F 4116 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2016

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 the term Camber.
2. Explain Overtaking sight distance.
3. Write any *three* advantages of traffic signal.
4. What are the factors to be considered in design of pavements ?
5. What are the requirements of highway d ainage system ?

(5 × 3 = 15 marks)

Part B

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

6. Explain the classification of roads by Nagpur road plan.
7. Define kerb and explain its types.
8. Explain the facilities of kerb parking with its merits and demerits.
9. Write down the types of tests on bitumen and explain any *one* test.
10. Explain the factors to be considered for airport site selection.

(5 × 5 = 25 marks)

Turn over

Part C

Answer **all** *questions.*

Each question carries 12 *marks.*

11. Explain the factors controlling alignment ?

Or

12. Calculate the stopping sight distance on a highway at a descending gradient of 2% for a design speed of 80 kmph. Assume other data as per IRC recommendations.

13. Design the rate of super elevation for a horizontal highway curve of radius 500 m and speed 100 kmph.

Or

14. Explain the objectives of providing Transition curve and explain its curves.

15. Explain the various forms of road intersections.

Or

16. Spot speed studies were carried out at a certain sketch of a highway and the consolidated data collection are given below :

Speed range	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100
No. of vehicles observed	12	18	68	89	204	255	119	43	33	9

Determine :

(i) The upper and lower values or speed limits for regulation of mixed traffic flow ; and

(ii) The design speed for checking the geometric design elements of the highway.

17. List out the desirable properties of road aggregates and explain it.

Or

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

19. Explain in detail about the runway markings.

Or

20. Explain the various enrouting aids used for air traffic control.

(5 × 12 = 60 marks)

F 4136 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2016

Seventh Semester

Branch : Civil Engineering

CE 010 706—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. Discuss the necessity of soil improvement.
2. Explain Thermal stabilization.
3. Explain Thixotropy of soil.
4. Discuss the action of reinforcement on earth.
5. Write short note on geotextile filters.

(5 × 3 = 15 marks)

Part B

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

6. Explain the necessity and design of stone columns.
7. Explain Electrical stabilization.
8. Explain Groutability ratio.
9. Explain the properties of reinforcement for earth reinforcement.
10. Explain soil improvement with geotextiles.

(5 × 5 = 25 marks)

Part C

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

11. Discuss the condition of the site where soil improvement is required for construction purpose. Explain the selection of type of improvement.

Or

12. Explain Mechanical stabilization. Discuss the soil properties effecting due to stabilization.

Turn over

13. Explain cement stabilization of soil. Discuss the effect of cement on soil. Discuss stabilization procedure.

Or

14. Explain Bituminous stabilization. Briefly explain the stabilization procedure.

15. Define Grout and Grouting. Discuss the functions and classification of grouts.

Or

16. Discuss the application of stabilization grouting for underpinning.

17. Explain the concept and mechanism of earth reinforcement. Discuss the applications and advantages.

Or

18. Discuss the stability analysis of retaining wall.

19. Explain the concept, formation and applications of geotextiles.

Or

20. Explain the applications of geotextiles.

(5 × 12 = 60 marks)

F 4103

(Pages : 2)

Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2016

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. Define Architecture.
2. Explain licensing for building works.
3. Discuss the importance of vertical transportation in tall buildings.
4. Explain Raeburn plan.
5. Define Slum. Discuss reasons for formation of slum.

(5 × 3 = 15 marks)

Part B

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

6. Explain historical examples for style in architecture.
7. Write short note on air circulation for industrial building.
8. Discuss comfort factors in buildings.
9. Explain zoning in town planning.
10. Explain preparation of master plan.

(5 × 5 = 25 marks)

Part C

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

11. Distinguish between industrial development and architectural development. Discuss the factors influencing architectural development.

Or

12. Briefly explain the concept of space in architectural design.

Turn over

13. Explain the occupancy classification of buildings.

Or

14. Discuss the data required for preparation of the site plan and working drawings for a residential building. State the building rules for preparation of site plan.

15. Explain with a neat sketch an escalator. Discuss design constraints of passenger escalator. Discuss operation arrangements.

Or

16. Discuss the design principles of a lift. Explain the various factors to be considered for design of a lift for a high-tech hospital. Sketch the layout of the lift room.

17. (a) Discuss problems of urban growth.

    (b) Explain garden city movement.

Or

18. (a) Explain neighbor hood unit planning.

    (b) Discuss land use planning.

19. Explain development plan. Discuss problems for implementation of development plan.

Or

20. Discuss planning standards for public buildings and industries.

(5 × 12 = 60 marks)

F 4074 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2016

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. Define the term per capita demand.
2. Define Intake.
3. What is meant by coagulation ?
4. Explain break point chlorination.
5. Define deflouridation.

(5 × 3 = 15 marks)

Part B

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

6. Explain any *two* factors affecting the per capita demand.
7. Explain about pressure-relief valves.
8. List out the chemicals used for coagulation. Explain any *one* chemical reaction.
9. Briefly explain super chlorination.
10. Explain the requirements of a good water distribution system.

(5 × 5 = 25 marks)

Turn over

Part C

Answer **all** *questions.*

Each question carries 12 *marks.*

11. Explain in detail about the hardness in water and explain its types.

Or

12. The population of 5 Decades from 1930 to 1970 are given below. Find out the population after one, two and three decades, by using arithmetic increase method.

Year	1930	1940	1950	1960	1970
Population	25,000	28,000	34,000	42,000	47,000

13. What are the types of Intake ? Explain canal Intakes in detail.

Or

14. Explain in detail about the working principle of jet pumps with neat sketch.

15. Explain plain sedimentation and the theory of sedimentation.

Or

16. With a neat sketch explain the working procedure of flocculation tank.

17. Design a rapid sand filter unit for 4 million litres/day of supply with all its principal components.

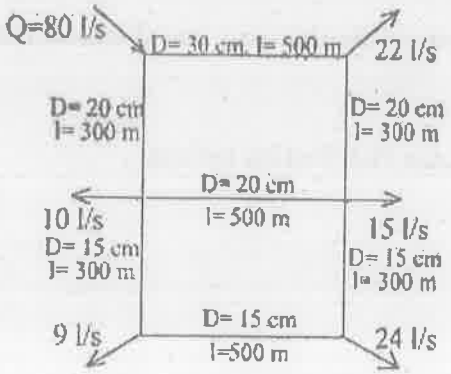
Or

18. What are the methods of disinfection ? Explain any *two* methods.

19. Explain dead end system of distribution network with its advantages and disadvantages.

Or

20. Calculate the head losses and the corrected flows in the various pipes of a distribution network as shown in figure. The diameters and the lengths of the pipes used are given against each pipe. Compute corrected flows after one correction. Use Hardy Cross method.



(5 × 12 = 60 marks)

F 4059 (Pages : 3) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2016

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 meant by gravity ?
2. What are earthen dams and under what circumstances are they preferred ?
3. Draw a neat sketch of a river-regulators.
4. Explain canal escapes.
5. Enumerate the different types of hydel plants.

(5 × 3 = 15 marks)

Part B

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

6. What is meant by the term "low dam" ? Determine the dimension of the elementary profile of a low gravity dam.
7. Define an arch dam and a double arc dam.
8. Explain Lane's weighted creep theory.
9. Explain syphon aqueduct.
10. Explain penstock.

(5 × 5 = 25 marks)

Part C

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

11. Write a note on :
    (i) Dam Galleries.
    (ii) Grout curtain.
    (iii) Force acting on gravity dam.

Or

Turn over

12. Write a note on :

    (i) Construction joints.

    (ii) Uplift force.

    (iii) Rigid and non-rigid dams.

13. (i) Explain the advantages of buttress dams.

    (ii) What are rockfill dams and what are their advantages over earthen dams ?

Or

14. Write a note on :

    (i) Phreatic lite in earthen dams.

    (ii) Chimney drain.

    (iii) Horizontal drainage blanket.

15. What are the different types of weirs ? Explain with neat sketches circumstances under which each type is adopted.

Or

16. (i) Differentiate between silt excluder and ejectors.

    (ii) Write a note on location of "head works".

17. Design the size and number of notches required for a canal drop with the following particulars :

Full Supply discharge	=	4 cumecs
Bed width	=	6.0 m.
F.S.depth	=	1.5 m.
Half supply depth	=	10 m.

Or

18. Design a 1.5 meters sarda type fall for a canal having a discharge of 12 cumecs with the following data :

Bed Level upstream	=	103.0 m
Side slopes of channel	=	1 : 1
Bed Level downstream	=	101.5 m
Full supply level upstream	=	104.5 m
Bed with u/s and d/s	=	1.0 m
Soil	=	Good loam
Assume Bligh's coefficient	=	6

19. The Load on hydel plant varies from a minimum of 10,000 kW to a maximum of 35,000 kW. Two turbo generators of capacities 22,000 kW each have been installed. Calculate :

    (i) Total installed capacities of the plant.

    (ii) Plant factor.

    (iii) Maximum demand.

    (iv) Load factor.

    (v) Utilization factor.

Or

20. Write a note on :

    (i) Peltons turbine.

    (ii) Fore boy.

    (iii) Draft tube.

(5 × 12 = 60 marks)

F 4089 (Pages : 3) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2016

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

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

Part A

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

1. Explain IS specifications for pre-stressed concrete.
2. Discuss the classification of retaining wall.
3. Discuss the shear development in circular beams.
4. Sketch the shape of a conical dome.
5. List the various forces acting on ground water tank.

(5 × 3 = 15 marks)

Part B

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

6. Discuss different system of pre-stress.
7. Discuss the various forces acting on a retaining wall.
8. Discuss the structural behavior and application of continuous beam.
9. Discuss the various forces acting on a conical dome excluding external forces.
10. Distinguish between flexible and rigid joints in water tank.

(5 × 5 = 25 marks)

Part C

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

11. A simply supported beam of span 8 m is loaded with a uniformly distributed load of 50 kN/m including self weight of the beam. The cross-section of the beam is 800 mm deep and 300 mm wide. If a straight tendon with a pre-stress of 1200 kN be applied along a level of 200 mm above the bottom of the beam, find the stress developed at ends, quarter span and midspan.

Or

Turn over

12. A concrete rectangular beam 300 mm wide and 800 mm total depth is pre-tensioned by pre-stressing wires of area 1800 mm^2, the total pre-stressing force applied initially being 1800000 N. The wires placed with their C.G. at 200 mm from the bottom all along the simply supported span of 8 m. Determine the loss of pre-stress in the beam. Assume $E_s = 2\ (10)^5\ N/mm^2$ $E_c = 3\ (10)^4\ N/mm^2$.

13. Design a reinforced concrete cantilever type retaining wall having a 5.5 m. tall stem. The wall retains soil level with its top. The soil weights 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 :

Height of wall above G.L.	=	6.50 metre
Safe bearing capacity of the soil	=	160 $kN/metre^2$
Angle of repose	=	30°
Weight of Soil	=	16000 $N/metre^3$
Spacing of counter forts	=	3.2 metres centers
Weight of RCC	=	25000 $N/metre^3$

15. Design a continuous beam A, B, C fixed at A and C. The span AB is 3 m and BC 3.5 m uniformly distributed load on the beam including self weight is 20 kN/m.

Or

16. A curved beam in plan in the form of a segment of a circle having 10 m diameter and central angle 90° have a span of 6 m and its fixed at the ends. The beam carries a uniform distributed load of 20 kN/m including self weight. As a first trail consider a section of sizes 300 × 600 mm over all sizes. Design the curved beam using concrete M 25 and steel grade FE 415.

17. Design a conical roof for a seminar hall having diameter 25 m. The rise of the dome is 5 m. Assume live and other loads as 1600 N/m^2.

Or

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

(i)	Inside diameter of room	=	10 m
(ii)	Rise of dome	=	3.3 m
(ii)	Live load due to wind	=	1.5 kN/m^2
(iv)	The dome has an opening of 1.5 m diameter at its crown. A lantern is provided at its top, which causes a dead load of 22 kN acting the circumference of the opening.		

19. Design a circular tank to the following particulars :

(i)	Diameter of tank	=	3 metre.
(ii)	Depth of water	=	2 metre.
(iii)	The tank rests on ground		
(iv)	The walls and base slab are not monolithic with each other		
(v)	Specific weight of water	=	9810 $N/metre^3$

Use M 20 concrete and grade 1 and steel Fe 415.

Or

20. An open tank 8m × 4m × 4m. deep rests on firm ground. Design the tank. Use M 200 concrete and steel reinforcement.

(5 × 12 = 60 marks)

F 4137 (Pages : 3) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2016

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**

Use of I.S : 1343 is Permitted.

Part A

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

1. Discuss the merits of prestressed concrete.
2. Explain extreme fiber stresses.
3. Define shrinkage of concrete.
4. Define ultimate moment of resistance.
5. Explain anchorage zone.

(5 × 3 = 15 marks)

Part B

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

6. Explain chemical pre stressing.
7. Discuss load distribution curve for prestressed concrete members.
8. Discuss losses due to anchorage slip.
9. Discuss stress behavior in unsymmetrical sections.
10. Discuss evaluation of secondary moments in concrete sections.

(5 × 5 = 25 marks)

Part C

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

11. Explain systems of prestressing.

Or

12. Briefly explain the classification of prestressed concrete.

13. A simply supported prestressed concrete beam of rectangular cross-section 400 mm × 60 mm, is loaded with a total uniformly distributed load of 256 kN over a span of 6 m. Find the extreme fibre stresses at mid-span of the beam applying the principle of internal resisting couple.

Or

14. A concrete beam having a rectangular cross-section 100 mm wide and 300 mm deep is prestressed by a parabolic cable carrying an initial force of 240 kN. The cable has an eccentricity of 50 mm at the center 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 $\phi = 2.0$, loss of prestress = 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 prestress.

15. A pretensioned prestress concrete beam of 9 m span has a cross-section of 40 mm × 800 mm, and is prestressed with 2400 kN at transfer. the cable has cross-sectional area of 2000 mm^2 of steel and has a parabolic profile with maximum eccentricity of 120 mm at the middle of span. Determine the loss of prestress, given that $E_s = 2.1 \times 10^5$ N/mm^2. Use M 30 concrete. Assume minimum ultimate tensile strength of prestressing steel as 1500 N/mm^2.

Or

16. A prestressed concrete pile, 250 mm square, contains 60 pretensioned wires, each of 2 mm diameter, uniformly distributed over the section. The wires are initially tensioned on the prestressing 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} per unit length.

    Relaxation of steel stress = 5 percent of initial stress.

17. A rectangular beam of prestressed concrete is required to support a dead load moment of 15×10^6 N – mm (inclusive of its own weight) and a live load moment of 40×10^6 N-mm at its mid-section. Determine the initial prestressing force and its eccentricity at the mid-span section.

    Take the following values :

    Allowable initial compressive stress = 17 N/mm^2.

    Allowable final compressive stress = 14 N/mm^2.

    Allowable initial or final tensile stress = 1 N/mm^2.

    Ultimate stress in steel = 1500 N/mm^2.

    Assume losses 15%.

Or

18. The support section of a prestressed concrete beam, 100 mm wide and 250 mm deep, is required to support an ultimate shear force of 60 kN. The compressive prestress 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 standard code IS : 1343 recommendations.

19. Discuss the analysis of stress distribution in end block.

Or

20. The end block of a post-tensioned prestressed member is 550 mm wide and 550 mm deep. Four cables, each made up of 7 wires of 12 mm diameters strands and carrying a force of 1000 kN, are anchored by plate anchorages, 150 mm by 150 mm, located with their centers 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 25N/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.

(5 × 12 = 60 marks)