

F 6645

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Reg. No.....

Name.....

**B.TECH. DEGREE EXAMINATION, NOVEMBER 2013**

**Seventh Semester**

Branch : Civil Engineering

CE 010 701—DESIGN OF HYDRAULIC STRUCTURES (CE)

(New Scheme—Regular)

Time : Three Hours

Maximum : 100 Marks

**Part A**

*Answer all questions.*

*Each question carries 3 marks.*

1. List the forces acting on a gravity dam.
2. Distinguish arch dam and gravity dam.
3. Define regime river.
4. List the various canal regulation works.
5. Define load factor in water power engineering.

(5 × 3 = 15 marks)

**Part B**

*Answer all questions.*

*Each question carries 5 marks.*

6. List different types of dam. Discuss the selection criteria for selection of dam for a particular site.
7. State and explain thin cylinder theory for design of arch dam.
8. Explain the construction details and functions of silt ejector.
9. Distinguish between ogee fall and rapid fall.
10. Discuss the functions of surge tank.

(5 × 5 = 25 marks)

**Part C**

*Answer one question from each module.*

*Each question carries 12 marks.*

**MODULE I**

11. Show that the theoretical profile of a gravity dam is a right angled triangle. Design the practical profile of a gravity dam having depth of storage 10 m.

*Or*

12. Discuss the classification and design of galleries in gravity dam. Sketch and explain the construction details of galleries in gravity dam.

**Turn over**

## MODULE II

13. State the structural behavior, classification, merits and demerits of buttress dam.

*Or*

14. State the design criteria, and causes of failure of earth dam. Sketch the typical cross-section of an earth dam which store 3 m of water upstream.

## MODULE III

15. Distinguish between permeable and impermeable foundation. Discuss the causes of failure of weirs on permeable foundation.

*Or*

16. State and explain Khosla's theory and its applications.

## MODULE IV

17. Sketch the longitudinal section of a Sarda type canal fall and explain the design procedure of each part.

*Or*

18. Distinguish between head regulator and cross regulator. Explain with neat sketches the functions of each.

## MODULE V

19. Sketch the plan and sectional elevation of an aqueduct and explain the functions and design procedure.

*Or*

20. Briefly explain the classification of hydel plants with examples from Kerala.

(5 × 12 = 60 marks)

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**B.TECH. DEGREE EXAMINATION, NOVEMBER 2013**

**Seventh Semester**

Branch : Civil Engineering

**CE 010 705 – TRANSPORTATION ENGINEERING – II (CE)**

(New Scheme – Regular)

Time : Three Hours

Maximum : 100 Marks

**Part A**

*Answer all questions.*

*Each question carries 3 marks.*

1. Define Camber and median in road formation.
2. Discuss the necessity of extra widening the road.
3. Discuss the importance of traffic engineering studies.
4. State the desirable properties of aggregate for road construction.
5. List the factors to be considered for selection of site for airport.

(5 × 3 = 15 marks)

**Part B**

*Answer all questions.*

*Each question carries 5 marks.*

6. Sketch the typical cross section of a road in rural area.
7. Discuss the problems of vertical alignment of roads.
8. Write short note on kerb parking.
9. Distinguish between flexible and rigid pavements.
10. Write brief note on navigational and landing aids.

(5 × 5 = 25 marks)

**Part C**

*Answer one question from each module.*

*Each question carries 12 marks.*

**MODULE I**

11. Briefly explain the requirements and factors controlling alignment of roads. Discuss the probable problems in alignment of new roads in urban area.

*Or*

**Turn over**

12. Define safe overtaking sight distance and minimum length of over taking zone. Find the minimum length of overtaking zone and safe overtaking sight distance for vehicles having speeds overtaking/ overtaken, 60/36 kmph respectively. The acceleration of the overtaking vehicle is  $1.2 \text{ m/s}^2$ .

MODULE II

13. Define super elevation and discuss the necessity, calculations and methods of attainment of super elevation in highways.

Or

14. Define transition curve in road alignment. Calculate the length of transition curve and shift to be provided in a built up area for the given data, Pavement width = 6.5 m, Extra widening = 0.75 m, Design speed = 60 kmph. Radius = 2 m. Assume payment rotates about central line.

MODULE III

15. Briefly explain the importance and procedure of traffic studies and their applications.

Or

16. Explain different traffic signals and traffic signal systems and their merits and demerits.

MODULE IV

17. Discuss the types and causes of failure of flexible roads. Give examples.

Or

18. Explain the construction and maintenance for bituminous surface dressing.

MODULE V

19. State and explain the characteristic of airport.

Or

20. Describe briefly the salient features and functions of aprons and taxi ways in an airport. Discuss the design factors for apron in airport.

(5 × 12 = 60 marks)

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**B.TECH. DEGREE EXAMINATION, NOVEMBER 2013**

**Seventh Semester**

Branch : Civil Engineering

CE 010 704—ARCHITECTURE AND TOWN PLANNING (CE)

(New Scheme—Regular)

Time : Three Hours

Maximum : 100 Marks

**Part A**

*Answer all questions.*

*Each question carries 3 marks.*

1. Explain in concept of space and activity space in architecture.
2. List the requirements for preparation of site plan.
3. List the merits and demerits of elevators in vertical transportation.
4. Briefly explain comprehensive planning.
5. Define master plan for a city. List the data required for preparation of master plan.

(5 × 3 = 15 marks)

**Part B**

*Answer all questions.*

*Each question carries 5 marks.*

6. Define form and explain form related with material.
7. Write brief note on circulation diagrams.
8. Give a dimensional sketch for an RCC stair with lay-out and details for a two storey residential building.
9. Explain transportation network and planning.
10. Discuss the problems of slum development.

(5 × 5 = 25 marks)

Turn over

**Part C**

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

**Module I**

11. Define Architecture, Architectural engineering and Architect. Discuss the factors influencing architectural development.

*Or*

12. State and explain architectural design principles.

**Module II**

13. Explain occupancy classification of buildings as per Kerala building rules.

*Or*

14. Briefly explain the functional requirements of industrial and commercial buildings.

**Module III**

15. Explain the features, operation arrangements, location and types of escalators in public buildings.

*Or*

16. Discuss the ventilation requirements for a hostel building. Distinguish between natural and mechanical ventilation. Explain cross ventilation.

**Module IV**

17. Briefly explain evaluation of towns and growth of towns.

*Or*

18. Briefly explain legislation on environmental pollution and land use planning.

**Module V**

19. Briefly explain the planning standards for land use allocation for an industry.

*Or*

20. Discuss the problems and procedure for land acquisition.

(5 × 12 = 60 marks)

**B.TECH. DEGREE EXAMINATION, NOVEMBER 2013****Seventh Semester****Branch : Civil Engineering****CE 010 706 L02 – GROUND IMPROVEMENT TECHNIQUES (Elective – II) [CE]****(New Scheme – Regular)****Time : Three Hours****Maximum : 100 Marks****Part A****Answer all questions.****Each question carries 3 marks.**

1. Explain electro osmosis.
2. Explain cement stabilization.
3. Define fluidity of grouts.
4. Explain the mechanism of earth reinforcement.
5. Explain Geogrid.

**(5 × 3 = 15 marks)****Part B****Answer all questions.****Each question carries 5 marks.**

6. Discuss the necessity of soil improvement.
7. Write short note on thermal stabilization.
8. Explain bleeding and stability of grouts.
9. Discuss the applications of earth reinforced work.
10. Write short note on advantages of geotextiles.

**(5 × 5 = 25 marks)****Turn over**

**Part C**

*Answer one question from each module.*

*Each question carries 12 marks.*

**MODULE I**

11. Discuss the engineering properties of soil which determine the bearing capacity of soil for foundation design.

*Or*

12. Discuss in detail the design of diameter, depth and spacing of stone columns for ground improvement.

**MODULE II**

13. Briefly explain lime stabilization. Explain effect of lime on soil properties.

*Or*

14. Explain bituminous stabilization. State the advantages and disadvantages of bituminous stabilization.

**MODULE III**

15. Explain classification of grouts. Distinguish between Suspension grout and Solution grouts.

*Or*

16. Discuss the applications of grouting in hydraulic structures. Explain grouting procedure and nature of grout.

**MODULE IV**

17. Discuss the stability analysis and construction procedure for earth reinforced earth retaining wall.

*Or*

18. Distinguish between external and internal stability. Explain tie back analysis.

**MODULE V**

19. Discuss the role of geotextiles as filter and drainage media. List the applications.

*Or*

20. Discuss the various tests for quality assurance such as strength and durability of earth reinforcing material. List geotextile materials.

(5 × 12 = 60 marks)



**B.TECH. DEGREE EXAMINATION, NOVEMBER 2013****Seventh Semester****Branch : Civil Engineering****CE 010 702—ENVIRONMENTAL ENGINEERING—I (CE)****(New Scheme—Regular)****Time : Three Hours****Maximum : 100 Marks****Part A**

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

1. List WHO standards for drinking water.
2. Explain hydraulic gradient in pipe flow.
3. Sketch the layout of water treatment plant.
4. Explain super chlorination of water.
5. Explain deflouridation of water.

**(5 × 3 = 15 marks)****Part B**

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

6. Discuss the physical tests for analysis of drinking water.
7. Explain the working of valves in pipe flow.
8. Write brief note on clarify flocculators.
9. Sketch and explain slow sand filter.
10. Explain pipe grids in water distribution.

**(5 × 5 = 25 marks)****Part C**

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

**MODULE I**

11. Define per capita demand of water in cities. Explain the factors affecting per capita demand.

*Or*

**Turn over**

12. Briefly explain the bacteriological tests in the analysis of drinking water. Explain total coli forms and fecal coli forms.

MODULE II

13. Discuss the location, functions and different types of intakes in water supply. Give detailed sketches where ever necessary.

*Or*

14. State and explain Chezy equation for flow through pipes. Compare Chezys equation with Manning's formula.

MODULE III

15. Define aeration and the aeration procedure in water supply scheme. Give a neat sketch of an aeration tank.

*Or*

16. Define coagulation and flocculation. Discuss the theory of coagulation.

MODULE IV

17. Define filter and filter media. Explain the theory of filtration of water.

*Or*

18. Define disinfection. Discuss the requirement of good disinfectant.

MODULE V

19. Define hardness of water. Explain the process of removal of hardness in drinking water. Discuss the reason for removal of hardness from drinking water.

*Or*

20. Discuss the process of cleaning and maintenance of distribution system.

(5 × 12 = 60 marks)

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**B.TECH. DEGREE EXAMINATION, NOVEMBER 2013**

**Seventh Semester**

**Branch : Civil Engineering**

**CE 010 703—DESIGN OF CONCRETE STRUCTURE II (CE)**

**(New Scheme—Regular)**

**Maximum : 100 Marks**

**Time : Three Hours**

**Relevant IS codes are permitted.  
(IS-456, 875, 1343, 3370 Part 2 and SP 16)**

**Part A**

*Answer all questions.*

*Each question carries 3 marks.*

1. Distinguish between pre-stress and bending stress.
2. Define and explain the term coefficient of friction between soil and base slab of retaining wall.
3. Distinguish between one way and two way reinforced slabs.
4. List the disadvantage of dome construction.
5. A rectangular water tank has to store 5000 liters of water. Fix the internal dimensions of the tank required.

(5 × 3 = 15 marks)

**Part B**

*Answer all questions.*

*Each question carries 5 marks.*

6. Explain system of prestressing.
7. Discuss the modes of failure of retaining wall.
8. Discuss the advantages of continuous beams of structures. Explain design coefficient and the application of coefficient as per IS 456.
9. Explain with neat sketches different parts of dome.
10. Distinguish between rigid joint and flexible joints in water tank.

(5 × 5 = 25 marks)

**Turn over**

## Part C

Answer one question from each module.  
Each question carries 12 marks.

## MODULE I

11. Design a bonded post-tensioned prestressed concrete beam simple supported over an effective span of 9 m. The beam has to be a rectangular section. It carries superimposed dead and live load of 6 and 12 kN per m, respectively. Given unit weight of R.C.C. 25 kN per cum and the mix designed is M-35.

Or

12. A post-tensioned prestress concrete beam of 30 m span is subjected to a transfer prestress force of 2500 kN at 28 days 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  $b \times d$  500 × 800 mm and is prestressed with 9 cables, each cable consisting of 12 wires of 5 mm diameter.  
Given  $E_s = 2.1 \times 10^5$  N per sqmm and  $E_c = 3.5 \times 10^4$  N per sqmm. One cable is tensioned at a time.

## MODULE II

13. Design a counter fort retaining wall for the given data :

Length of retaining wall	=	24 m
Height retaining wall from top of base slab	=	4m
Density of earth	=	18 kN per cum
Angle of repose of soil	=	28°
Bearing capacity of soil	=	150 kN per sqm.

Use M-20 concrete and F-415 steel.

Assume any other data required suitably.

Or

14. Design a cantilever retaining wall to retain earth having density 18 kN per cum, and angle of repose 36°. The retaining wall is constructed retain the level of the upper ground at + 12.40 m, and lower ground at + 7.80 m. The bearing capacity of the soil at lower level is 120 kN per sqm. Coefficient of friction between the base slab and soil may be assumed as 0.5. Select suitable concrete mix and steel.

## MODULE III

15. A curved beam is in the form of full continues circle in plan with a radius of 4 m and is supported continuously on six supports. The beam carries a uniformly distributed load of 2 kN per m length inclusive of its own weight. Determine the bending moment, shear force and twisting at salient sections.

Or

16. Briefly explain the analysis and design of circular beams. Define and derive equations for bending moment, twisting moment and shear force in circular beams. State the assumptions.

## MODULE IV

17. Explain membrane analysis for dome design. State the assumptions in membrane analysis of a dome. List the forces acting in the bottom ring of the dome.

Or

18. Design a circular dome for a silo having 12 m diameter and dome height 2.1 m. Assume data required suitably. Discuss the design criteria for providing opening in dome surface.

## MODULE V

19. List and explain the various forces to be considered for design of staging for overhead water tank. Height of the staging 11.5 m. Also sketch the staging arrangement.

Or

20. Design a square footing for a column 300 mm × 300 mm supporting a water tank. Given service load as 1000 kN and bearing capacity of soil at 1.5 m depth from ground level as 250 kN per sqm. Use F-415 steel and M-20 concrete. Assume any other data required suitably.

(5 × 12 = 60 marks)