G 5619 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2017

Seventh Semester

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 sight distances in road alignment.
2. Explain the necessity and method of extra widening of roads.
3. Explain kerb parkings.
4. List different aggregates used as highway material.
5. List the use of wind rose diagrams.

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*

Each question carries 5 *marks.*

6. List the factors controlling alignment of roads.
7. Explain transition curves for road alignment.
8. Write short note on signals.
9. Explain highway drainage.
10. Explain air traffic control.

(5 × 5 = 25 marks)

Turn over

Part C

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

11. Discuss the engineering surveys for high way location and alignment.

Or

12. Find the absolute minimum non passing and passing sight distance for a speed of 60 kmph. Assume the efficiency of the break as 1.

13. Define super elevation. Explain methods for providing super elevation. Discuss the limits of Providing super elevation.

Or

14. A road bend which deflects 70 degrees is to be designed for a maximum speed of 90 kmph a maximum centrifugal ratio of 0.25, and maximum rate of change of acceleration of 0.45 m/sec^2. The curve consist of circular arc combined with two cubic parabolas. Calculate, the radius of the circular curve, required length of transition and total length of composite curve.

15. Explain traffic characteristics.

Or

16. Discuss the relationship between the following in a traffic stream flow analysis. Speed, travel time, volume, density and capacity.

17. Explain the properties and tests for bituminous materials used for highway construction.

Or

18. Discuss the difference between flexible and rigid pavement. Explain IRC method of design of flexible pavements.

19. Explain the classification of air port. Discuss the factors to be considered for selection of site for air port.

Or

20. Sketch and explain a typical air port lay out.

(5 × 12 = 60 marks)

20. Analyze the pipe network in the following figure (Fig. 1) by Hardy Cross method.

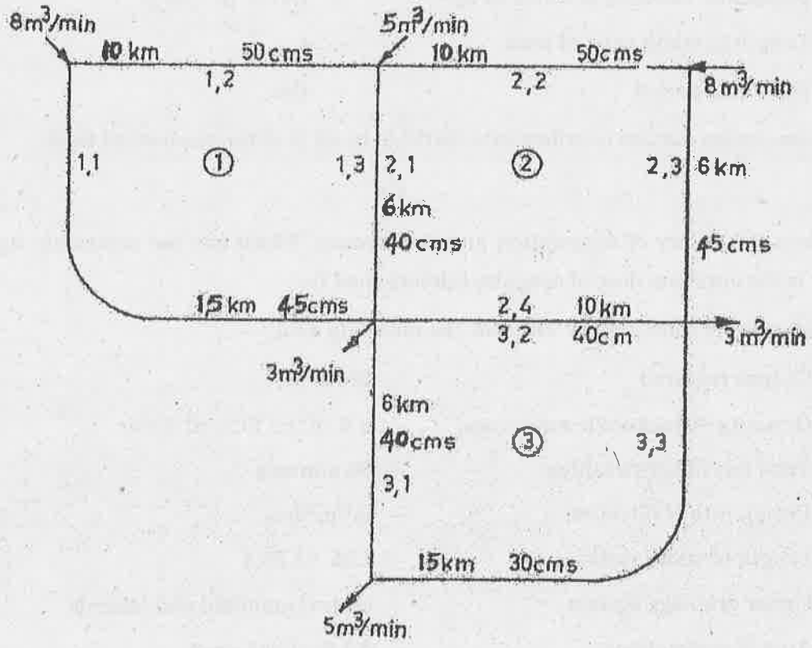

Fig. 1

[5 × 12 = 60 marks]

G 5577

(Pages : 4) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2017

Seventh Semester

Branch : Civil Engineering

ENVIRONMENTAL ENGINEERING—I (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 is the significance of hardness in water ?
2. What are intakes ? What are the factors influencing its location ?
3. How is the purpose of aeration different for groundwater and surface water ?
4. Why slow sand gravity filters are more efficient in removing microbial load ?
5. What are the ways of detecting leaks in the water distribution system ?

(5 × 3 = 15 marks)

Part B

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

6. Explain the factors influencing per capita demand of water.
7. Explain with sketches, the working of reciprocating pumps. What are its advantages over centrifugal pumps ?
8. What are the constituents of concern in surface waters with regards to potability ? How are they removed ?
9. Explain the action of ozone and UV rays as disinfectants.
10. Explain the removal of dissolved salts through reverse osmosis method.

(5 × 5 = 25 marks)

Part C

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

11. Following are the population of a community in seven consecutive decades :—

Year	:	1951	1961	1971	1981	1991	2001	2011
Population (1000's)	:	563	1163	1388	1601	1699	1747	1778

Predict the population in 2021 and 2031 using arithmetic increase method, geometrical increase method and incremental increase method. Compare the values obtained.

Or

12. What is the significance of the *coliform* test ? Explain the procedure for the presumptive and confirmatory test for determining the MPN of fecal *coliforms*.

13. (a) What are the methods of testing water mains for pressure and leakage ? (6 marks)

(b) With the help of neat sketches explain the working of a reflux valve and sluice valve. What are their uses ?

(6 marks)

Or

14. (a) What are the ways in which storage affect the quality of water ?

(6 marks)

(b) Find the BHP of the motor required for pumping water from an intake to the treatment plant if the pipe length required is 760 m. The low water level (LWL) in the river near the intake is 27.500 and the RL of the discharge point in the treatment unit is 109.000. The population served by the treatment plant is 0.5 lakhs and the per capita demand is 350 l/day. The pump works for 8 hours a day at constant speed to meet the demand. (Assume $f = 0.04$, combined efficiency of motor and pump = 60 %, diameter of pipe = 600 mm.)

(6 marks)

15. Design a rectangular plain sedimentation tank for the following data :—

- Desired average outflow – $250 m^3/hr$.
- Water lost in de-sludging – 2 %.
- Minimum size of particle to be removed – 0.02 mm.
- Nature of particle – discrete and non-flocculating.
- Specific gravity of particle – 2.65.
- Kinematic viscosity of water at 20°C – $1.01 \times 10^{-6} m^2/s$.
- Length to width ratio of tank – 4.
- Detention period – 4hr.

Assume design surface overflow rate (SOR) to be 60 % of the theoretical SOR.

Or

16. Explain the theory of coagulation and flocculation. Which are the commonly used coagulants? How is the optimum dose of coagulant determined ?

17. Design a rapid sand gravity filter for the following data :—

- Output required – $250 m^3/hr$.
- Quantity of backwash water used – 3 % of the filtered water.
- Time lost in backwashing – 30 minutes.
- Design rate of filtration – $m^3/m^2/hr$.
- Length to width ratio – 1.25 - 1.33:1
- Under drainage system – central manifold and laterals.
- Area of perforations – 0.3 % of bed area.
- Size of perforations – 9 mm.

Or

18. Draw and explain the typical curve between chlorine dosage and chlorine residue. How is the curve used to decide the chlorine dosage required for disinfection ?

19. Explain the various layouts of water distribution system, highlighting the relative advantages and disadvantages.

Or

G 5592 (Pages : 3) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2017

Seventh Semester

Branch : Civil Engineering

CE 010 703—DESIGN OF CONCRETE STRUCTURES—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.
Relevant IS *codes are permitted (*IS 456, IS 875, IS 1343, IS 3370, *Part* 2 *and* SP 16*)*

Part A

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

1. Define and explain pre stress.
2. Sketch and explain the component parts of counter fort retaining wall.
3. Sketch the bending moment diagram for a three span continues beam both ends fixed.
4. Explain with neat sketch the sectional elevation of a spherical dome.
5. List the various forces to be considered for design of bottom slab for ground supported circular water tank.

(5 × 3 = 15 marks)

Part B

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

6. Explain different systems of pre stressing.
7. Sketch a typical earth pressure diagram for a retaining wall having 4 m height.
8. Determine the ultimate moment of resistance of a 120 mm thick slab reinforced with 10 mm diameter bars at 15 mm spacing located at an effective depth of 80 mm. Assume M 20 concrete and Fe 415 steel.
9. Discuss the procedure for design of ring beams in dome design.
10. Distinguish between flexible and rigid joints in design of water tank.

(5 × 5 = 25 marks)

Turn over

Part C

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

11. A pre-tensioned beam of rectangular section, 80 mm wide and 120 mm deep is to be designed to support concentrated loads of 4 kN each at one-third span points over an effective span of 3 M. The permissible stresses in concrete are limited to zero and 140 N/sq cm tension at transfer and working load respectively. If 3 mm diameter wires initially stressed to 1.4 kN/sqmm are used, find the number of wires required and the eccentricity of the pre-stressing force. Assuming 20% loss in pre stress. Consider weight of concrete as 24 kN/cum.

Or

12. A simply supported post-tensioned concrete beam of span 15 m has a rectangular cross-section 300 mm × 800 mm. The pre-stress at the ends is 1300 kN with zero eccentricity at supports and an eccentricity of 250 mm at the centre, the cable profile being parabolic. Assuming $k_f = 0.15$ per 100 metres, and $\mu = 0.35$, determine the loss due to friction at the centre of the beam.

13. Design a Cantilever retaining wall for the following data :

    (i) Height of earth to be retained is 4 m above bottom base with level top and surcharge of 14 kN/m^2.

    (ii) Angle of repose of soil = 30°.

    (iii) Bearing pressure of soil = 150 kN/m^2.

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

    (v) Concrete grade M20 and steel fe 415.

Or

14. Design a counter fort retaining wall to retain earth 6.0 m above the basement level. The density of the earth is 16 kN/m^3 and the angle of repose of the soil is 30°. The bearing capacity of the soil is 150 kN/m^2 use M20 concrete and fe 415 steel.

15. A post tensioned continuous beam consists of two span each 20 metres long. The external loading other than the dead load of the beam is 20 kN/m. Design the beam.

Or

16. A beam circular in plan and diameter 8 M is loaded with 12 kN/m inclusive of self weight. The beam is supported on 8 columns symmetrically placed. Draw the bending moment, twisting moment and shear force diagrams for one span.

17. Design a conical roof for a circular elevated water tank of diameter 10 M. The rise of the roof is such that the angle of the base is thirty degrees. Assume live load 2 kN/sqm. Use M25 concrete Fe 415 steel.

Or

18. Design a spherical dome over a circular room having inside diameter 6 M and rise 2 M. Assume a live load of one kN per sqm due to various reasons. Use M25 concrete and Fe415 steel.

19. Design a square water tank 6 m × 6 m resting on firm ground. Capacity of the tank required 8000 liters. Free board required is 300 mm. Use M 20 concrete and Fe 415 steel. Sketch the details of reinforcement.

Or

20. Design a rectangular over head water tank having 6 m × 3 m inner area and height 2.5 m excluding free board. The height of the bottom of the tank is 3M above ground level. Sketch the details of reinforcement. Use M 20 concrete and Fe 415 steel.

(5 × 12 = 60 marks)

G 5640 (Pages : 3) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2017

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

Use of IS : 1343 *is permitted.*

Part A

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

1. Explain basic concept of pre stressed concrete.
2. Discuss the assumptions in the analysis of stresses in pre stressed concrete.
3. Define elastic deformation of concrete.
4. Discuss different types of flexural failure.
5. Discuss stress distributions in end blocks.

(5 × 3 = 15 marks)

Part B

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

6. Discuss the advantages of pre stressed concrete over reinforced cement concrete.
7. Explain internal resisting couple.
8. Discuss losses due to friction.
9. Explain design of pre stressed concrete members for shear and torsion.
10. State Guyon's theorem.

(5 × 5 = 25 marks)

Turn over

Part C

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

11. Discuss modes of failure of pre stressed concrete.

Or

12. Discuss tension development in pre stressing. Explain pre stressing and post tensioning.

13. A simply-supported prestressed concrete beam of rectangular cross-section 400 mm × 600 mm, is loaded with a total uniformly distributed load of 256 kN over a span of 6 m. Sketch the distribution of stresses at mid-span end sections if the prestressing force is 1920 kN and the tendon is (a) concentric ; (b) eccentric located at 200 mm above the bottom fibre.

Or

14. A rectangular concrete beam of cross-section 30 cm deep and 20 cm wide is prestressed 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 prestress 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.

15. A post-tensioned prestress concrete beam of 30 m span is subjected to a transfer prestress force of 2,500 kN at 28 day's strength. The profile of the cable is parabolic with maximum eccentricity of 200 mm at mid span. Determine the loss of prestress, and the jacking force required if jacking is done from both ends of the beam. The beam has a cross-section of 500 mm × 800 mm, and is prestressed with 9 cables, each consisting of 12 wires of 5 mm diameter. Take $E_s = 2.1 \times 10^5$ N/mm^2 and $E_c = 3.5 \times 10^4$ N/mm^2. One cable is tensioned at a time.

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 0.87 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.

17. Design a prestressed concrete slab over a span of 16 meters to carry a superimposed load of 15 kN/m^2. Assume permissible stresses in concrete of 12 N/mm^2 and no tension. Also, assume that the initial losses in prestress in steel will amount to 15 per cent. The live load will be bought to bear after the ducts are grouted. The initial prestress in the wires will be 1100 N/mm^2.

Or

18. 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 $A_p = 200$ m^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.

19. Explain the analysis and design of continuous beam.

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.

(5 × 12 = 60 marks)