F 6755 (Pages : 3) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2017

Seventh Semester

Branch : Civil Engineering

CE 010 701—DESIGN OF HYDRAULIC STRUCTURE (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 Gravity Dam and list the names of any two Gravity Dam in Kerala.
2. State Thin Cyclinder theory for Arch Dam design.
3. Define Permeable foundation for a River Weir.
4. Sketch the cross section of a typical Irrigation Canal.
5. Define Firm Power in Water Power Engineering.

(5 × 3 = 15 marks)

Part B

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

6. Explain the functions of Galleries in Gravity Dam.
7. Discuss the classification of Arch Dam.
8. Discuss the Component parts of Diversion Head Works.
9. Distinguish between Head Regulator and Cross Regulator.
10. Explain the working of Siphon Aqueduct in Cross Drainage Works.

(5 × 5 = 25 marks)

Turn over

Part C

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

11. Discuss the modes of Failure and Stability criteria for Masonry Gravity Dam.

Or

12. Discuss the functions of Spillways in Gravity Dam. Sketch different types of Spillways and its design principles.

13. Discuss the causes of Failure and Design criteria for Earth Dam.

Or

14. Explain with neat sketches the Materials of Construction, Classification and Advantages of Rock Fill Dam.

15. Briefly explain Khosla's theory and design of Weir Foundations.

Or

16. (a) Wite short note on Silt Ejector.

(6 marks)

(b) Explain Lane's Weighted Creep Theory.

(6 marks)

17. Design a Siphon Well drop for the following particulars :

Height of fall	=	3 m.
General ground level	=	+101.55 m.
Full supply depth	=	0.80 m.
Bed level upstream	=	+100.65 m.
Rate of discharge	=	0.85 cumec.
Bed with u/s and d/s	=	3.60 m

Or

18. Design a Sarda type Canal fall for a discharge of 15 cumecs for the following particulars :

Bed level u/s	=	+123.50 m.
Bed level d/s	=	+122.00 m.
Full supply depth	=	1.20 m.
Side slope of Canal	=	2:1

Good soil for foundation is available at Canal bed levels and assume Blighi's co-efficient as 5.

19. An yearly out put of a Hydroelectric power plant is 12×10^6 kWH. The peak load taken by the station is 15 MW and the installed capacity of the plant is 25 MW. The total working period of the Station in year is 2400 hours. Determine annual Load Factor, Plant use Factor and Capacity factor for the plant.

Or

20 (a) Explain Low and Medium and High Head schemes with examples.

(6 marks)

(b) Explain the functions of Surge Tanks.

(6 marks)

[5 × 12 = 60 marks]

F 6833

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

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2017

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 IS code 1343 *is permitted.*

Part A

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

1. Explain basic concept of prestressing.
2. Define internal resisting couple.
3. Explain loss due to elastic shortening in prestressed concrete.
4. Define ultimate moment of resistance.
5. Explain concordant cable profile.

(5 × 3 = 15 marks)

Part B

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

6. Explain systems of prestressing.
7. Explain load deflection curve.
8. Explain shrinkage in concrete. Discuss losses due to shrinkage in prestressed concrete.
9. Discuss the action of torsion on prestressed concrete beams.
10. Explain secondary moment and evaluation of secondary moment.

(5 × 5 = 25 marks)

Turn over

Part C

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

11. List the materials required for prestressed concrete. Explain the properties of materials used for prestressed concrete.

Or

12. Briefly explain the modes of failure of prestressed concrete.

13. Explain the concept of load balancing. A simply supported beam of pre-stressed concrete spanning over 10 m is rectangular in section 500 mm wide and 800 mm deep. The beam is prestresses by a parabolic cable having an eccentricity of 210 mm at the centre of the span and zero at end supports. The effective force on the cable is 1800 kN. If the beam supports a total uniformly distributed load of 50 kN/m including the self weight of the beam, calculate the force required in the cable having the same eccentricity to balance a total load 50 kN/m.

Or

14. Define creep ratio and loss ratio. A concrete girder of unsymmetrical-section for a bridge spans over 36 m and its self weight is 10 kN/m. The girder is prestressed by a parabolic cable having an eccentricity of 600 mm at centre of span and 200 mm at supports towards the soffit of the girder. The initial force in the cable is 3000 kN. If the loss ratio is 0.85 and the creep coefficient is 1.6, modulus of elasticity of concrete is 32 kN/sqmm. estimate the long term deflection of the bridge girder. Assume second moment of inertia as 72×10^9 mm^4 and live load is 12 kN/m.

15. Design a suitable section for the tie member of a truss to support a maximum design tensile force 250 kN. The permissible compressive stress in concrete at transfer is 16 N/mm^2 and no tensile stresses are permitted under working loads. Loss ratio is 0.8. High tensile wires of 7 mm. diameter tensioned to 1000 N/mm^2 is used. Fp = 1600 N/mm^2. The direct tensile strength of concrete is 3 N/mm^2. Load factor against collapse = 1.5 and load factor against cracking = 1.25.

Or

16. A straight pretensioned member 16 meters long with a cross-section of 400 mm × 400 mm is concentrically prestressed with 900 mm^2 of steel wires which are anchored to the bulkheads with a stress of 105kN/cm^2. Taking the modular ratio as 6, determine the loss of prestress due to elastic shortening of concrete at the transfer of prestress.

17. A prestressed concrete beam of uniform rectangular cross-section and span 15 metres supports a total distributed load of 272 kN excluding the weight of the beam. Determine the suitable dimensions of the beam and calculate the area of the tendons and their position. The permissible stresses are 1400 kN/cm^2 for concrete and 105 kN/cm^2 for the tendons.

Or

18. A prestressed concrete T beam is to be designed to support an imposed load of 4.5 kN/m over an effective span of 5 M. The T beam is made up of a flange 400 mm. wide and 400 mm. thick. The rib is 100 mm wide and 200 mm. deep. The stress in concrete must not exceed 15 N/sqmm. in compression and zero in tension at any stage. Check for the adequacy of the section provided, and calculate the minimum prestressing force necessary and corresponding eccentricity. Assume loss of prestress equal 20 %.

19. A pre stressed concrete beam 250 mm wide and 600 mm deep is subjected to an axial compressive force of 1500 kN. Design the and block.

Or

20. A continuous two equal span prestressed concrete beam, ABC (AB = BC = 12 M) has a uniform rectangular cross-section with a width of 120 mm and depth 320 mm. The cable carrying an effective prestressing for of 400 kN parallel to the axis of the beam and located at 100 mm. from the soffit. Locate the resultant line of thrust through the beam AB.

(5 × 12 = 60 marks)

F 6785 (Pages : 3) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2017

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 code permitted. Missing data may be assumed suitably)

Part A

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

1. State general principles of pre stressing.
2. Explain classification of retaining wall.
3. Discuss the application of coefficients in continuous beam analysis.
4. Explain membrane stresses for conical domes.
5. Discuss the classification of concrete water tank.

(5 × 3 = 15 marks)

Part B

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

6. Explain systems of pre stressing.
7. Sketch the earth pressure diagram for cantilever retaining wall.
8. Explain design principles of ring beam for dome.
9. Explain the structural behaviour of circular beams.
10. Discuss rigid joints in concrete water tank.

(5 × 5 = 25 marks)

Turn over

Part C

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

11. A pre stressed concrete beam section is 250 mm wide and 300 mm deep. The total pre stressing force is 450 kN at an eccentricity of 60 mm. The beam has a span of 6 M and has to carry a superimposed load of 7.5 kN per M. Calculate the stresses produced at mid span before and after the application of live load. Allow a loss of pre stressing 16 %.

Or

12. A pre stressed concrete rectangular beam 300 mm × 600 mm is pre stresses with a force of 1565 kN applied at 180 mm from the bottom, the force finally reducing to 1361 kN. The span of the beam is 12 M. The beam carries two equal live loads 45 kN each at a distance of 4.5 M from each support. Find extreme fibre stresses at mid span under initial pre stresses and no live load. Assume specific weight of concrete 24 kN per cum.

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

Height of wall above d/s GL	=	6.5 M
Safe bearing capacity of soil	=	165 kN/sqm
Angle of repose	=	28°
Specific weight of soil	=	15.5kN/cum
Weight of RCC	=	25 kN/cum
Spacing of counter fort	=	2.9 m

Use of M20 concrete and Fe415 steel.

Sketch the details of reinforcement.

Or

14. Design a cantilever retaining wall for the following data :

Height of wall above d/c GL	=	4.5 M
SBC of soil	=	156 kN/sqm
Angle of repose	=	31°
Weight of soil	=	17.5 kN/cum
Weight of RCC	=	25 kN/cum
Length of wall	=	23 M

Use M20 concrete and Fe 415 steel.

Sketch the details of reinforcement.

15. A continuous beam ABC fixed at A and a cantilever of 1.20 M span at C. Span AB and BC are equal having 3 M distance. The beam carries a uniformly distributed 10 kN/M. Give step by step design procedure for the beam as per IS specification. Sketch the details of reinforcement.

Or

16. A curved beam ABC is to connect A and C which is located with an effective span 8 M is front of reception hall of a guest house. The column B is located at mid span with 3 M off set from line AC. The curved beam ABC forms the segment of a circle. Discuss the design procedure for the beam.

17. Design a conical roof for a hall for the following data :

Inside diameter of room	=	24 M
Height of dome	=	4 m
Live load due to various reasons	=	2 kN/sqm

Or

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

Inside diameter of the room	=	25 M
Height of the dome	=	5 M
Live load due to various reasons	=	1.5 kN/sqm

19. Design a rectangular RCC over head water tank for the following particulars :

Inside length	=	6 M
Inside width	=	3 M
Depth of water	=	2.5 M

Design the side walls and corners. Sketch the details of reinforcement.

Use M20 concrete and Fe 415 steel.

Or

20. Design a circular ground supports RCC water tank for a capacity of 5000 liters. Design the side walls only and sketch the detail of reinforcement. Use M20 concrete and Fe 415 steel.

(5 × 12 = 60 marks)