or

20. What are the principal components of a hydroelectric scheme ? Discuss the utility of each component.

[5 × 12 = 60 marks]

F 3380 (Pages : 3) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2014

Seventh Semester

Branch : Civil Engineering

CE 010 706 L03—PRESTRESSED CONCRETE—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. Define the term pre-tensioning ?
2. Explain the term pressure line ?
3. What are the types of losses in pre-stress ?
4. What are the ways to improve the shear resistance of structural members ?
5. What is meant by primary moment in continuous pre-stressed concrete members ?

(5 × 3 = 15 marks)

Part B

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

6. Explain the principles of post-tensioning ?
7. Explain the importance of controlling deflection in pre-stressed member ?
8. Explain in detail about the loss due to creep on concrete ?
9. What are the assumptions made in strain compatibility method ?
10. Explain in detail about stress distribution in end block ?

(5 × 5 = 25 marks)

Part C

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

11. (i) Why high strength concrete and steel is used in pre-stressed concrete structures ?

    (ii) Explain the basic concept of pre-stressing ?

Or

Turn over

12. Explain in detail about the advantages of pre-stressed concrete over other concrete.

13. A pre-stressed concrete beam of section 120 mm. wide by 300 mm. deep is used over an effective span of 6 m. to support a uniformly distributed load of 4 kN/m, which includes the self-weight of the beam. The beam is pre-stressed by a straight cable carrying a force of 180 kN and located at an eccentricity of 50 mm. Determine the location of the thrust-line in the beam and plot its position at quarter and central span sections.

Or

14. A simply supported beam with a uniform section spanning over 6 m. is post-tensioned by two cables, both of which have an eccentricity of 100 mm. below the centroid of the section at mid-span. The first cable is parabolic and is anchored at an eccentricity of 100 mm. above the centroid at each end, the second cable is straight and parallel to the line joining the supports. The cross-sectional area of each cable is 100 mm^2. and they carry an initial stress of 1200 N/mm^2. The concrete has a cross-section of 2×10^4 mm^2. and a radius of gyration of 120 mm.

The beam supports two concentrated loads of 20 kN each at the third points of the span, $E_c = 38$ kN/mm^2. Calculate using Lin's simplified method :

(a) The instantaneous deflection at the centre of span ; and

(b) The deflection at the centre of span after 2 years, assuming 20 percent loss in pre-stress and the effective modulus of elasticity to be one-third of the short-term modulus of elasticity.

15. A pre-tensioned beam, 200 mm. wide and 300 mm. deep, is pre-stressed by 10 wires of 7 mm. diameter initially stressed to 1200 N/mm^2, with their centroids located 100 mm. from the soffit. Find the maximum stress in concrete immediately after transfer, allowing only for elastic shortening of concrete.

If the concrete undergoes a further shortening due to creep and shrinkage while there is a relaxation of 5 percent of steel stress, estimate the final percentage loss of stress in the wires using the Indian Standard Code (IS : 1343 — 1980) regulations, and the following data:

$E_s = 210$ kN/mm^2.

$E_c = 5700$ (f_{cu}) ½.

$f_{cu} = 42$ N/mm^2.

Creep coefficient $((\varnothing) = 1.6$

Total residual shrinkage strain $= 3 \times 10^4$.

Or

16. Design the thickness and circumferential reinforcement required for a cylindrical tank wall subjected to a design tensile force of 500 kN/m. $f_{ct} = 16$ N/mm^2, $f_{tw} = -0.8$ N/mm^2, direct tensile strength of concrete = 2.5 N/mm^2 and □ = 0.85. High tensile wires of 5 mm. diameter (U.T.S. = 1700 N/mm^2) with an initial stress of 1000 N/mm^2 may be used. Desirable load factors against collapse and cracking should not be less than 2 and 1.25 respectively.

17. A pre-tensioned, T-section has a flange 1200 mm. wide and 150 mm. thick. The width and depth of the rib are 300 and 1500 mm. respectively. The high-tensile steel has an area of 4700 mm^2 and is located at an effective depth of 1600 mm. If the characteristic cube strength of the concrete and the tensile strength of steel are 40 and 1600 N/mm^2 respectively, calculate the flexural strength of the T-section.

Or

18. The cross-section of a pre-stressed concrete beam is rectangular with a width off 350 mm. and an overall depth of 700 mm. The pre-stressing force of 180 kN acts at an eccentricity of 190 mm. If the bending and twisting moments at the section are 80 and 20 kNm respectively, calculate the maximum principle tensile stress at the section.

19. The end block of a post-tensioned beam is 80 mm. wide and 160 mm. deep. A prestressing wire, 7 mm in diameter, stressed to 1200 N/mm^2. has to be anchored against the end block at the centre. The anchoring plate is 50 mm. by 50 mm. The wire bears on the plate through a female cone of 20 mm diameter. Given the permissible stress in concrete at transfer, f_{ci}, as 20 N/mm^2. and the permissible shear in steel as 94.5 N/mm^2, determine the thickness of the anchor plate.

Or

20. Two simply supported beams, AB = BC = 10 m. of rectangular cross-section, each post-tensioned by means of two parabolic cables (P = 300 kN each) with eccentricities of zero at the supports and 150 mm. at mid-span, are converted into a continuous beam by tensioning a parabolic cap cable carrying a force of 300 kN. The ends of the cap cable are located at 3 m from the central support B. The beam is 200 mm. wide and 600 mm. deep.

(a) Calculate the secondary moment induced at B.

(b) Locate the resultant line of thrust through the beam AB.

(c) Evaluate the resultant pre-stress along the top and bottom of the beam.

$(5 \times 12 = 60$ marks)