G 5343 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2017

Sixth Semester

Branch : Civil Engineering

CE 010 601 – DESIGN OF STEEL STRUCTURES (CE)

(New Scheme - 2010 Admission onwards)

[Regular/Improvement/Supplementary]

Time : Three Hours Maximum : 100 Marks

Use of IS codes - IS 800-2007, IS 805, IS 801, IS 811, IS 6533 Part I and Part 2 and Steel table are permitted.

Assume any data missing suitably.

Part A

Answer **all** *questions.*

Each question carries 3 *marks.*

1. Explain IS structural sections.
2. Distinguish between long and short columns.
3. Sketch and explain the connections of riveted rectangular water tanks.
4. Explain local buckling in light gauge steel structures.
5. List different types of steel chimneys.

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*

Each question carries 5 *marks.*

6. Explain the design philosophy of working stress method.
7. Explain with neat sketches gusseted base connections for column.
8. Discuss the analysis of supporting towers for water tank.
9. Explain with sketches different types of light gauge structures.
10. Discuss the design of foundation for steel chimney.

(5 × 5 = 25 marks)

Turn over

Part C

Answer **all** *questions.*

Each question carries 12 *marks.*

11. Design a tension member to carry a factored load of 400 kN. Use 20 mm diameter bolts and gusset plate 10 mm thick.

Or

12. Explain the design procedure for riveted joints. Explain with sketches lap joint, single butt joint and double butt joint. List the merits and demerits of riveted joints.

13. Determine the load carrying capacity of a compression member with two ISA 8080 6 mm thick placed back to back, if the length of the member is 4 m and welded to a 10 mm thick gusset plate.

Or

14. An ISMB 300 is used as a column for a factory building. The column is laterally supported in both the axis at 3.6 m. The ends of the columns are hinged. Determine the allowable load on columns.

15. Design a circular overhead water tank for 20,000 liter capacity. Structural design required is only for cylindrical wall. Give detailed specification for the proposed tank.

Or

16. Design the side and bottom plate for a rectangular water tank, the storage volume being 6 m × 3 m × 2.8 m. Determine the overall dimensions of the tank and the capacity of the tank in liters.

17. A square box section 200 mm × 200 mm × 2 mm is to be used as a column for an effective height of 4 M. Find the maximum load bearing capacity of the column.

Or

18. A hat section 100 mm × 50 mm × 2 mm with lap 25 mm is to be used as a beam having 4 M span. Find the moment of resistance of the section. The ends of the beam are unrestricted against lateral loading.

19. Explain the design procedure for steel stack of a self-supporting chimney. Discuss the permissible stresses induced in plate and efficiency of joints.

Or

20. Design a self-supporting chimney of 75 M height. The diameter of the cylindrical shell is 4 M. The chimney has a 100 mm thick brick lining.

(5 × 12 = 60 marks)

G 5355

(Pages : 2)

Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2017

Sixth Semester

Branch : Civil Engineering

CE 010 602—GEOTECHNICAL ENGINEERING—II (CE)

(New Scheme—2010 Admission onwards)

[Regular/Improvement/Supplementary]

Time : Three Hours

Maximum : 100 Marks

Part A

Answer **all** *questions.*

Each question carries 3 *marks.*

1. Explain soil sampling tools.
2. Discuss state of plastic equilibrium.
3. Define bearing capacity of soils.
4. Define foundation. List the functions of foundation.
5. Write brief note on floating foundation.

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*

Each question carries 5 *marks.*

6. Explain electrical resistivity method of soil exploration.
7. Explain uses of sheet pile walls.
8. Write brief note on sand drains.
9. Distinguish between shallow and deep foundation.
10. Explain negative skin friction.

(5 × 5 = 25 marks)

Turn over

Part C

Answer **all** *questions.*

Each question carries 12 *marks.*

11. State and explain Boussinesque's equation for vertical pressure due to point loads in soils. Explain the assumptions and limitations.

Or

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

13. Define active earth pressure. State the assumptions in Rankine's earth pressure theory. Derive equation for earth pressure of moist back fill as per Rankine's theory.

Or

14. A retaining wall, 3M high, supports a dry cohesion less back fill with a plane ground surface sloping up wards at a surcharge angle of 10 degree from the top of the wall. The back of the wall in inclined to the vertical at a positive batter angle of 8 degrees. The back fill weighs 18 kN per cum and has an angle of shearing resistance of 30 degrees. Assuming an angle of wall friction of 10 degrees, determine by Rebhann's method the total active pressure, and the pressure distribution.

15. Define settlement of soil. State the causes for settlement. Discuss different types of settlement. Suggest methods to reduce settlement.

Or

16. A strip footing 1.20 M wide is located at a depth of 1.5 M in a non cohesive soil deposit for which the corrected N value of SPT is 20. water table is located at a depth of 2 M below the ground surface. Find the allowable bearing pressure for the soil.

17. State the data required and procedure for design of foundation for the three story building.

Or

18. A soft normally consolidated clay layer is 6M thick with natural content of 30 %. The clay has a saturated unit weight of 17.40kN/cum, a specific gravity of 2.60 and liquid limit 40 %. The ground water level is at the surface of the clay. Determine the settlement of foundation if the foundation load will subject to the centre of the clay layer to a vertical stress increase of 8kN/sqm.

19. Explain the classification of piles based on materials and composition. Describe the pile driving procedure.

Or

20. In a 16 pile group, the pile diameter is 450 mm and centre to centre spacing of the square group is 1.5 M. If C = 50 kN/sqm, determine whether the failure would occur with the pile acting individually or as a group ? Neglect bearing at the top of the pile. All piles are 8M long. Take M equals 0.7 for shear mobilization around the pile.

(5 × 12 = 60 marks)

G 5381 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2017

Sixth Semester

Branch : Civil Engineering

CE 010 604—TRANSPORTATION ENGINEERING—I (CE)

(New Scheme—2010 Admission onwards)

[Regular/Improvement/Supplementary]

Time : Three Hours Maximum : 100 Marks

Part A

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

1. What are the different types of curves ?
2. What do you understand about tongue rails ?
3. Name the different types of sections in tunnel.
4. Classify harbours.
5. Write down the functions of dock.

(5 × 3 = 15 marks)

Part B

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

6. Why is coning of wheels necessary in Railways with sketch.
7. Distinguish between ATC and CTC.
8. Write short notes on tunnel lining.
9. Name the forces acting on the break water.
10. What is the use of slip ways ?

(5 × 5 = 25 marks)

Part C

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

11. Discuss merits and demerits in Highway and Railway.

Or

Turn over

12. Write short notes on :

    (a) Wear and creep of rails. (6 marks)

    (b) Cant deficiency. (6 marks)

13. What are the types of signaling systems in railways and discuss briefly ?

Or

14. Write briefly on principles of track circuiting.

15. Explain about selection of route of tunneling and tunnel surveying.

Or

16. What is the necessity of tunnel and discuss about the methods of tunnel ?

17. What are the features in Harbour and explain it ?

Or

18. Discuss the requirements of Harbour.

19. Short notes on :

    (a) Grapple dredger.

    (b) Ladder dredger.

    (c) Hydraulic dredger.

Or

20. Discuss about different types of Docks.

[5 × 12 = 60 marks]

G 5396 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2017

Sixth Semester

Branch : Civil Engineering

CE 010 605 – WATER RESOURCES ENGINEERING [CE]

(New Scheme – 2010 Admission onwards)

[Regular/Improvement/Supplementary]

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions.*

Each question carries 3 *marks.*

1. Write the environmental effects of irrigation.
2. What are the factors affecting the runoff ?
3. What do you mean by specific yield ?
4. What are the requirements of a good distribution system ?
5. What are the methods to control flood ?

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*

Each question carries 5 *marks.*

6. Explain about the system of irrigation.
7. Explain in detail the various types of rain gauges.
8. With help of neat sketch, explain the infiltration galleries.
9. Derive the Lacey's theory.
10. Define : Water logging. Explain its control measures.

(5 × 5 = 25 marks)

Part C

Answer **all** *the questions.*

Each question carries 12 *marks.*

11. Explain in detail about water requirement for crop.

Or

12. The base period, intensity of irrigation and duty of various crops under a canal system are given below :

Crop	Base period (days)	Duty at the field (hectare/cumec)	Area under the crop (hectares)
Wheat	120	1800	4800
Sugarcane	360	800	5600
Cotton	200	1400	2400
Rice	120	900	3200
Vegetables	120	700	1400

Find the reservoir capacity if the canal losses are 20% and reservoir losses is 12%.

13. With help of neat diagram, explain the types of rain gauges with merits and demerits.

Or

14. What is a hydrograph? Draw a single peaked hydrograph and explain its components.

15. State Dupit's assumptions for obtaining general equations governing ground water flow. Derive an expression for the confined aquifer. How can the expression be used to evaluate the aquifer permeability?

Or

16. Differentiate between shallow well and deep well. Define and explain the importance of 'cavity formation' in such wells and compare the possible yields from both these types of wells.

17. What is meant by canal? Explain the classification of canal and their alignment.

Or

18. Derive and expression for Kennedy's theory and its demerits.

19. Describe various types of river training and protection works.

Or

20. Explain with sketches the (i) Denehy's groyne ; (ii) Marginal bunds. What consideration determine the length of both?

(5 × 12 = 60 marks)

G 5418 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2017

Sixth Semester

Branch : Civil Engineering

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

(New Scheme – 2010 Admission onwards)

[Regular/Improvement/Supplementary]

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions.*

Each question carries 3 *marks.*

1. State and explain the physical properties of cement.
2. Explain bleeding in concrete.
3. Define water cement ratio.
4. Explain flexural strength of concrete.
5. Discuss cold weather concreting.

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*

Each question carries 5 *marks.*

6. Explain the structure of hydrated cement paste.
7. Write a brief note on damp proofing agents.
8. Explain gain of strength of concrete with age.
9. Discuss action of organic acids in concrete.
10. Write brief note on ferro cement.

(5 × 5 = 25 marks)

Turn over

Part C

Answer **all** *questions.*

Each question carries 12 *marks.*

11. Explain the significance and structure of transition zone in concrete.

Or

12. Define flakiness index and elongation index for aggregates. Explain the procedure to determine flakiness index and elongation index.

13. Explain the process of curing in concrete. Discuss different methods of curing.

Or

14. Explain the process of manufacturing concrete.

15. Define modulus of elasticity of concrete. Discuss the factors affecting modulus of elasticity of concrete.

Or

16. Explain creep and shrinkage in concrete. Discuss the factors affecting creep and shrinkage in concrete.

17. Explain the concept of concrete mix design. Explain IS method of concrete mix design.

Or

18. Discuss non destructive testing of concrete.

19. Explain polymer cement concrete. Discuss the manufacturing, properties and applications of polymer cement concrete.

Or

20. Explain sulphur infiltrated concrete. Discuss the properties and applications.

(5 × 12 = 60 marks)

17. Derive the strain compatibility equations in three dimensional case.

Or

18. Explain Airy's stress functions. Investigate whether the polynomial $\phi = Axy + Bxy^3$ is permissible as an Airy's stress function.

19. State D'Alembert's principle. Derive the equation of motion for free vibration of SDOF system and hence obtain the expression for amplitude of motion

Or

20. Determine the natural frequency of the system shown in Fig.7. A weight of 500 N is suspended from a cantilever beam AB, through a spring of stiffness 30N/cm. The beam is 2.5 cm wide and 0.5 cm deep and of span lm. Take $E = 2 \times 10^5$ MP*a*.

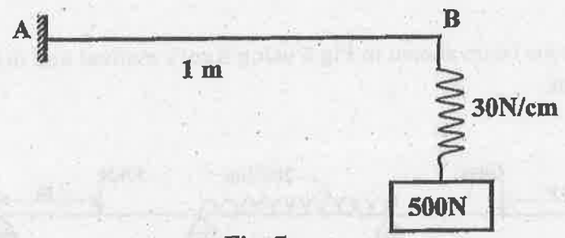

Fig. 7

[5 × 12 = 60 marks]

G 5367 **(Pages : 4)** **Reg. No.....**

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2017

Sixth Semester

Branch : Civil Engineering

CE 010 603—STRUCTURAL ANALYSIS—II (CE)

(New Scheme—2010 Admission onwards)

[Regular/Improvement/Supplementary]

Time : Three Hours Maximum : 100 Marks

Part A

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

1. Define plastic hinge and plastic moment.
2. What are the assumptions made in portal method of analysis ?
3. What is meant by statically indeterminate structures ?
4. Explain the concept of principal stresses and principal planes.
5. Write the mathematical expressions for equivalent stiffness of springs in parallel and springs in series.

(5 × 3 = 15 marks)

Part B

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

6. Explain various types of collapse mechanisms in structures.
7. What are substitute frames ? Explain with sketches the critical load positions for maximum positive and negative moments in beams.
8. What is meant by influence lines ? What are the uses of influence line diagrams ?
9. Differentiate between plane stress and plane strain problems.
10. What are the practical situations where dynamic analysis has to be used ? Discuss.

(5 × 5 = 25 marks)

Turn over

Part C

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

11. Find the required value of plastic moment capacity in the continuous beam shown in Fig. 1. The loads shown are collapse loads.

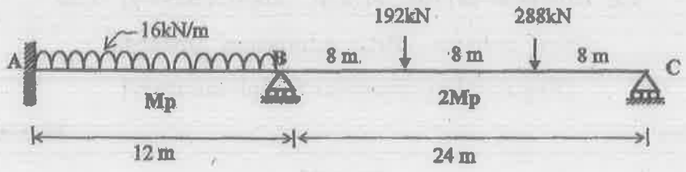

Fig. 1

Or

12. Determine the collapse load for the frame shown in Fig.2.

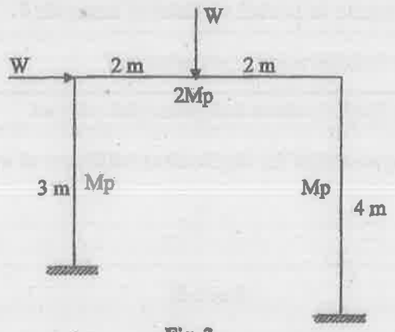

Fig. 2

13. Analyse the building frame shown in Fig.3 using cantilever method and draw the bending moment diagrams. All the columns have the same area of cross section.

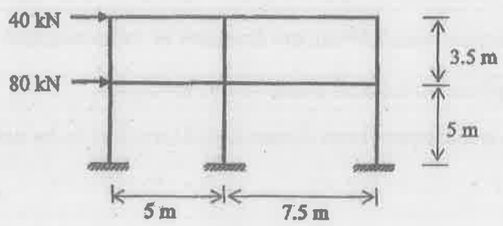

Fig. 3

Or

14. Fig.4 shows the plan of a tripod. The feet A, B and C are in the same horizontal plane and the apex D is 3.75m above the plane. Horizontal loads are applied at D as shown. Using the method of tension coefficients, find the forces in all the members.

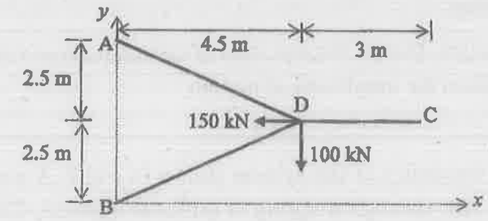

Fig. 4

15. Analyse the continuous beam shown in Fig.5 using Kani's method and draw the bending moment diagram. EI constant.

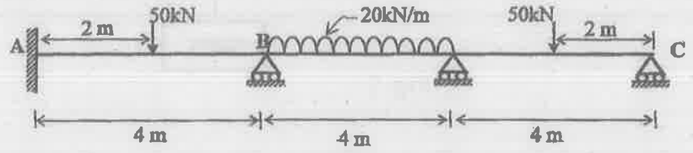

Fig. 5

Or

16. Draw the influence line diagram for bending moment at the midpoint D of span BC for the continuous beam ABC shown in Fig.6.

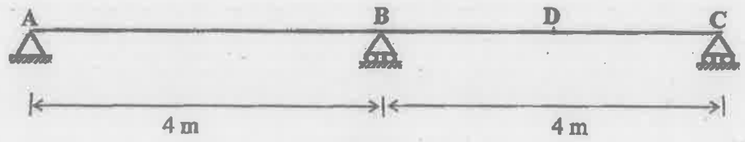

Fig. 6