F 4760 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2015

Third Semester

Branch : Civil Engineering

CE 010 306—ENGINEERING GEOLOGY (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. List the various subdivisions of Geology.
2. What do you understand by the term "earthquake" ?
3. Explain the term "metamorphic" as applied in rocks.
4. What are folds ? How do they originate ?
5. What do you understand by silting of reservoir ?

(5 × 3 = 15 marks)

Part B

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

6. Distinguish clearly between mechanical weathering and chemical weathering. Give examples.
7. Explain the tectonic movements and their significance.
8. Discuss processes of formation of minerals in nature. Which group of minerals is the most common in occurrence ?
9. What are the general geological characteristics of the area that must be known before a tunnel project is decided in that area ?
10. Discuss the mode of occurrence and methods of flow of subsurface water.

(5 × 5 = 25 marks)

Turn over

Part C

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

11. Give an account of physical and engineering properties of soil. Outline specific engineering problems expected to be encountered in :

    (i) Aeolian soils. (ii) Glacial soils.

    (iii) Black cotton soil. (iv) Laterititic soils.

    How do engineers overcome them ?

Or

12. Describe the geological work of oceans and seas. Discuss the different land forms, features produced by the geological work of oceans and seas. What are the shore line control problems and measures to be taken ?

13. Write descriptive notes on :

    (i) Plate Tectonics.

    (ii) Asthenosphere.

Or

14. Describe the geological effects of earthquakes. What means are to be adopted in the construction of buildings in earthquake areas ?

15. Give an account of the mode of origin and consolidation of igneous magmas. How are igneous rocks classified ? Give their features.

Or

16. Give a classification of the sedimentary rocks on the basis of the mode of formation. Describe the sedimentary rocks, which are used as building stones.

17. Explain, with the help of neat sketches, principal types of faults as recognized on the basis of (i) apparent movement ; (ii) actual movement ; and (iii) mode of occurrence.

Or

18. Write descriptive notes on :

    (i) Master joints ; (ii) Columnar jointing ; and (iii) Angular unconformity.

19. Discuss the geological factors, which should be taken into account inselecting sites for dams.

Or

20. What is meant by the term "water table" ? Illustrate by sketches the geological conditions favourable for the accumulation of underground water supplies.

(5 × 12 = 60 marks)

F 4727 (Pages : 3) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2015

Third Semester

Branch : Civil Engineering

CE 010 303—FLUID MECHANICS (CE)

(New Scheme—2010 Admission onwards)

[Regular/Improvement/Supplementary]

Time : Three Hours Maximum : 100 Marks

Answer should be supported by sketches wherever necessary.
Assume missing data suitably.

Part A

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

1. What is the difference between dynamic viscosity and kinematic viscosity ? State their unit of measurement.
2. Define stream line, path line and streak line.
3. Distinguish between orifice and mouthpiece.
4. What is a Siphon ?
5. State Buckingham's π-theorem.

(5 × 3 = 15 marks)

Part B

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

6. Distinguish between Manometers and Mechanical gauges. What are different types of mechanical gauges ?
7. What is flownet ? Mention the uses and limitation of flow net.
8. Explain the classification of orifices.
9. What do you mean by equivalent pipe ? Obtain an expression for equivalent pipe.
10. What do you mean by dimensionless numbers ? Name any four dimensionless numbers.

(5 × 5 = 25 marks)

Turn over

Part C

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

11. (a) Find the magnitude and direction of the resultant force due to water acting on a roller gate of cylindrical form of 4 m. diameter, when the gate is placed on the dam in such a way that water is just going to spill. Take the length of gate as 8 m.

Or

(b) (i) A pipe contains an oil of sp.gr. 0.8. A differential manometer connected that the two points A and B of the pipe shows a difference in mercury level as 200 mm. Find the difference of pressure in the pipe.

(8 marks)

(ii) A certain liquid has a dynamic viscosity of 0.073 poise and specific gravity 0.87. Compute the kinematic viscosity of the liquid in $m.^2/s$.

(4 marks)

12. (a) (i) Write a brief note on vorticity. (4 marks)

(ii) A wooden cylinder of diameter 2.0 m. and length 4.0 m. floats in water with its axis vertical. Is the equilibrium stable ? Locate the metacentre with reference to the water surface. Take specific gravity of wood as 0.6.

(8 marks)

Or

(b) If for a two-dimensional potential flow, the velocity potential is given by $\phi = x(2y - 1)$. Determine the velocity at the point P (4, 5). Determine also the value of stream function ϕ at the point P.

13. (a) A horizontal venturimeter with inlet and throat diameters 300 mm. and 150 mm. respectively is used to measure the flow of water. The reading of differential manometer connected to inlet and throat is 100 mm. mercury. Determine the rate of flow. Take $C_d = 0.98$.

Or

(b) The water is flowing through a taper pipe of length 100 m. having diameter 600 mm. at the upper end and 300 mm. at the lower end, at the rate of 50 litre/s. The pipe has a slope of 1 in 30. Find the pressure at the lower end if the pressure at the higher level is 19.62×10^4 N/m^2.

14. (a) Two tanks are connected with the help of two pipes in series. The lengths of the pipes are 1000 m. and 800 m. whereas the diameters are 400 mm. and 200 mm. respectively. The coefficient of friction of both the pipes is 0.008. The difference of water level in the two tanks is 15 m. Find the rate of flow of water through the pipes, considering all losses. Also draw the total energy line and hydraulic gradient line.

Or

(b) (i) What do you understand by turbulent flow ? What factor decides the type of flow in pipes ?

(4 marks)

(ii) A pipe of diameter 300 mm. and length 3500 m. is used for the transmission of power by water. The total head at the inlet of pipe is 500 m. Find the maximum power available at the outlet of the pipe. If the value of $f = 0.006$.

(8 marks)

15. (a) A 1:15 model of a flying boat is towed through water. The prototype is moving in sea-water of density 1024 $kg./m^3$ at a velocity of 20 m/s. Find the corresponding speed of the model. Also determine the resistance due to waves on model if the resistance due to waves of prototype is 600 N.

Or

(b) Find an expression for the drag force on a smooth sphere of diameter D, moving with a uniform velocity V in a fluid of density ρ and dynamic viscosity μ.

[5 × 12 = 60 marks]

F 4737 (Pages : 3) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2015

Third Semester

Branch : Civil Engineering

CE 010 304—MECHANICS OF SOLIDS—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. Define Saint Venant's principle.
2. Sketch and define an overhanging beam.
3. What is neutral axis ?
4. Define shear flow.
5. What is the importance of slenderness ratio ?

(5 × 3 = 15 marks)

Part B

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

6. Derive an expression for strain in a bar of uniform taper.
7. If the bending moment M_x for a particular portion of beam with x varying from 1 to 2 m. is given by $M_x = 2 - 2x$ kN-m, where x is in m, find the expression for shear force. What is the intensity of loading ?
8. State all the assumptions made in deriving flexure formula for symmetrical bending.
9. What are the various stresses occurring in a shaft and their significance ?
10. What are the important assumptions in Euler's formula for columns ?

(5 × 5 = 25 marks)

Turn over

Part C

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

11. A boiler shell is subjected to tensile principal stresses of P, P/2 and zero. Calculate the normal and shear stress components on plane perpendicular to the plane of zero stress and making an angle of 30° with the plane on which the principal stress P is acting.

Or

12. Two steel plates each 25 mm. thick are riveted together forming a lap joint by using 25 mm. diameter steel rivets. Before placing the rivets in drilled holes, they are heated to 60° C., and then heads formed. Find the gripping force exerted by each rivet on the plates when the assembly has cooled down to room temperature of 20° C. Assume that plates do not deform.

13. A beam 20 m. long is simply supported with overhangs of 2 m. at the left end and 'a' m at the right side. The beam carries a concentrated load of 5 'W' at the extreme left end with uniformly distributed load of 'W'/metre run over whole of the beam. Find the value of 'a' in order that bending moment is zero at the mid-point of the beam. Hence, draw bending moment and shear force diagrams taking 'W' = 10 kN.

Or

14. A horizontal cantilever 60 cm. long fixed at left end carries over the whole of length a U.V.L. varying from intensity of zero at free end to an intensity of 1 kN/m. at the fixed end. An anticlockwise bending couple of 0.5 kN-m is applied at the free end. Draw the shear force and bending moment diagrams.

15. A C.I. inverted T-section beam is designed in such a way that it is subjected to a maximum tensile stress equal to one-third of the maximum compressive stress. The beam is subjected to pure sagging bending moment. The thickness of both flange and web is 25 mm. and depth of beam is 10 cm. Find suitable width of flange.

Or

16. A beam of angle cross-section 12 cm. × 12 cm. × 0.3 cm. is placed in such a way that it is symmetrically placed about a horizontal plane. The beam is loaded through elastic axis. If shear force at a section is 5 kN, draw shear stress and shear flow distribution diagrams.

17. Compare the weights of equal lengths of a hollow shaft and a solid shaft of same material to transmit same torque for the same maximum shear stress if the inside diameter is 0.6 times the outside diameter of the hollow shaft.

Or

18. A 75 mm. diameter shaft is subjected to a maximum bending moment of 400 Nm and a torque of 300 Nm. Determine equivalent torque, equivalent bending moment, maximum shear stress and maximum normal stress in the shaft.

19. A short column of rectangular cross-section 25 cm. × 20 cm. is loaded with a compressive load of 800 kN applied eccentrically normal to the X-section. The load is 5 cm. from the longer side and 10 cm. from the smaller side. Calculate the maximum tensile and compressive stresses in the column.

Or

20. A round bar 1.5 m. long deflects 10 mm. under a load of 300 N at its free end when used as a cantilever. Find Euler's crippling load when used as strut with both ends pinned.

(5 × 12 = 60 marks)

F 4749 ℨ

(Pages : 3)

Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2015

Third Semester

Branch : Civil Engineering

CE 010 305—SURVEYING—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. Define magnetic declination and dip.
2. What are the different methods for locating contour ?
3. What is the purpose of an analytic lens ?
4. Write two precautionary steps to be taken, while using a planimeter.
5. Enlist the methods employed for setting out a simple curve by linear method.

(5 × 3 = 15 marks)

Part B

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

6. Briefly explain the tracing paper method for the solution of three point problem.
7. Find the distance to the visible horizon and the dip of the horizon if the height at which the observer stands on top of a tower, is 80 m. Take the diameter of earth as 12740 km.
8. If the bearings of two adjacent lines are missing, explain how they can be determined ?
9. Explain how the capacity of reservoirs are calculated.
10. What is a reverse curve ? Explain the situations in which it is used.

(5 × 5 = 25 marks)

Turn over

Part C

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

11. The whole circle bearings of the lines of a closed traverse are given below. Determine which stations, if any, are affected by local attraction and correct the bearings by calculating the included angles :

PQ : 41° 20′	QP : 221° 20′
QR : 114° 30′	RQ : 293° 50′
RS : 164° 40′	SR : 346° 20′
SP : 275° 30′	PS : 94° 30′

Or

12. (a) Explain the various accessories used in plane table surveying with neat sketches. (6 marks)

(b) Explain the procedure for evaluating missing quantities in a closed traverse. (6 marks)

13. The following ten readings were taken with a level, the instrument being shifted after the fifth and eighth readings :

1.315, 0.965, – 2.345, 1.105, 0.875, 1.155, 1.305, 1.675, 1.345 and 1.875.

The R.L. of the first turning point is 100.000. Find the reduced levels of the remaining points by the height of collimation method.

Or

14. Two stations P and Q were on either side of a river 1200 m. apart. The instrument was kept near P and the readings on the staff at P and Q were 1.701 and 2.427 respectively. The instrument was then shifted to Q and the readings on the staff held at P and Q were 0.805 and 1.285 respectively. If the reduced that of P was 203.135, find the R.L. of Q.

15. Explain the methods of measuring horizontal angles with a theodlite.

Or

16. A tacheometer was kept at a station P and observations were made to a staff held vertically at Q. The cross hair readings were 1.835, 1.92 and 3.755. The vertical angle of depression was 8° 06′. From the same set up, the reading on a staff held at a BM of RL 962.55 was 2.035 m. Find the horizontal distance PQ and the RL of point Q. Take K = 100, C = 0.

17. The offsets (in meters) taken from a chain line to a curved boundary are given below :

Chainage	0	5	10	15	20	25	35	45	55	65
Offset	2.5	3.8	8.4	7.6	10.5	9.3	5.8	7.8	6.9	8.4

Find the area between the chain line, the first and last offsets and the boundary by :

(i) Trapezoidal rule ; and

(ii) Simpson's rule.

Or

18. Calculate the volume of the embankment of which cross-sectional area at 25 m. intervals are as follows :

Chainage (m)	0	25	50	75	100	125	150
Area ($m.^2$)	11	40	48	68	118	141	172

using (i) Trapezoidal rule ; and (ii) Prismoidal rule.

19. The curve of radius 420 m. is to be set out by offset from the long chord. The deflection angle is 60°. Tabulate the offsets from the tangent point at 20 m. intervals for half the curve.

Or

20. Two straight roads intersect at a deflection angle of 60°30′ at chainage 3030 m. The maximum speed of vehicles is 120 kmph. The centrifugal ratio is 1/4 and the rate of change of radial acceleration is to be 0.3 m/s. Design the transition and circular curves and find the chainages of points at the beginning and end of the curves.

[5 × 12 = 60 marks]