G 1856

Reg. No...........................

Name...........................

B.TECH. DEGREE EXAMINATION, MAY 2018

Sixth Semester

Branch : Civil Engineering

CE 010 601—DESIGN OF STEEL STRUCTURE (CE)

(New Scheme—2010 Admission onwards)

[Supplementary]

Time : Three Hours

Maximum : 100 Marks

Use if IS codes-IS 800-2007, IS 805, IS 801, IS 811, IS 6533 Part 1 and 2.
and steel tables are permitted.
Assume any data missing suitably.

Part A

Answer all questions.
Each question carries 3 marks.

1. Distinguish between simple and compound beam.

2. Explain axial and eccentric loading.

3. Explain different types of circular water tank.

4. Discuss the structural characteristics of light gauge steel structures.

5. Discuss the classification of steel chimney.

(5 × 3 = 15 marks)

Part B

Answer all questions.
Each question carries 5 marks.

6. Explain limit state.

7. Explain column base connections.

8. Sketch the connection between water tank and supporting structure.

9. Sketch different types of sections of light gauge structures and explain.

10. Discuss the classification of steel chimney.

(5 × 5 = 25 marks)

Turn over

Part C

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

11. Explain with neat sketches lap joint, single butt joint and double butt joint. List the merits and demerits of rivet joints and welded joints.

Or

12. The span between an opening is 3 m. The side brick walls are 240 mm thick. Height of the opening is 2.20 m. Design a simple beam over the opening. Live load may be taken as 2.5 kN/m.

13. Design a built up column 10 m long to carry a fractured axial compressive load of 120 kN. The column is restrained in position but not in direction at both the ends. Design the column with connecting system as battens with bolted connections. Use two channel sections back to back. Use steel of grade Fe 415.

Or

14. An ISMB 300 is used as a column for a factory building. The column is laterally supported in both the axis at 4 m. The ends of the columns are hinged. Determine the allowable load in columns.

15. Design the supporting tower for a rectangular water carrying 20000 litres of water. Select the dimensions of the tank. Assume any other data required suitably.

Or

16. Design the cylindrical wall for a circular water tank carrying 30000 litres of water. Give detailed specification for construction of tank.

17. Design a 5m span beam resting on unrestricted support against lateral bending carrying a uniformly distributed load 1.5 kN/m.

Or

18. A hat section 100 mm × 50 mm × 2 mm is to be used as a beam having 3 m span. The ends of the beam are unrestricted against lateral loading. Find the moment of resistance of the section.

19. Explain breech opening and base plate for a steel chimney. Sketch and explain the design procedure for base plate.

Or

20. Design a self supporting chimney for a height of 95 m from floor level. Diameter of the cylindrical shell is 4.5 m. Thickness of brick lining 100 mm.

(5 × 12 = 60 marks)

G 1868

Reg. No...........................

Name............................

B.TECH. DEGREE EXAMINATION, MAY 2018

Sixth Semester

Branch : Civil Engineering

CE 010 602—GEOTECHNICAL ENGINEERING (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 pressure bulb.

2. Define active and passive earth pressure.

3. Define ultimate and allowable bearing capacity of soils.

4. Define footing and the design principles of footing.

5. Discuss the advantages of pile foundation.

(5 × 3 = 15 marks)

Part B

Answer all questions.
Each question carries 5 marks.

6. Discuss the objectives of soil investigation and exploration.

7. Distinguish between cohesion less and cohesive soils with examples.

8. Discuss the effect of water table on bearing capacity of soils.

9. Explain the construction details of well foundation.

10. Discuss the problems of well sinking.

(5 × 5 = 25 marks)

Part C

Answer all questions.
Each full question carries 12 marks.

11. State and explain Wetergaard's equation for point loads. Discuss the pressure distribution limitations and applications.

Or

Turn over

12. Explain cone penetration test. Discuss the equipments used, test procedure, recording and conclusions.

13. Explain Coulomb's wedge theory for earth pressure. State the assumptions in wedge theory. Discuss the applications.

Or

14. A retaining wall, 4M high supports a backfill having cohesion 20 kN/sqm, shear resistance 30 degrees, and unit weight 18 kN/cum with a horizontal top, flush with the top of the wall. The back fill carries a surcharge of 20 kN/cum. If the wall is pushed towards the backfill, compute the total passive pressure on the wall and its point of application.

15. Explain plate load test to determine the bearing capacity of soils. Discuss the equipments required, test procedure, result recording, calculations merits and demerits of plate load test.

Or

16. A 0.30M square bearing plate settles by 8 mm in the plate load test on cohesion less soil, when the intensity of loading is 180 kN per sqm. Estimate the settlement of a shallow footing of 1.60 M square under the same intensity of loading.

17. Distinguish among individual footing, continuous footing and combined footing. Discuss the design principles of each.

Or

18. A rectangular footing 2 M × 3 M carries a column load of 800 kN at a depth of 1.20 M. The footing rests on ac-φ soil strata 8 M thick, having Poisson's ratio 0.27 and Young's modulus of elasticity 21000 kN/sqm. Calculate the immediate elastic settlement of footing.

19. Explain raft foundation for buildings. Discuss the merits and demerits and raft foundation. Explain IS code of practice for design or raft foundations.

Or

20. Design a friction pile group to carry a load of 4000 kN including the weight of the pile cap at a site where the soil is uniform clay to a depth of 22 M, underlain by rock. Average un-compressive strength of the clay is 80 kN/sqm. The clay may be assumed to be of normal sensitivity and normally loaded, with liquid limit 65%. A factor of safety 3 is required against shear failure.

(5 × 12 = 60 marks)

G 1880

B.TECH. DEGREE EXAMINATION, MAY 2018

Sixth Semester

Branch : Civil Engineering

CE 010 603—STRUCTURAL ANALYSIS 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. Write short notes on plastic hinges.

2. Define space frame.

3. What is meant by Non-sway frames ?

4. Define strain tensor.

5. What is dynamic loading ?

(5 × 3 = 15 marks)

Part B

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

6. State lower bound theorems for plastic analysis.

7. Explain briefly about substitute frame method.

8. State Muller Breslau's Principle.

9. Discuss about compatibility equations.

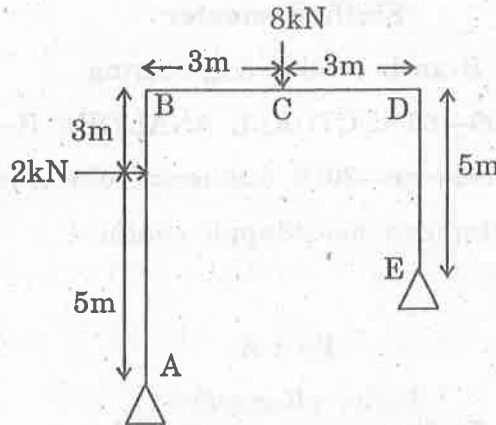10. Write short notes on types of vibrations.

(5 × 5 = 25 marks)

Part C

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

11. Calculate the shape factor for a hollow circular section of internal diameter 'd' and external diameter 'D'.
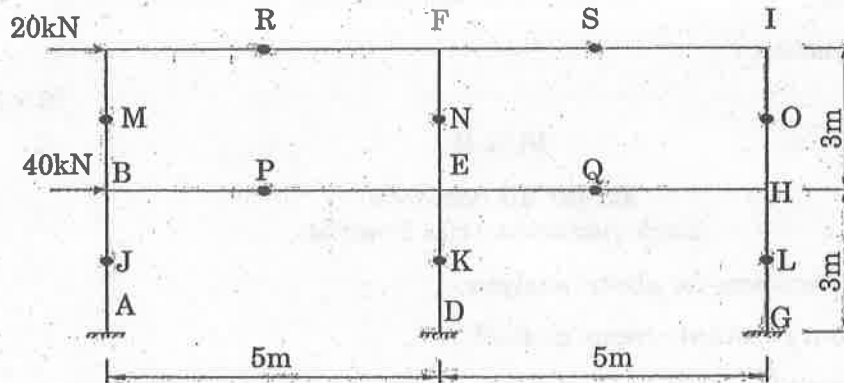
Or

Turn over

12. Find the collapse load for the portal frame of uniform cross section shown below :

13. Analyze a frame shown below using cantilever method. Draw the BMD.

Or

14. With an example discuss the procedure for analyzing the building frame by substitute frame method.

15. A continuous beam ABCD simply supported at A, B, C and D having span AB 5 m., BC 7 m. and CD 3 m. carries a concentrated load 10 kN at mid span of AB, span BC carries a uniform load of intensity 14 kN/m. throughout the full span and span CD does not carry any load. Analyze this beam using Kani's method and draw the BMD and SFD.

Or

16. Construct the influence line for the moment at point C of the beam shown in Fig.
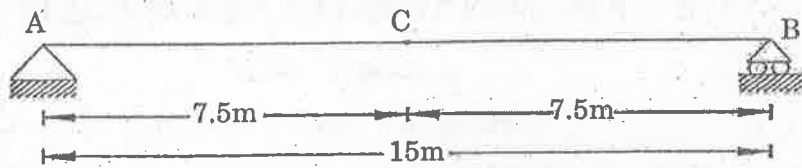
17. Derive the Compatibility equation for a three dimensional strain system.

Or

18. What is generalized Hooke's law ? Establish the stress - strain relationship for isotropic materials and prove the relationship between E, G and K.

19. A harmonic motion has a maximum velocity of 6 m/s and it has a frequency of 12cps. Determine its period, amplitude and maximum acceleration.

Or

20. Find the natural Period of vibration of a system in which a S. S, beam having a span of 4 m. is having a spring mass system attached at a distance of 1 m. from the end, the spring having a constant of 25,000 N/m. and the mass of the body is "M" Kg. The circular cross section of the beam is having a diameter of 15 cm. E is 2×10^5 N/mm^2.

(5 × 12 = 60 marks)

G 1894

Reg. No..............................

Name..................................

B.TECH. DEGREE EXAMINATION, MAY 2018

Sixth Semester

Branch : Civil Engineering

CE 010 604—TRANSPORTATION ENGINEERING—I (CE)

(New Scheme—20120 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 wear of rail ?

2. Define Yard.

3. Define tunnel.

4. List out the types of signals.

5. What is Caission ?

(5 × 3 = 15 marks)

Part B

Answer all questions.
Each question carries 5 marks.

6. What are the disadvantages in having *two* different gauges in Railways ?

7. Write down the principles of track circuit.

8. What are the points to be considered in construction of tunnel drainage ?

9. Mention the importance of break waters.

10. Distinguish between dry and wet docks.

(5 × 5 = 25 marks)

Turn over

Part C

Answer all questions.
Each full question carries 12 marks.

11. Write notes on :

    (a) Coning of wheels.   (6 marks)

    (b) Tractive effort of locomotive.   (6 marks)

Or

12. What are the functions and requirements of railway track ?

13. Explain the design features of turnout.

Or

14. Discuss the control system of rail.

15. Explain about tunnel driving procedures.

Or

16. Write notes on :

    (a) Tunnel lining.

    (b) Ventilation in tunnel.

    (c) Lighting in tunnel.

17. What are the factors to be considered in site selection for Harbour ?

Or

18. Explain navigational aids used in harbour.

19. Explain the design and construction of basins.

Or

20. What are the functions of Docks and explain the types of Docks ?

(5 × 12 = 60 marks)

(Pages : 2)

Reg. No..................................

Name..................................

B.TECH. DEGREE EXAMINATION, MAY 2018

Sixth Semester

Branch : Civil Engineering

CE 010 605—WATER RESOURCES ENGINEERING (CE)

(New Scheme—2010 Admission onwards)

[Improvement / Supplementary]

Three Hours

Maximum : 100 Marks

Part A

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

Define Irrigation.

Define rainfall and run off.

Define porosity.

Explain balancing depth of cutting in canal design.

Distinguish between silt and scour.

(5 × 3 = 15 marks)

Part B

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

Distinguish between base period and crop period of crops.

Explain catchment area.

Define permeability and coefficient of permeability.

Write short note on non-modular outlets.

Write short note on groynes.

(5 × 5 = 25 marks)

Turn over

Part C

Answer all questions.
Each full question carries 12 marks.

11. A field channel has cultured commanded area of 2000 hectares. The intensity of irrigation for gram is 30% and for wheat is 50%. Gram has a kor period of 18 days and kor depth of 12 cm, while wheat has a kor period of 15 days and a kor depth of 15 cm. Calculate the discharge of the field channel.

Or

12. Find the delta for a crop if the duty for a base period of 110 days 1400 hectares/cumsec. Derive the relation between duty and delta.

13. Explain hydrological cycle and its components.

Or

14. A precipitation station X was inoperative for some time during which a storm occurred. The storm totals at three stations A, B and C surrounding X were respectively 66, 48 and 37 mm. The normal annual precipitation amounts at stations X, A, B and C are respectively 656, 726, 518 and 382 mm. Estimate the storm precipitation for station X.

15. State and explain Darcy's equation and its applications.

Or

16. Design an open well in fine sand to give a discharge of 3 litres per second when worked under a depression head of 2.5 m. Given the specific yield capacity for fine sand is 0.25 cum/hr per sqm of area under unit depression head.

17. State and explain Kannedy's silt theory and its application in canal design.

Or

18. Design a canal section for the following data. Discharge = 30 cumecs. Slit factor = 1 side slope 1H to 2V. Find also the longitudinal slope.

19. Explain the reasons and remedial measures for canal sedimentation.

Or

20. Explain mass in flow curve for a reservoir. Discuss calculation of reservoir capacity and safe yield from mass inflow curve.

$(5 \times 12 = 60 \text{ marks})$

G 1931 (Pages : 2) Reg. No..............................

Name..................................

B.TECH. DEGREE EXAMINATION, MAY 2018

Sixth Semester

Branch : Civil Engineering

CE 010 606 L05—CONCRETE TECHNOLOGY (Elective 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. Discuss the chemical properties of Cement.

2. Explain segregation in Concrete.

3. Discuss shrinkage in Concrete.

4. Explain the action of sugar on Concrete.

5. Explain hot weather Concreting.

(5 × 3 = 15 marks)

Part B

Answer all questions.
Each question carries 5 marks.

6. Discuss the solids and voids in hydrated Cement paste.

7. Explain compaction of Concrete.

8. Discuss maturity concept of Concrete.

9. Explain thermal properties of Concrete.

10. Write short on high density Concrete.

(5 × 5 = 25 marks)

Part C

Answer all questions.
Each full question carries 12 marks.

11. Define impact value and abrasion value of aggregates. Explain the procedure to determine impact value and abrasion value.

Or

Turn over

12. Explain the quality of water required for formation of Concrete. Discuss the impact of saline water, chlorinated water and oil containing water on concrete.

13. Define workability of Concrete. Discuss the factors affecting workability. Explain different methods for measuring workability.

Or

14. Explain the necessity and application of admixtures in concrete.

15. Define strength of Concrete. Discuss the effect of maximum size of aggregate on strength.

Or

16. Explain compressive and tensile strength of Concrete. Discuss the relation between compressive and tensile strength of Concrete.

17. Explain sulphate attack on concrete. Discuss methods to control sulphate attack.

Or

18. Explain the necessity and principle of concrete mix design. Discuss ACI method of concrete mix design.

19. Explain fibre reinforced concrete. Discuss the manufacture, properties and application of Fibre reinforced concrete.

Or

20. Explain Ferro Cement. Discuss the manufacture, properties and application of Ferro Cement.

(5 × 12 = 60 marks)