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B.TECH. DEGREE EXAMINATION, MAY 2013

Sixth Semester

Branch : Civil Engineering

CE 010 604—TRANSPORTATION ENGINEERING—I (CE)

(New Scheme—Regular)

Time : Three Hours

Maximum : 100 Marks

Answer all questions.

Part A

Each question carries 3 marks.

1. List out Characteristics of highways.

2. Write notes on crossings in railway.

3. Explain about Tunnel surveying.

4. List notes on Moorings.

5. Explain functions of Docks.

(5 × 3 = 15 marks)

Part B

Each question carries 5 marks.

6. Explain functions and requirements of rails.

7. Explain gradients and its classifications.

8. List notes on Tunnel Lining.

8. Write notes on transit sheds.

10. Functions of Dredger. Explain.

(5 × 5 = 25 marks)

Part C

Each question carries 12 marks.

11. (a) Sketch and explain typical cross-section of a single lane railway track in a level ground.

    (b) Explain coining of wheels.

(2 × 6 = 12 marks)

Or

Turn over

12. List notes on :

    (a) Super clevation.

    (b) Cant deficiency.

    (c) Grade compensation.

$(3 \times 4 = 12 \text{ marks})$

13. Explain briefly about station yards and Marshalling yards.

Or

14. List notes on :

    (a) Track circuting.

    (b) Interlocking of signals and points.

$(2 \times 6 = 12 \text{ marks})$

15. Explain about different classification of Tunnel.

Or

16. Explain shield method of tunnelling.

17. Explain about various types of signals used in harbours.

Or

18. Explain : (a) Wharves ; (b) Jetties ; (c) Navigational aids.

$(3 \times 4 = 12 \text{ marks})$

19. Explain : (a) Wet and dry docks ; (b) dock entrances.

$(2 \times 6 = 12 \text{ marks})$

Or

20. Explain :

    (a) Grapple dredger.

    (b) Hydraulic dredger.

$(2 \times 6 = 12 \text{ marks})$

$[5 \times 12 = 60 \text{ marks}]$

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B.TECH. DEGREE EXAMINATION, MAY 2013

Sixth Semester

Branch : Civil Engineering

CE 010 605—WATER RESOURCES ENGINEERING (CE)

(New Scheme—Regular)

Time : Three Hours

Maximum : 100 Marks

Answer all questions.

Part A

Each question carries 3 marks.

1. What do you mean by Crop period and base period ?

2. What is meant by a unit hydrograph ?

3. Define specific yield.

4. List the different types of canal outlets.

5. Which are the storage zones in a reservoir ?

(5 × 3 = 15 marks)

Part B

Each question carries 5 marks.

6. Derive the relationship between duty and delta.

7. Explain in detail the factors affecting run off.

8. Explain Darcy's law for determining ground water velocity.

9. Compare Kennedy's silt theory over Lacey's silt theory.

10. Explain the major objectives of river training works.

(5 × 5 = 25 marks)

Part C

Each question carries 12 marks.

11. Name any *two* methods used for estimating consumptive use of water for a particular crop at a particulars place. Explain in detail the one which is most widely used in your region, and the reasons for preferring that particular method.

Or

Turn over

12. Compute the depth and frequency of irrigation required for a certain crop with data given below :

Root zone depth = 100 cm, field capacity = 22%, wilting point = 12%, Apparent specific gravity of soil = 1.50, consumptive use = 25 mm/day, Efficiency of irrigation = 50%. Assume 50% depletion on available moisture before application of irrigation water at field capacity.

13. Define a 'Unit hydrograph' and explain how it is used to estimate the flood hydrograph of a storm of a given magnitude and of the same duration.

Or

14. What is meant by 'runoff' and discuss the variance factors on which it depends.

15. Explain the following terms :—

   (a) Capillary funge ;

   (b) Specific yield ;

   (c) Coefficient of storage ;

   (d) Aquiclude.

(3 × 4 = 12 marks)

Or

16. What is meant by Tube-wells ? What are their types ? Describe the most widely used type of tube well with a neat sketch. What are the approximate values of the average yield and depth of such a tube well ?

17. Explain in detail with neat sketches the distribution systems for canal Irrigation.

Or

18. (a) What is meant by 'Balancing depth' and how is it determined ?

(5 marks)

   (b) The following data refer to an irrigation canal :

   Bed width = 1.0 m, side slopes = 2.1 (filling) and 1 : 1 (cutting). Top width of embankment on either side of canal = 3 m

   Full supply depth = 5 m

   Free board = 1 m.

   Determine the balancing depth. Draw the canal cross-section showing the dimensions.

(7 marks)

19. Explain in detail the different methods of lives training.

Or

20. What is meant by a 'Reservoirs' ? Discuss briefly the different types of reservoirs and the purpose served by each type.

[5 × 12 = 60 marks]

(Pages : 3)

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B.TECH. DEGREE EXAMINATION, MAY 2013

Sixth Semester

Branch : Civil Engineering

CE 010 606 L05 – CONCRETE TECHNOLOGY (Elective I) (CE)

(New Scheme – Regular)

Maximum : 100 Marks

Time : Three Hours

Answer all questions.

Part A

Each question carries 3 marks.

1. Name the cement used in the following situations specifying the reason for selection :

    (a) Where form work is required to be removed early for reuse elsewhere.

    (b) Mass concrete construction such as Dam.

    (c) Under water construction.

2. Write short note on Kelly Ball Test.

3. Define creep in concrete. What is its significance?

4. Compare compressive strength results of cube test with cylinder test on concrete.

5. What are the effects of cold weather on concreting?

(5 × 3 = 15 marks)

Part B

Each question carries 5 marks.

Write short note on the following :

6. Transition zone in concrete.

7. Batching of concrete.

8. Accelerated curing tests.

9. Thermal properties of concrete.

10. Ferrocement.

(5 × 5 = 25 marks)

Turn over

Part C

Each full question carries 12 marks.

11. (a) (i) What do you mean by Grading of aggregates ? What is its significance in concrete making?

    (ii) Explain how grading of aggregates are determined.

    (5 + 7 = 12 marks)

Or

(b) (i) What do you mean by hydration of cement ? What are the products of hydration ? Explain in detail.

    (ii) Briefly discuss on water requirement for cement hydration.

    (7 + 5 = 12 marks)

12. (a) (i) Define workability of concrete. Mention the various methods of determination of workability.

    (ii) Explain any *one* important method for determining workability of concrete.

    (4 + 8 = 12 marks)

Or

(b) Explain in detail curing of concrete highlighting its importance and methods.

    (12 marks)

13. (a) (i) Briefly discuss about the elastic properties of concrete.

    (ii) Explain how the various elastic modulii is determined for concrete.

    (6 + 6 = 12 marks)

Or

(b) Write short notes on the following :

    (i) Water Cement ratio.

    (ii) Gel-space ratio.

    (iii) Revibration of concrete.

    (3 x 4 = 12 marks)

14. (a) Explain the following :

    (i) Sulphate attack on concrete.

    (ii) Durability of concrete in sea water.

    (2 x 6 = 12 marks)

Or

20. Find natural frequency of system shown. The mass of beam is negligible to suspended mass. Take $E = 2 \times 10^5$ N/mm^2. The cross-section of beam b = 15 mm d = 200 mm.
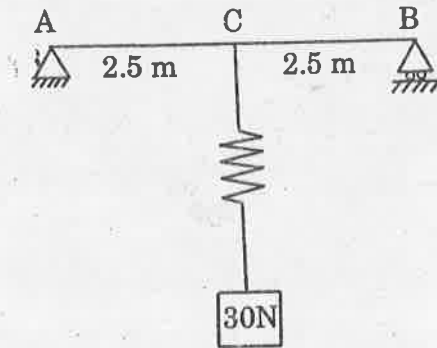

Figure. 6

(5 × 12 = 60 marks)

B.TECH. DEGREE EXAMINATION, MAY 2013

Sixth Semester

Branch : Civil Engineering

CE 010 603—STRUCTURAL ANALYSIS II (CE)

[New Scheme]

(Regular)

Maximum : 100 Marks

Time : Three Hours

Answer **all** questions.

Part A

Each question carries 3 marks.

1. List out the assumptions made in plastic theory.

2. Explain about substitute frame.

3. Describe influence line diagram.

4. Explain plane strain problems.

5. Explain natural frequency.

(5 × 3 = 15 marks)

Part B

Each question carries 5 marks.

6. Find the shape factor for a typical triangular section of base width b and depth h.

7. Explain briefly Cantilever method and assumptions made in it.

8. State and prove Muller-Breslau principle.

9. Find the principle stresses for stress matrix shown below. All values are in MPa

$$\begin{bmatrix} 8 & 5 & 2 \\ 7 & 6 & 3 \\ 4 & 1 & 5 \end{bmatrix}$$

10. Explain briefly about Free and forced vibrations.

(5 × 5 = 25 marks)

Turn over

Part C

Each question carries 12 marks.

11. Determine the plastic moment capacity M_p required for continuous beam shown below. Assume same section is used throughout
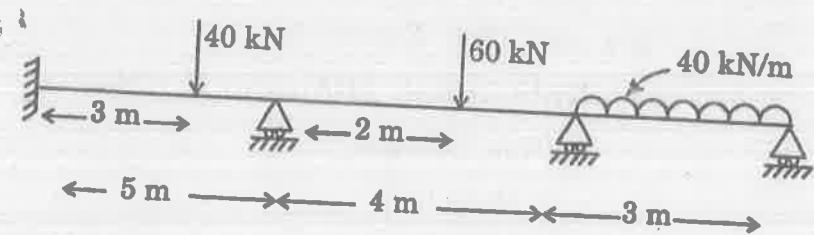

Figure. 1

Or

12. Determine load factor λ for the frame shown in Fig. below
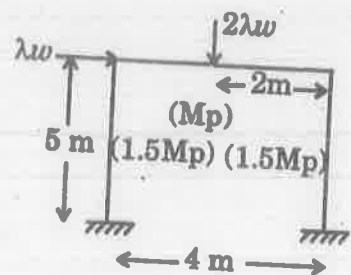

Figure. 2

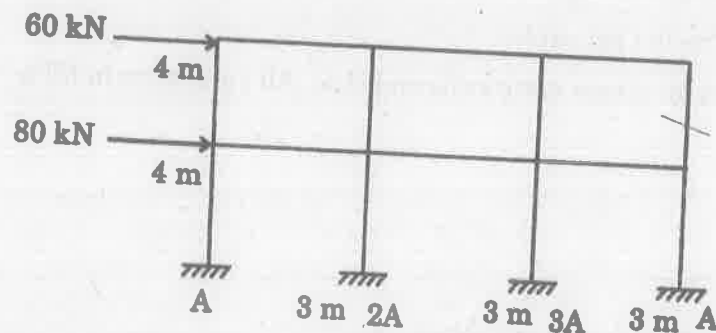13. Analyze frame using Cantilever method

Figure. 3

Or

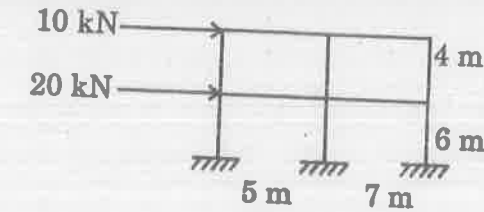14. Analyze frame using portal method

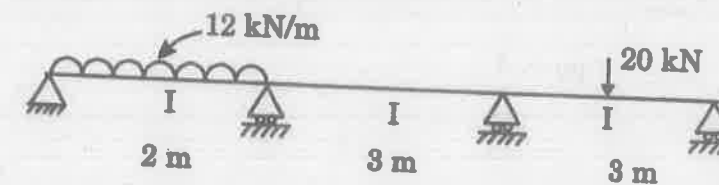
Figure. 4

15. Analyze using Kani's method

Figure. 5

Or

16. Draw influence line diagram for reaction at B in a continuous beam ABC, pinned at A, roller support at B and C. Span AB is 8 m and BC is 6 m.

17. Explain :

   (a) State of stress at point.

   (b) Stresses on arbitrary plane.

Or

18. State of stress at a point is given by

   H$\sigma_x = 250$ $\sigma_y = -125$ $\sigma_s = 60$ $\tau_{xy} = 50$ $\tau_{yz} = 70$ $\tau_{xz} = 60$ MPa . If $E = 2.1 \times 10^5$ N/mm^2 and $G = 0.75 \times 10^5$ BN/mm^2 determine strain components.

19. Briefly explain and state D Alembert's principle.

Or

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B.TECH. DEGREE EXAMINATION, MAY 2013

Sixth Semester

Branch : Civil Engineering

CE 010 602—GEOTECHNICAL ENGINEERING—II (CE)

(New Scheme—Regular)

Time : Three Hours

Maximum : 100 Marks

Part A

Answer all questions.
Each question carries 3 marks.

1. Define soil profile.

2. List out the common types of sheet piles.

3. Define ultimate and allowable hearing capacity.

4. Explain shallow and deep foundation.

5. Explain group action of piles.

(5 × 3 = 15 marks)

Part B

Answer all questions.
Each question carries 5 marks.

6. What are the assumptions and limitations of Boussinesque's equation.

7. Explain earth pressure at rest, active and passive.

8. Explain permissible, total and differential settlement.

9. Explain different types of foundation.

10. Explain open, box and pneumatic caissons.

(5 × 5 = 25 marks)

Part C

Each question carries 12 marks.

11. (a) Explain geophysical methods.

    (8 marks)

    (b) Explain different stages of exploration.

    (4 marks)

Or

Turn over

12. Explain Boussinesque's equation for vertical pressure due point load.   (12 marks)

13. (a) Explain Culman's graphical method.   (5 marks)

    (b) A 5 m high retaining wall has a granular soil backfill with a level top. The retaining face makes an angle of 85° with the base. Soil parameters γ, ϕ and δ are 16 kN/m³ , 35° respectively. Demonstrate the Coulomb's method and obtain the active thrust.   (7 marks)

Or

14. (a) Describe Coulomb's wedge theory. Explain how maximum active pressure is determined.   (5 marks)

    (b) A retaining wall is 7 m high, with its back face smooth and vertical. It retains sand with its surface horizontal using Rankine's theory, determine active earth pressure at the base when the backfill is (a) dry ; (b) saturated. Take $\gamma = 18 kN/m^3$, $\phi = 30°$, $\gamma_{sat} = 21 kN/m^3$.   (7 marks)

15. (a) Describe the Terzaghi's equation of bearing capacity indicating its assumptions and concept.   (4 marks)

    (b) A strip footing of width 2.5 m is to be founded at a depth of 2.0 m in a well drained sand stratum having the following properties :

$\phi = 38°, c = 18, \gamma = 18 kN/m^3$. Determine the ultimate bearing capacity using Terzaghi's bearing capacity equation.   (8 marks)

Or

16. (a) The thickness of the normally consolidated soft clay layer is 6 m. The natural water context is 31 percent. The specific gravity of the soil being 2.68 with a liquid limit of 41%. The saturated unit weight of clay being 17.5 kN/m³. The ground water table is at the surfaces of the clay. Determine the settlement of the foundation if the centre of the clay layer is subjected to an increase of vertical stress intensity of 8 kN/m².   (8 marks)

    (b) Write a note on contact pressure.   (4 marks)

17. (a) Discuss the design procedure for combined rectangular footing.

    (b) Discuss the following :

       (i) Deep foundation.

       (ii) Shallow foundation.

                                   (7 + 5 = 12 marks)

Or

18. Discuss in detail various types of foundation with the help of sketches.   (12 marks)

19. A group of 16 friction piles is arranged in a square pattern. The spacing between pile is 3 times of pile dia. The diameter of the pile is 400 mm having 5 m length. The value of cohesion is 100 kN/m². Find the group efficiency.

                                             (12 marks)

Or

20. Write short notes on the following :

    (a) Pneumatic caissons.

    (b) Well foundation – Construction details.

                          (6 + 6 = 12 marks)

                          [5 × 12 = 60 marks]

(Pages : 3)

B.TECH. DEGREE EXAMINATION, MAY 2013

Sixth Semester

Branch—Civil Engineering

CE 010 601—DESIGN OF STEEL STRUCTURES (CE)

(New Scheme—Regular)

Time : Three Hours

Maximum : 100 Marks

Answer **all** *questions.*

Part A

Each question carries 3 marks.

1. Enumerate the available design philosophies.

2. Why do we need to provide lacings or battens for columns ?

3. List the different types of circular steel tanks.

4. Differentiate between stiffened, unstiffened and multi-stiffened elements.

5. List the classification of chimneys.

(5 × 3 = 15 marks)

Part B

Each question carries 5 marks.

6. Differentiate the behaviour of laterally supported beams and laterally unsupported beams.

7. State the failure modes of short and long columns.

8. Explain the design procedure of supporting towers.

9. Explain the commonly used forms for light-gauge sections with neat sketches.

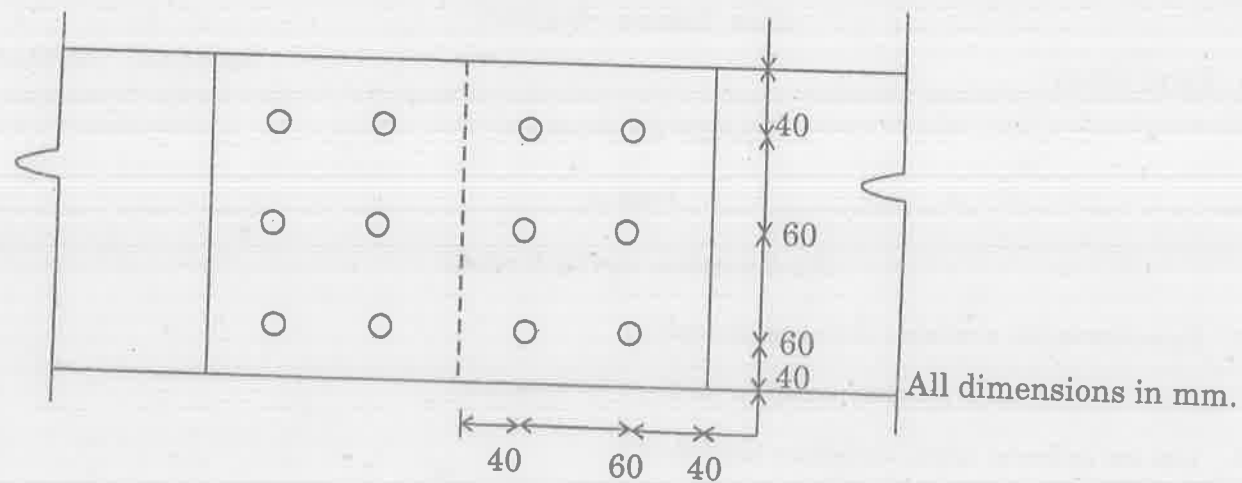10. Enumerate the permissible stresses in chimneys.

(5 × 5 = 25 marks)

Turn over

Part C

Each question carries 12 marks.

11. Two cover plates, 10 mm and 18 mm thick are connected by a double cover butt joint using 6 mm cover plates. Find the strength of the joint. Given M-20 bolts of grade 4.6 and Fe-415 plates are used.

All dimensions in mm.

(12 marks)

Or

12. An ISMB 500 section is used as a beam over a span of 6 m, with simply supported ends. Determine the maximum factored u.d.l. that the beam can carry, if the ends are restrained against torsion but compression flange is laterally unsupported.

(12 marks)

13. Design the column using beam sections and plates if it is 4 m long to support a factored load of 6000 kN. The column is effectively held at both ends and restrained in direction at one of the ends.

(12 marks)

Or

14. Design a gusseted base for a column ISHB 350 at 710 N/m with two plates 450 mm × 20 mm carrying a factored load of 3600 kN. The column is to be supported on concrete pedestal to be built with M-20 concrete.

(12 marks)

15. Design an overhead riveted steel rectangular flat bottom tank of capacity 1,20,000 liters. The staging consists of sin columns. The bottom of the tank is 10 mm above the GL.

(12 marks)

Or

16. Design an elevated circular steel tank for 2,40,000 litres capacity with circular girder supported on 8 columns.

(12 marks)

17. Design a beam to span 5 m carrying a load inclusive of self-load of 2000 N/m. The ends of the beam are unrestrained against lateral bending.

(12 marks)

Or

18. Design a column 4 m long to carry a load of 200 kN.

(12 marks)

19. Design only the chimney of a self supporting stack of effective height 30 m, having its diameter at top equal to 3 m. Take wind pressure intensity as 2 kN/mm^2 uniform throughout its height. Assume uniform values of permissible tensile and compressive stresses as 120N/mm^2 and 90N/mm^2.

(12 marks)

Or

20. Design a self-supporting chimney of 100 m height. The diameters of cylindrical shell is 4 m. The chimney has a 100 m thick brick lining supported on the shell.

(12 marks)

[5 × 12 = 60 marks]