F 2991 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, DECEMBER 2012

Third Semester

Branch : Civil Engineering

CE 010 305—SURVEYING—I (CE)

(New Scheme—Regular/Improvement/Supplementary)

Time : Three Hours Maximum : 100 Marks

Answer **all** *questions.*

Part A

Each question carries 3 *marks.*

1. Distinguish between true and magnetic bearing.
2. Explain dip and declination.
3. What is meant by degree of curve ?
4. What are the sources of errors in levelling ?
5. What are the uses of contour ?

(5 × 3 = 15 marks)

Part B

Each question carries 5 *marks.*

6. The bearing of one side of a regular pentagon is 52°14′. Find the bearings of other sides.
7. Prove that reciprocal levelling eliminates all errors in levelling operation.
8. What are the fundamental lines of throdolite ? State the desired relationship between these axes.
9. Explain the concept of zero circle in planimeter.
10. The chainage at the point of intersection of the tangents to a railway curve is 3876 links and the angle between them is 124°. Find the chainage and the beginning and end of the curve if it is 40 chains radius.

(5 × 5 = 25 marks)

Part C

Each question carries 12 *marks.*

11. The following angles were measured in clockwise directions in an open traverse :

$\angle ABC = 124°15'$, $\angle BCD = 156°30'$, $\angle CDE = 102°01'$, $\angle DEF = 95°15'$, $\angle EFG = 215°45'$.

The bearing of line AB was 241°31′. What would be the bearing of line FG ?

Or

12. What is meant by the point problem ? How is it solved ?

Turn over

13. How would you make the vertical axis truly vertical in levelling instrument ?

Or

14. What are the various methods of interpolating contours ? State the suitability of each one of them.

15. Describe the method of repetition and restoration for horizontal angle measurement in theodolite.

Or

16. Following observations were taken from two traverse station by means of a tacheometer fitted with anallatic lens. The constant of the instrument was 100. Compute the length and gradient of the line ST :

Inst. station	*Staff station*	*Ht. of inst. M*	*WCB*	*Vert. ∠le*	*Staff reading*
P	S	1.31	226°30′	+10°12′	0.765, 1.595, 2.425
Q	T	1.42	84°45′	– 12°30′	0.820, 1.840, 2.860

Co-ordinates of the station P are 215.3 N and 190.00 W, co-ordinates of station Q are 105.8 N and 99.7 W. Assume P and Q to be at same level.

17. The following readings were obtained when the perimeter of a figure was traversed clockwise with the anchor point outside and with the tracing arm set to the natural state (M = 100 sq.cm.) The zero mark of the disc passed the fixed index mark once in the clockwise direction I.R. = 9.625, F.R. = 1.224. Calculate the area of the frequency.

Or

18. State and prove the Simpson's rule for computation of area.

19. A compound railway curve ABC is to have the radius of the AB 600 metres and that of the BC 400 metres. The intersection point V of the straights is located, and the intersection angle is observed to be 35°6′. If the arc AB is to have a length of 200 metres, calculate the tangent distances VA and VC.

Or

20. (a) What is meant by Degree of curve, normal chord, subchord tangent distance, deflection angle, intersection point ?

(b) What are the problems encountered in setting out reverse curve ?

(5 × 12 = 60 marks)

F 2970 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, DECEMBER 2012

Third Semester

Branch—Common to all Branches

EN 010 302—ECONOMICS AND COMMUNICATION SKILLS

[AI, AN, AU, CE, CS, EC, EE, EI, IC, IT, ME, PE and PO]

(New Scheme—Regular/Improvement/ Supplementary)

Time : Three Hours Maximum : 100 Marks

Part A

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

1. What are the functions of stock markets ?
2. Mention any *six* MNC's working in India.
3. What do you mean by progressive and regressive taxes ?
4. What are the difficulties in estimating national income ?
5. What do you mean by BOP ?

(5 × 3 = 15 marks)

Part B

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

6. Explain the credit control system of RBI.
7. Comment on LPG (Liberalisation, Privatisation and Globalisation).
8. What are the major functions of taxation system ?
9. Explain the major causes of inflation in a country.
10. Comment on the impact of WTO decisions on Indian industries.

(5 × 5 = 25 marks)

Part C

Answer any one **full** *question.*
Each question carries 12 *marks.*

11. Explain the role of National banks for the agriculture and rural development.

Or

12. Banker's bank of India is RBI. Explain.

Turn over

13. Comment on the effects of MNC's in growth of India.

Or

14. The growth of IT industry is essential for India. Explain the reasons.

15. The major source of a nation is taxation system. Give reasons.

Or

16. Write notes on (a) Direct and indirect taxes ; (b) Tax evasion ; and (c) Deficit financing.

17. Explain the methods of estimating National Income.

Or

18. What are the measures of controlling inflations ? Explain.

19. Explain the causes of disequilibrium in India's Balance of payments (BOP).

Or

20. Comment on the effects TRIPS and TRIMS in the Indian economy.

(5 × 12 = 60 marks)

F 3000 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, DECEMBER 2012

Third Semester

Branch : Civil Engineering

CE 010 306—ENGINEERING GEOLOGY (CE)

(New Scheme—Regular/Improvement/Supplementary)

Time : Three Hours Maximum : 100 Marks

Answer **all** *questions.*

Part A

Each question carries 3 *marks.*

1. Explain meanderings and ox-bow lake.
2. Define plate tectonics.
3. Write textures and mineralogical composition of Granite.
4. Define dip and strike.
5. What is a landslide ?

(5 × 3 = 15 marks)

Part B

Each question carries 5 *marks.*

6. Explain marine erosional and depositional features.
7. Earthquake resistant structures.
8. Write physical properties of Feldspars.
9. Describe formation of folds.
10. Explain different aquifers.

(5 × 5 = 25 marks)

Part C

Each question carries 12 *marks.*

11. Define weathering. Discuss the process of weathering and its products.

Or

12. Briefy describe geological work of rivers with erosional and depositional land forms. Add a note on its engineering significance.

13. Describe interior constitution of the earth. Give an account of benioff zone and transform faults.

Or

14. Discuss the causes and effects of earthquakes. Describe different classification of earthquakes. Add a note on Intensity and Magnitude and earthquakes.

Turn over

15. Write various physical properties of the minerals with examples.

Or

16. Describe in detail the distinguishing features of igneous, sedimentary and metamorphic rocks.

17. Briefly describe the classification of faults. Add a note on recognition of fold and fault or the field.

Or

18. What is a joint ? Explain the classification of joints. Add a note on unconformities.

19. Discuss the causes responsible for landslides. Write the classification of landslides. Explain the preventive measures to control the landslides.

Or

20. Explain the importance of geological investigation for Dam construction. Describe various geological factors that may cause trouble in the construction of a dam.

(5 × 12 = 60 marks)

F 2968 (Pages : 3) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, DECEMBER 2012

Third Semester

Branch : Common to all Branches except CS and IT

EN 010 301-A—ENGINEERING MATHEMATICS—II

(CE, ME EE, AU, AN, EC, AI, EI, IC, PE AND PO)

[New Scheme—Regular/Improvement/Supplementary]

Time : Three Hours Maximum : 100 Marks

Part A

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

1. Evaluate grad $\left(\frac{1}{r}\right)$ where $r = |\bar{r}|$ and $\bar{r} = x\bar{i} + y\bar{j} + z\bar{k}$.
2. If R is a region bounded by a simple closed curve C, then using Greens theorem show that the area of R is given by $\frac{1}{2}\oint_c [xdy - ydx]$.
3. Prove that $\Delta \log f(x) = \log\{1 + \Delta f(x)\}$.
4. What is numerical differentiation ? Explain.
5. Find $Z\{\sin(3n+5)\}$.

(5 × 3 = 15 marks)

Part B

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

6. If $\bar{f} = xyz\bar{i} + 3x^2y\bar{j} + (xz^2 - y^2z)\bar{k}$ find div $\bar{f}$ and curl $\bar{f}$ at (1, 2, 3).
7. If $\bar{F} = (3x^2 + 6y)\bar{i} - 14yz\bar{j} + 20xz^2\bar{k}$ evaluate $\int_C \bar{F} \cdot d\bar{r}$ from (0, 0, 0) to (1, 1, 1) along the path $x = t, y = t^2$ and $z = t^3$.
8. Prove that : (a) $E^{1/2} - \frac{1}{2}f - \mu = 0$ and (b) $\Delta = \frac{1}{2}f^2 + f\sqrt{1 + \frac{f^2}{4}}$.

Turn over

9. Solve $y_{x+2} - 4yx = 9x^2$.

10. Prove that $Z\left\{\frac{1}{n}\right\} = z\log\frac{z}{z-1}$.

(5 × 5 = 25 marks)

Part C

Answer any **one** *full question from each module.*
Each full question carries 12 *marks.*

Module I

11. (a) Find the directional derivative of $\phi(x,y,z) = 4xz^3 - 3x^2yz^2$ at (2, –1, 2) along the z-axis.

(5 marks)

(b) Prove that $\text{div}\{\bar{f} \times \bar{g}\} = \bar{g} \cdot (\text{curl}\,\bar{f}) - \bar{f} \cdot (\text{curl}\,\bar{g})$.

(7 marks)

Or

12. (a) Prove that $\bar{f} = (2x + yz)\bar{i} + (4y + zx)\bar{j} - (6z - xy)\bar{k}$ is both solenoidal and irrotational. Also find the scalar potential of $\bar{f}$.

(7 marks)

(b) Prove that $\nabla^2\left\{\nabla \cdot \left(\frac{\bar{r}}{r^2}\right)\right\} = 2r^{-4}$.

(5 marks)

Module II

13. Verify Stoke's theorem for $\bar{F} = y\bar{i} + z\bar{j} + x\bar{k}$, where S is the upper half surface of the sphere $x^2 + y^2 + z^2 = 1$ and C its boundary.

(12 marks)

Or

14. Verify divergence theorem for $\bar{F} = 4xz\bar{i} - y^2\bar{j} + yz\bar{k}$ and S is the cube bounded by $x = 0, x = 1, y = 0, y = 1, z = 0$ and $z = 1$.

(12 marks)

Module III

15. Find y_{32} given y_{20} = 14.035, y_{25} = 13.674, y_{30} = 13.257, y_{35} = 12.734, y_{40} = 12.089 and y_{45} = 11.309.

(12 marks)

Or

16. Using Lagrange's interpolation formula obtain the polynomial from the following data :

x	:	0	1	3	4
y	:	–12	2	6	12

Hence determine y when x = 2 and x = 5.

(12 marks)

Module IV

17. From the following data find dy/dx and d^2y/dx^2 at x = 1.5.

x	:	1.0	1.1	1.2	1.3	1.4
y	:	43.1	47.7	52.1	56.4	60.8

(12 marks)

Or

18. Determine the value of $\int_0^1 e^{-x^2}dx$ correct to four places of decimals using Simpson's rule with h = 0.1.

(12 marks)

Module V

19. Using the inversion integral method find the inverse z transform of :

$$\frac{z(2z-1)}{2(z-1)\left(z+\frac{1}{2}\right)}.$$

(12 marks)

Or

20. Using z-transform solve $u_{n+2} - 2u_{n+1} + u_n = 3_{n+5}$.

(12 marks)

[5 × 12 = 60 marks]

F 2974 (Pages : 3) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, DECEMBER 2012

Third Semester

Branch : Civil Engineering

CE 010 303—FLUID MECHANICS (CE)

(New Scheme—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. Differentiate between Absolute and gauge pressure.
2. Define the terms : (i) Forced Vortex Flow ; (ii) Free Vortex Flow.
3. What is a Cippoletti Weir ?
4. Define the terms : Drag and lift.
5. Explain the term "Dimensionally homogeneous Equation".

(5 × 3 = 15 marks)

Part B

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

6. Calculate the pressure due to a column of 0.50 m of (a) water ; (b) An oil of specific gravity 0.9 ; and (c) mercury of specific gravity 13.6. Take density of water $\rho = 1000$ kg/m^3.
7. Describe the use and limitation of flow nets.
8. Discuss "end contraction" of a weir.
9. What is a compound pipe ? How would you determine the equivalent size of a compound pipe.
10. What do you mean by repeating variables ? How are the repeating variable selected for dimensional analysis ?

(5 × 5 = 25 marks)

Part C

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

11. (a) (i) If 5 m^3 of a certain oil weighs 50 kN, culculate the specific weight, mass density and specific gravity of this oil. (4 marks)

Turn over

(ii) A circular plate 2.5 m diameter is immersed in water, its greatest and least depth below the free surface being 3 m and 1 m respectively. Find (a) The total pressure on one face of the plate ; and (b) The position of the centre of pressure. (8 marks)

Or

(b) (i) Differentiate between simple and differential type manometers. (3 marks)

(ii) Determine the viscosity of a liquid having kinematic viscosity 7.5 stokes and specific gravity 1.5. (3 marks)

(iii) The pressure intensity at a point in a fluid is given by 6.5 N/cm^2. Find the depth of the point if the fluid is having a specific gravity of 0.9. (6 marks)

12. (a) An open circular cylinder of 150 mm diameter and 1 m long contains water upto a height of 700 mm. Find the speed at which the cylinder is to be rotated about its vertical axis. So that the axial depth becomes zero. (12 marks)

Or

(b) A rectangular pontoon 10.0 m long, 7.0 m broad and 2.5 m deep weights 650 KN. It carries on its upper deck an empty boiler of 5.0 m diameter weighing 550 kN. The centre of gravity of the boiler and pontoon are at their respectively centres along a vertical line. Find the meta centric height. Take weight density of sea water as 10.104 kN/m^3. (12 marks)

13. (a) (i) Define "Veena Contracta". Explain how is it developed. (4 marks)

(ii) Find the discharge over a rectangular weir of length 100 m. The head of water over the weir is 2.0 m. The velocity of approach is given as 0.5 m/s. Take $C_d = 0.62$. (8 marks)

Or

(b) (i) What is a venturimeter ? Derive an expression for the discharge through venturimeter. (8 marks)

(ii) Define Continuity Equation and Bernoulli's Equation. (4 marks)

14. (a) (i) What is a syphon ? On what principle it works. (4 marks)

(ii) Derive an expression for Hagen Poiseuille's formula. (8 marks)

Or

(b) Two reservoirs are connected by a pipe line of diameter 600 mm and length 4 km. The difference of water level in the reservoir is 20 m. At a distance of 1000 m from the upper reservoir, a small pipe is connected to the pipe line. The water can be taken from the small pipe. Find the discharge to the lower reservoir. If,

(i) No water is taken from the small pipe.

(ii) 100 litres/s of water is taken from small pipe. Take $f = 0.005$ and neglect minor losses. (12 marks)

15. (a) A model of a submarine of scale 1/40 is tested in a wind tunnel. Find the speed of air in wind tunnel if the speed of submarine in sea water is 15 m/s. Also find the ratio of the resistance between the model and its prototype. Take the values of kinematic viscosities for sea water and of air are given as 1030 kg/m^3 and 1.24 kg/m^3 respectively. (12 marks)

Or

(b) The resistance R to the motion of completely submerged body depends upon the length of the body L; velocity of flow 'V', mass density of fluid 'ρ' and kinematic viscosity of fluid 'ν'. By dimensional analysis prove that $R = \rho V^2 L^2 \phi\left(\frac{VL}{\nu}\right)$. (12 marks)

[5 × 12 = 60 marks]

F 2981 (Pages : 3) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, DECEMBER 2012

Third Semester

Civil Engineering

CE 010 304—MECHANICS OF SOLIDS—I (CE)

(New Scheme—Regular/Improvement/Supplementary)

Time : Three Hours Maximum : 100 Marks

Part A

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

1. Explain Hooke's law.
2. Explain neutral axis and neutral plane.
3. Write short note on beams of uniform strength.
4. Give equations for Euler's critical load for columns with different end conditions.
5. Differentiate thin cylinder and thick cylinder with respect to thickness and stresses.

(5 × 3 = 15 marks)

Part B

Each question carries 5 *marks.*

6. Show that for a rectangular section the distribution of shear-stress is parabolic.
7. Draw the shear force and bending moment diagram for a simply supported beam subjected to a moment M at midspan.
8. Derive the simple torsion formula for circular sections.
9. What is buckling or critical load ? Derive the Rankine's formula for crippling load.
10. Prove that no shear stress acts on principal planes.

(5 × 5 = 25 marks)

Part C

Each question carries 12 *marks.*

11. Two vertical rods of steel and copper are rigidly fixed with the ceiling at their upper-end at 1000 mm apart. Each rod is 3 m long and 25 mm diameter. A horizontal cross-piece connects the lower-ends of the rods. Where should a load of 35 kN be placed on the cross-piece so that it remains horizontal after being loaded. Take $E_S = 2 \times 10^5$ N/mm^2 $E_{copper} = 1 \times 10^5$ N/mm^2.

Or

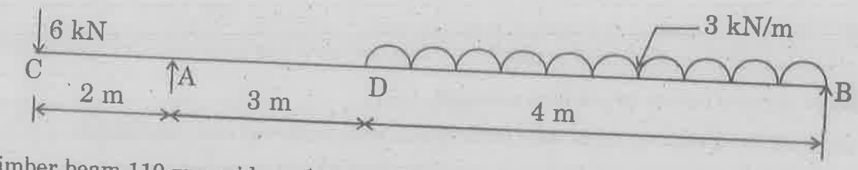
Turn over

12. A point in a strained element consists of normal stresses of 200 N/mm^2 (tensile) and 100 N/mm^2 (tensile) on two mutually perpendicular planes together with a shear stress of 50 N/mm^2. With the help of Mohr's circle, determine the principal planes and principal stresses and the stresses on an oblique plane inclined at 30° with the plane of 200 N/mm^2 tensile stress. Also find the maximum shear stress.

13. A simply supported beam AB, 8 m long carrying a point load 3 kN at 2 m from A and a point load 2 kN at 5 m from A and a uniform distributed load of 2 kN/m between the point loads. Determine the position and magnitude of maximum bending moment. Draw S.F. and B.M. diagrams.

Or

14. Draw the shear force and bending moment diagrams for the beam shown in figure. Locate the point of contraflexure if any.



15. A timber beam 110 mm wide and 220 mm deep is strengthened by two steel plates 110 mm wide and 20 mm thick at top and bottom of the timber section. Find the moment of resistance of the section. Allowable stress in timber = 7N/mm^2 $E_S = 20\ E_{timber}$.

Or

16. For a given maximum allowable bending stress, compare the moments of resistance of a beam of square cross-section (a) when it is placed with its two sides horizontal ; (b) when it is placed with its diagonal horizontal.

17. A hollow steel shaft having internal diameter half the external diameter transmits 145 kW at 225 r.p.m. If maximum allowable shear stress is not to exceed 60N/mm^2 and angle of twist is not to exceed 1° in length of 20 times external diameter. Select a suitable section of shaft assuming G as 1×10^5 N/mm^2.

Or

18. A compound cylinder is formed by shrinking one cylinder on the another. The internal and external radius of the compound cylinder are 150 mm and 240 mm respectively. At the junction the radius is 210 mm. If after shrinking on, the radial pressure at the junction is 4N/mm^2, calculate the loop stress across the section of the inner and outer cylinder.

19. A hollow circular column 2 m long has one of its end fixed and other end free and has to support an axial load of 520 kN. The internal diameter is 0.8 times the external diameter. Allowing a factor safety of 4, calculate the external diameter and thickness of the metal. Use Rankine's formula.

Take f_c=340 N/mm^2 and $\alpha = \frac{1}{7500}$.

Or

20. A short column of internal diameter 400 mm and internal diameter 200 mm carries an eccentric load of 80 kN at an eccentricity of 150 mm.

(a) Find the maximum and minimum stresses in the section. (b) Find the greatest eccentricity which the load can have without producing tension on the section.

(5 × 12 = 60 marks)