G 1333 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2016

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 activity space.
2. List out the occupancy classification of buildings.
3. What are the effects of orientation ?
4. What are the principles of town planning ?
5. Define master plan.

(5 × 3 = 15 marks)

Part B

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

6. Explain about iconic theory of design in architecture.
7. Explain in detail about checking for ventilation.
8. Explain traction type of elevators.
9. List out the requirement of a new town.
10. Explain the theory of land use planning.

(5 × 5 = 25 marks)

Part C

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

11. What are the creative principles of architecture ? Explain.

Or

Turn over

12. Explain in detail about :

    (i) Circulation space.

    (ii) Tolerance space.

13. Explain in detail about occupancy classification of buildings.

Or

14. Explain the process of identifying activity areas.

15. Explain the features and operation arrangement of Escalators.

Or

16. Explain the factors considered in the design of acoustic and lighting.

17. What are the concepts of new town development ? Explain it.

Or

18. What are the surveys to be done during town planning ? Explain it.

19. Explain the procedure of preparation of master plan in detail.

Or

20. Explain in detail about land acquisition.

(5 × 12 = 60 marks)

G 1344 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2016

Seventh Semester

Branch : Civil Engineering

CE 010 705—TRANSPORTATION ENGINEERING—II

Time : Three Hours Maximum : 100 Marks

Assume suitable data wherever necessary.

Part A

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

1. Draw the typical cross section of rural arear.
2. Explain Transition curves.
3. List traffic control device.
4. Explain flexible pavements.
5. Explain Clearway.

(5 × 3 = 15 marks)

Part B

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

6. Write a note on :
   (i) Median ;
   (ii) Kerbs.
7. Briefly explain vertical curves.
8. Explain the disadvantages of traffic signals.
9. List the test conducted on bituminous material.
10. Write a note on aircraft parking system.

(5 × 5 = 25 marks)

Part C

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

11. Explain requirement and factors controlling alignment of roads.

Or

Turn over

12. (i) A vehicle is travelling at an average speed of 100 km/h under the following conditions :—

(a) Level Surface ;

(b) Upward gradient of 1.98% ;

(c) Downward gradient of 2%.

Assume perception and break reaction time = 2.5 sec and coefficient of longitudinal friction between vehicle tires and road surface = 0.35. Determine safe stopping sight distance. (6 marks)

(ii) Explain road margin and right of way. (6 marks)

13. (i) A vertical curve is formed when an ascending gradient of 1 in 30 meets a descending gradient of 1 in 40. The curve is to be designed to provide OSD for a design speed of 80 km/h. calculate the suitable length of the summit curve. Assume suitable data. (6 marks)

(ii) A national highway is passing through plain rolling and hilly areas. According to IRC guidelines design super elevation for the given condition.

(a) For Plain Terrain :

Ruling Design Speed : 80 kmph and horizontal curve radius : 215 m.

(b) For hilly area :

Ruling Design Speed : 100 kmph and horizontal curve radius : 137 m.

Or

14. Calculate the length of transition curve and shift to be provided in a built up area using the following data. Design speed 80 kmph, radius 240 m, pavement rotated about centerline, pavement width 7.5 m.

15. Explain the classification of road sign.

Or

16. Explain types of road intersection.

17. Explain the construction procedure for bituminous surface dressing.

Or

18. (i) Explain the types and causes of failure in rigid pavement. (6 marks)

(ii) Write a short note on highway drainage. (6 marks)

19. (i) How is the runway orientation decided ? (6 marks)

(ii) Write a note on airport lighting. (6 marks)

Or

20. (i) Write a note on navigational aids and landing aids. (6 marks)

(ii) Write a note on obstruction and zoning law. (6 marks)

[5 × 12 = 60 marks]

G 1295 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2016

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 steel dams ?
2. Define constant angle arch dams.
3. Explain in detail about barrage.
4. Define canal Regulation.
5. Define cross drainage work.

(5 × 3 = 15 marks)

Part B

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

6. List out the factors governing the selection of a particular type of dam.
7. What are the forces acting on arch dams ? Explain briefly about it.
8. Explain about gravity and non gravity weirs.
9. What are the main functions of cross regulator ?
10. What are the types of cross drainage works ?

(5 × 5 = 25 marks)

Part C

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

11. Derive the base width for gravity dam when the resultant of all the forces passes through the outlet most middle their point.

Or

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

Turn over

13. What is buttress dam ? Explain any *one* type of buttress dam.

Or

14. Explain constant Radius Arch Dam.

15. Explain masonry weirs with vertical drop in detail.

Or

16. Explain Khosla's theory and concept of flow nets.

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 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 of upstream	=	104.5 m.
Bed width u/s and d/s	=	1.0 m.
Soil	=	Good loam
Assume Bligh's Co-efficient	=	6

19. Explain Low head scheme of hydel plants in detail.

Or

20. Explain in detail about penstocks.

(5 × 12 = 60 marks)

G 1363 (Pages : 3) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2016

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 I.S. : 1343 is Permitted.

Part A

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

1. Define pre tensioning.
2. Explain pressure line.
3. Explain loss due to Elastic deformation of concrete.
4. Explain prestressing force.
5. Explain secondary moment.

(5 × 3 = 15 marks)

Part B

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

6. Write a note on Tensioning device.
7. Explain the basic assumption made in the analysis of prestressed concrete.
8. Explain Loss due to anchorage slip.
9. Explain limitation of prestress in long span.
10. Explain stress distribution in end block.

(5 × 5 = 25 marks)

Part C

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

11. (i) Explain benefits of prestressed concrete.
    (ii) Explain Pre tensioning system.

Or

12. (i) Explain Magnel- Blaton System
    (ii) Explain thermo-electric prestressing.

Turn over

13. An un symmetrical I-section beam is used to support an imposed load of 2 kN/m over a span of 8 m. the sectional details are top flange 300 mm wide and 60 mm thick; bottom flange 100 mm wide and 60 mm thick ; thickness of the web 80 mm ; overall depth of the beam 400 mm. at the center of the span, the effective prestressing force of 100 kN is located at 50 mm from the softfit of the beam. Estimate the stress at the center of span section of the beam for the following load combination.

    (a) Prestress + self – weight.

    (b) Prestress + self – weight + live load.

Or

14. A prestressed concrete beam with a rectangular section 120 mm wide by 300 deep supports a uniformly distributed load of 4 kN/m , which includes the self-weight of the beam. The effective span of the beam is 6 m. The beam is concentrically prestressed by a cable carrying a force of 180 kN. Locate the position of the pressure lines in the beam.

15. A post tensioned concrete beam, 100 mm wide and 300 mm deep, is prestressed by three cables, each with a cross-sectional area of 50 mm^2 and with an initial stress of 1200 N/mm^2. All the three cables are straight and located 100 mm from the soffit of the beam. If the modular ratio is 6, calculate the loss of stress in the three cables due to elastic deformation of concrete for (i) simultaneous tensioning and anchoring of all the three cables, (ii) successive tensioning of the three cables, one at a time.

Or

16. A pretensioned beam, 200 mm wide and 300 mm deep, is prestressed by 10 wire 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 per cent of steel stress , estimate the final percentage loss of stress in the wire using Es = 210 kN/mm^2, Ec = $5700(f_{cu})^{1/2}$ f_{cu} = 42 N/mm^2. Creep coefficient = 1.6, total residual shrinkage strain = 3×10^{-4}.

17. Design a prestressed I-beam for the following data

    Span = .18 m, Live load 10 kN/m, fck = 45 N/mm^2, loss of prestress = 15%, initial stress in wire = 1500 N/mm^2. The stress in concrete shall not exceed 14 N/mm^2 in compression and 1.4 N/mm^2 intension.

Or

18. Design a rectangular post-tensioned beam of 150 mm wide for a span of 6 m. The live load to be carried is 5 kN/m. Permissible compressive stress in concrete is 15 N/mm^2 with no tension criteria. Loss of prestress = 20%. Initial stress in wires = 1200 N/mm^2.

19. The end block of a prestressed concrete beam, rectangular in section, is 100 mm wide and 200 mm deep. The prestressing force of 100 kN is transmitted to concrete by a distribution plate, 100 mm wide and 50 mm deep, concentrically located at the ends. Calculate the position and magnitude of the maximum tensile stress on the horizontal section through the center and edge of the anchor plate. Compute the bursting tension on these horizontal planes.

Or

20. Design a continuous prestressed beam of two span (AB = BC = 12 m) to support a uniformly distributed live load of 10 kN/m. tensile stress are not permitted in concrete and compressive stress in concrete is not to exceed 13 N/mm^2. Sketch the details of the cable profile.

(5 × 12 = 60 marks)

19. Design a circular tank to the following requirements:

(i) Diameter of tank = 6 metres.

(ii) Depth of water = 3.75 metres.

(iii) The tank rests on ground.

(iv) The walls and base slab are not monolithic.

Use M 20 concrete and Fe 415 steel.

Or

20. A reinforced concrete tank is 6 metres × 3 metres with a maximum depth of 2.50 metres of water. The tank rests on ground. 150 *mm* × 150 *mm* splays are provided at the junction of-walls and base slab. Design the tank. Use M 20 concrete and mild steel reinforcement.

(5 × 12 = 60 marks)

G 1321 (Pages : 4) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2016

Seventh Semester

Branch : Civil Engineering

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

(New Scheme—2010 Admission onwards)

[Supplementary/Improvement]

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. Write any *three* advantages of pre-stressed concrete ?
2. What are the main components of Counter fort Retaining wall ?
3. Define continuous beam ?
4. What are Domes ?
5. What are flexible joints in water tanks ?

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*

Each question carries 5 *marks.*

6. Explain in detail about pre-tensioning system ?
7. Explain in detail about Cantilever Retaining valve ?
8. Explain three moment theory in continuous beams ?
9. Explain about spherical domes.
10. How is the bending moment for the base slab of elevated water tank calculated ?

(5 × 5 = 25 marks)

Turn over

Part C

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

11. A pre-stressed concrete beam 400 *mm* × 600 *mm* in section has a span of 6 m and is subjected to a uniformly distributed load of 16 kN/metre including the self weight of the beam. The prestressing tendons are located at the lower third point and 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-tensioned beam 250 *mm* wide and 360 *mm* deep is pre-stressed by 10 wires of 8 *mm* diameter initially stressed to 1000 N/mm^2. The centroid of the steel wires is located at 105 *mm* from the soffit. Determine the maximum stress in concrete immediately after transfer allowing elastic shortening of concrete only at the level of the centroid of steel.

    If, however, the concrete is subjected to additional shortening due to creep and shrinkage and the steel is subjected to a relaxation of stress of 5 percent find the percentage loss of stress in the steel wires.

    Take E_s = 210 kN/mm^2, E_c = 36.85 kN/mm^2, creep coefficient ϕ = 1.60. Total residual shrinkage strain = 3×10^{-4}.

13. A cantilever type retaining wall has a 5.5 metre tall stem. It retains earth level with its top. The soil weighs 19000 newtons per cubic metre and has an angle of repose of 30°. The bearing capacity of the soil is 200 kilo-newtons per square metre. Design the wall assuming suitable working stress. Use M 20 concrete and grade 1 mild steel bars.

Or

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

    (i) Height of the wall above G.L. = 5.5 metre.

    (ii) Safe bearing capacity of soil = 16 tonnes / sq.m.

    (iii) Angle of repose = 30°.

    (iv) Weight of soil = 1600 kg/m^3.

    (v) Spacing of counterforts = 3 metres centres.

    (vi) Concrete weighs 2500 kg/m^3.

    (vii) Adopt the following stresses c = 50 kg/cm^2, t = 1400 kg/cm^2 and m = 18.67

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 1. 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.

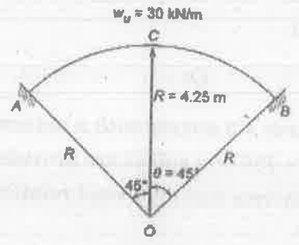

Figure 1

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/m2.

Or

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

    (i) Inside diameter of room = 12 *m*

    (ii) Rise of dome = 4 *m*

    (iii) 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.

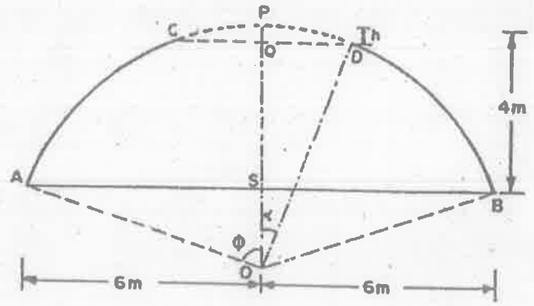

Figure 2

G 1308 (Pages : 3) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2016

Seventh Semester

Branch : Civil Engineering

CE 010 702—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 meant by coincident draft ? How is it used in the design of water distribution system ?
2. What are the considerations in locating the pumping station used for pumping water from intake to treatment plant ?
3. Draw a flow diagram indicating the various units in a typical drinking water treatment plant.
4. What are the mechanisms of turbidity removal in filtration process ?
5. What is the reason for hardness of water ? Differentiate between temporary hardness and permanent hardness.

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*

Each question carries 5 *marks.*

6. What are indicator organisms ? What are the requirements of an ideal indicator organism ?
7. Explain with the help of neat sketches, any *two* types of intakes for collecting water from a river.
8. How is the purpose of aeration different for groundwater and surface water ? Explain with sketch, the working of cascade aerator.
9. Draw a typical curve between chlorine dosage and chlorine residue. Explain the salient features of the curve. How can the curve be used to decide chlorine dosage ?
10. Explain the applicability of pumping, gravity and combined system for distribution of water. Also, mention their relative merits and demerits.

(5 × 5 = 25 marks)

Turn over

Part C

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

11. (a) Following are the population of a community in seven consecutive decades.

Year	...	1951	1961	1971	1981	1991	2001	2011
Population (100's)	...	563	1163	1388	1601	1699	1747	1778

Select a suitable method and predict the population of the community for the next two decades. Also, write the reasons for selecting the method used for prediction.

(6 marks)

(b) What are water borne diseases ? How can they be controlled ? List any *three* water borne diseases and their causative organisms.

(6 marks)

Or

12. (a) What is the standard for microbial quality of drinking water as per IS 10500 : 2012 ? Write the procedure for the confirmatory test for fecal coliforms.

(8 marks)

(b) Briefly explain diurnal variation in water demand. (4 marks)

13. (a) What are the different materials used for pipes ? What are their advantages and disadvantages ? (6 marks)

(b) With the help of neat sketches explain the working of a reflux valve and air valve. What are their uses ? (6 marks)

Or

14. (a) What are the methods of disinfecting water mains ? (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 2.5 lakhs and the per capita demand is 250 l/day (Assume f = 0.04, combined efficiency of motor and pump = 60%, peak hourly demand = 1.5 times average demand, diameter of pipe = 600 mm).

(6 marks)

15. (a) A plain sedimentation tank is to be designed for treating 1.5 MLD of water. What should be the minimum surface area of the tank if it is required to remove completely all particles having size greater than 0.18 mm. Assume specific gravity of particles as 1.24 μ 1.0 centipoise and ρ_w-1.0 g/cc.

(6 marks)

(b) What are clariflocculators ? Use a sketch for explanation. (6 marks)

Or

16. (a) The water treated in a coagulation sedimentation tank has an influent suspended solids concentration of 1500 mg/1. $Al_2(SO_4)_3$. 18 H_2O is used as the coagulant. The alum dose applied is 45 mg/l. Assuming 85% solids removal and complete conversion of alum to $Al(OH)_3$, calculate the dry mass of sludge produced per day. What will be the approximate daily volume of sludge produced if the water content of the sludge is 96% ?

(8 marks)

(b) Differentiate between type-1 and type-11 settling. (4 marks)

17. Water is to be supplied at a rate of 260 lpcd for a community having a population of 0.5 lakhs. Design suitable filter beds (number of beds and area of each bed) if

(i) Slow sand gravity filter is employed for treatment ;

(ii) Rapid sand gravity filter is employed for treatment.

(Assume characteristic filtration rates for each and mention it explicitly)

Further, compare the above two methods of filtration highlighting the suitability of each under various circumstances.

(12 marks)

Or

18. Design a rapid sand gravity filter including the under drainage system, that should be employed for filtering water for a community with a population of 2 lakhs. The per capita demand of water may be taken as 300 l/day. (The under drainage system adopted is manifold and laterals). Following thumb rules may be adopted for the design.

- Length to width ratio of filter bed –1.25-1.33 : 1.
- Diameter of perforations – 5-12 mm
- Total area of perforations – 0.3% of bed area
- Total cross sectional area of laterals – 2-4 times area of perforations
- Area of manifold –1.5–2 times area of laterals
- Horizontal travel of wash water before entering wash-water trough – 0,6–1.0m.

Draw the relevant sketches of the design.

19. Explain the procedure of obtaining the capacity of a balancing reservoir when the pumping to the reservoir is continuous (24 hrs/day) and when the pumping is for a specified period in a day.

Or

20. (a) How is leakage detected and prevented in a water distribution system ? (6 marks)

(b) Explain hardy-cross method for pipe network analysis taking a simple example. (6 marks)

[5 × 12 = 60 marks]