END TERM EXAMINATION

THIRD SEMESTER [B.TECH.] DECEMBER-2012

Paper Code: ETCE201.	Subject: Structural Analysis
Time : 3 Hours	Maximum Marks :75

**Note: Attempt five questions including Q.no. 1 which is compulsory.
Select one question from each unit. Assume suitable missing data if any.**

Q1. (a) List all theories of failure and explain any one with suitable example.   (5x5=25)

(b) State Betti's law, Castigliano's first and second theorem and write their applications.

(c) Write torsion equation and assumptions made in torsion equation.

(d) An I-section beam 340mm x 200mm has a web thickness of 10mm and flange thickness of 20mm. It carries a shearing force of 100kN. Sketch the shear stress distribution across the section.

(e) A circular shaft of 10cm diameter is subjected to a torque of 8×10^3 Nm. Determine the maximum shear stress and the consequent principal stresses induced in the shaft.

UNIT – I

Q2. (a) Draw the Mohr's stress circle for direct stresses of 65 MN/M^2 (tensile) and 35MN/m^2 (compressive) and estimate the magnitude and direction of the resultant stresses on planes making angles of 20^0 and 65^0 with the plane of the first principal stress. Find also the normal and tangential stresses on these planes.   (6)

(b) A flat steel plate of trapezoidal form of uniform thickness of 20mm tapers uniformly from a width of 100mm to 200mm in a length of 800mm. If an axial tensile force of 100kN is applied at each end, find the elongation of the plate. Take, E=205 GN/m^2.

(6.5)

OR

Q3. (a) Derive relation between Young's modulus (E) and modulus of rigidity (C).   (5)

(b) A bar of steel is 60mm x 60mm in section and 180mm long. It is subjected to a tensile load of 300kN along the longitudinal axis and tensile loads of 750kN and 600kN on the lateral faces. Find the change in the dimensions of the bar and the change in volume. Take: E=200GN/m^2, and Poission's ratio (μ) = 0.3   (7.5)

UNIT-II

Q4. (a) Write assumptions in simple theory of bending and derive Bending equation.   (6)

(b) Three beams have the same length, the same allowable stress and the same bending-moment. The cross-sections of the beams are a square, a rectangle with depth twice the width and a circle. Determine the ratios of weights of the circular and the rectangular beams with respect to the square beam.

(6.5)

OR

Q5. A girder, 12m long rests on two supports with equal overhang on either side and carries a u.d.l. of 0.5kN/m over the entire length. Calculate the overhang if maximum bending moment, positive or negative is to be as small as possible. Draw the S.F. and B.M. diagrams. Also locate points of contraflexure.

(12.5)

P.T.O.

UNIT III

Q6. A 1.5m long horizontal cantilever, tapers in section from 200mm deep by 75mm wide at the fixed end to 75mm square at the extreme end. It carries a load of 2.7 kN. Calculate the deflection of the free end. Take Young's Modulus $E=14\times10^6$ kN/m²

(12.5)

OR

Q7. A long flat strip 50mm wide and 3.2mm thick is lying on a flat horizontal plane. One end of the strip is now lifted 25mm from the plane by a vertical force applied at the end. The strip is so long that other end remains undisturbed. Calculate the maximum stress in the steel. Take : Weight of strip = 7800 kg/m³, and E=205 GN/m².

(12.5)

UNIT IV

Q8. (a) Compare the strength of solid and hollow shafts when both the shafts have same length, material, same weight and same maximum shear stress.

(b) Define torsional resilience. Two shafts are of length I and outside diameter D, the first one is solid while the second one is hollow with inside diameter D/2. What is the ratio of strain energies that two steel shafts can absorb without exceeding the allowable shear stress?

(6)

(6.5)

OR

Q9. A truss of 12m span is loaded as shown in fig. below. Find nature and magnitude of the forces in the members of the truss.

(12.5)
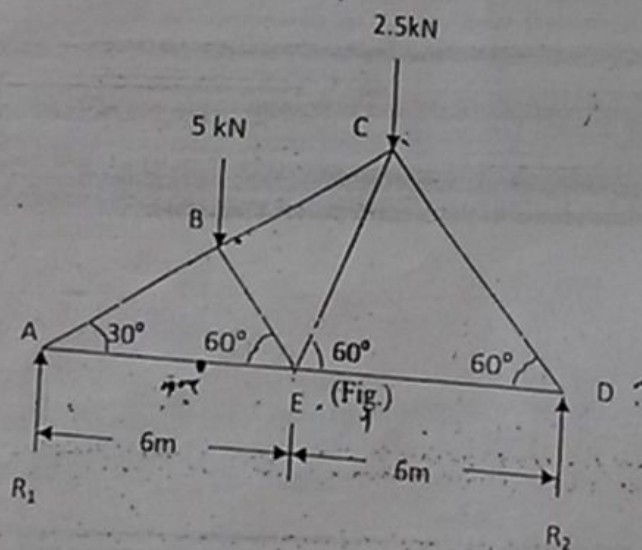
$$R_B \times 12 : 5 \times 1.5 \overset{********}{=} 3.579$$

$$= 23.5 + 22.5$$

$$2.5 - 3.75$$
$$= 3.75$$

$$= \frac{+5}{12}$$

$$6.75$$

ETCE 20)-2/2

END TERM EXAMINATION

THIRD SEMESTER [B.TECH.]– DECEMBER 2009

Paper Code: ETCE-201

Paper ID: 34201

Subject: Structural Analysis

Time : 3 Hours

Maximum Marks :75

Note: Q.No.1 is compulsory. Attempt one question from each unit.

Q.1 (a) Brief about simple strain. (1.5)

(b) A concrete cylinder of 150 mm diameter and 300 mm height is loaded with 80 KN load. If the cylinder contracts by 0.5 mm determine the average strain over a normal cross-section and the compressive strain. (2.5)

(c) Brief the construction of Mohr's circle when principal stresses are given. (3)

(d) A simply supposed beam AB is loaded with a triangular load as shown in fig 1(d). Draw shear and bending moment diagrams. (3)
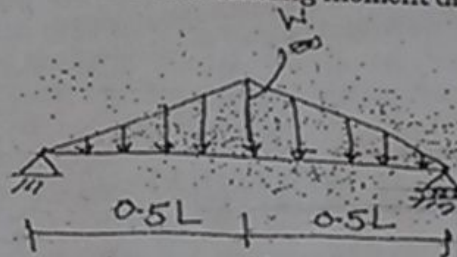
(e) What are the assumptions and limitations in the flexture formula? (3)

(f) Briefly comment on the moment area method and conjugate beam method. (3)

(g) State Betti's theorem, Castigliano's first and second theorem. (3)

(h) Brief are assumptions made for deriving the torsion formula. (3)

(i) With suitable example show just rigid and over rigid trusses. (3)

UNIT-I

Q.2 (a) A flat steel plate is a trapezoidal form of uniform thickness of 10 mm and tapers uniformly from a width of 50 mm to 100mm in a length of 400 mm. Determine the elongation of the plate under an axial force of 50 KN at each end, Take $E = 2.05 \times 10^5$ N/mm². (6)

(b) A composite bar made up of aluminum and steel is held between two supports as shown in fig 2(b). The bars are stress free at a temperature of 40°C. What will be the stresses in the two bars when the temperature drops to 20°C if the supports are unyielding? (6.5)

Take $E_a = 0.7 \times 10^5$ N/mm²

$E_s = 2.1 \times 10^5$ N/mm²

$\alpha_s = 23.4 \times 10^{-6}$/°C

$\alpha_a = 11.7 \times 10^{-6}$/°C

The cross sectional area of steel bar is 2 cm² and that of aluminum bar is 3cm².
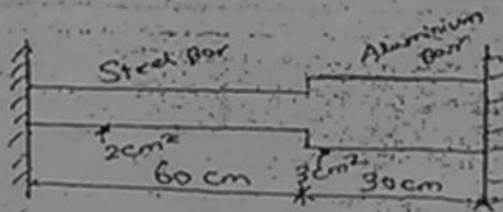
Fig 2(b)

P.T.O.

OR

Q.2 (a) Draw the Mohr stress circle for direct stresses of 60N/mm² (tensile) and 40 N/mm²(comp) and estimate the magnitude and direction of the resultant stresses on planes making angles of 25° and 70° with the plane of the first principal stress. Find also the normal and tangential stresses on these planes. (5)

(b) At a certain cross-section of a shaft 100 mm in diameter there is a bending moment of 5 KN-m and a twisting moment of 7.5 KN-m. Calculate the maximum direct stress induced in the section and specify the position of the plane on which its acts. If Poisson's ratio is 0.3, Find the stress which, acting alone, will produce the same maximum (i) strain ((ii) strain energy. (7.5)

UNIT-II

Q.3 (a) A simply supported beam of span 'L' is loaded with a triangular load with intensity zero at one end to w/unit length at the other end. Plot the bending moment and shear force diagram indicating principal values. (7)

Fig 3(a)
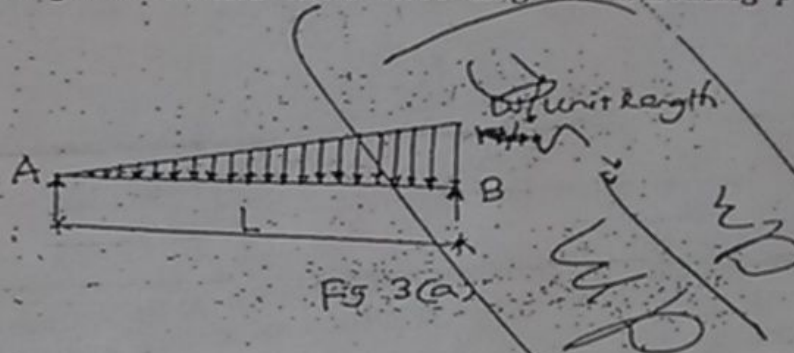
(b) Derive the relationship between bending moment and shear force. (5.5)

OR

Q.3 (a) What are the assumptions made in the theory of simple bending. (4)

(b) (i) A T-beam has a cross-section as shown in fig 3 b(i). It has span of 5 m. If the maximum permissible stress is 150 MPa, find the maximum uniformly distributed load it can safely carry.
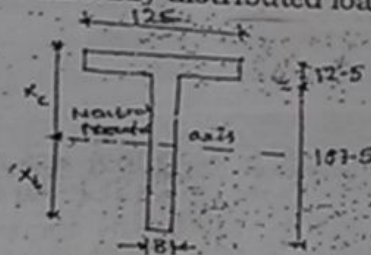

Fig 3(b)(i) T-section mm

(ii) If this section is used as a cantilever beam of 2m span as shown in fig. 3 b(ii), find the point load which can be safely placed at its tip. (8.5)

Fig 3 b(ii)

UNIT-III
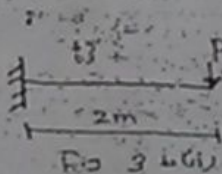
Q.4   Determine the slopes at A and D and the deflections at C and D by conjugate beam method for the overhanging beam as shown in fig 4(a). E = 2 x 10⁵ N/mm², I = 2 x 10⁷mm⁴   (12.5)

$$E = 2 \times 10^5 \ N/mm^2, \quad I = 2 \times 10^7 mm^4$$

Fig 4

OR
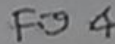
Q.4   State and prove castigliano's first and second theorems.   (12.5)

Unit — IV

Q.5   (a)   A solid circular shaft 200 mm in diameter is to be replaced by a hollow shaft the ratio of external diameter to internal diameter being 5:3. Determine the size of the hollow shaft if maximum shear stress is to be same as that of a solid shaft. Also find the percentage economy in mass.   (7.5)

       (b)   A straight rectangular steal bar, 40 mm wide by 20 mm deep and 500mm long, is subjected to a pure torque of 250 Nm. Calculate the maximum shear stress set up and the angle of twist, taking G = 0.8 x 10⁵ N/mm².   (5)

OR

Q.5   (a)   Briefly discuss the methods available for analyzing a truss.   (4)
       (b)   Analyse the truss shown in fig 5(b).   (8.5)

Fig 5(b)

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END TERM EXAMINATION

THIRD SEMESTER [B.TECH] DECEMBER 2010

Paper Code: ETCE201	Subject: Structural Analysis-I
Time : 3 Hours	Maximum Marks :75

Note: Attempt five questions. Graph paper is required.

Q1 (a) Express 2.0GN/m² in N/mm² units. [3]
(b) What is the deformation in a metal bar, hanging freely along the vertical axis, under its own weight? Total weight of the bar=W, Length of the bar=L, Youngs modulus of elasticity=E. [3]
(c) Distinguish between centre of gravity and centroid. [3]
(d) Explain the term redundant frame. [3]
(e) Draw the shear force and bending moment diagram for a simply supported beam loaded as shown in fig.1. [4]
(f) Sketch the distribution of shear stress over a T-section shown in fig.2. [3]
(g) In what form is a fixed end of the actual beam? [3]
(h) The polar modulus for a solid shaft is $\frac{\pi D^3}{16}$. What is the polar modulus for a hollow shaft? [3]

UNIT-I

Q2 A steel tube of 32mm external diameter and 20mm internal diameter encloses a copper rod of 16mm diameter, to which it is rigidly joined at each end, at a temperature of 10°C, when there is no longitudinal stress. Calculate the stresses in the rod and the tube when the temperature is raised to 200°C. E_s=2.1x10⁵MN/m², α_s=11x10⁻⁶/°C, E_c=1x10⁵MN/m², α_c=18x10⁻⁶/°C. [12.5]

OR

Two steel rods and one copper rod, each of 20mm diameter, together support a load of 200kN as shown in fig.3. Find the stresses in the rods. E_s=205GN/m², E_c=110GN/m². [12.5]

UNIT-II

Q3 A simply supported beam of span 4m is loaded as shown in fig.4.
(a) Determine the maximum tensile and compressive stresses at a section 2.2m from the left support. [10]
(b) Calculate the section modulus. [2.5]

OR

A timber beam 150mmx200mm is to be reinforced by bolting on two steel flitches: 150x12.5mm² each. Calculate the moment of resistance when-[12.5]
(a) The flitches are attached at the top and bottom.
(b) The flitches are attached symmetrically at the sides. $f_{t\,max}$=6N/mm², find $f_{s\,max}$ in each case, E_s=2x10⁵N/mm², E_t=1x10⁴N/mm².

UNIT-III

Q4 Determine θ_A, θ_B y_A and y_B for the cantilever beam loaded as shown in fig.5 using Macaulay's method E=2x10⁵N/mm², I=2x10⁸mm⁴. [12.5]

OR

Determine θ_A, θ_B, θ_D and y_{max} for the beam loaded as shown in fig.6 using conjugate beam method. E=2x10⁵N/mm², I=1.5x10⁸mm⁴. [12.5]

P.T.O.

UNIT-IV

Q5. A solid shaft of 19cm diameter has the same cross-sectional area as a hollow shaft of the same material with inside diameter of 14cm.

(a) Find the ratio of horse powers transmitted by the two shafts at the same angular velocity. (6)

(b) Compute the angles of twist in equal lengths of these shafts, when stressed to the same intensity. (6.5)

OR

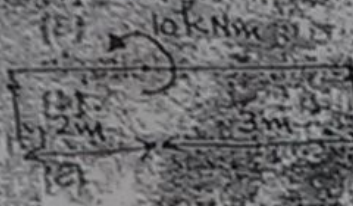Determine the nature and magnitude of the forces in the members of the trusses shown in fig 7. (12.5)
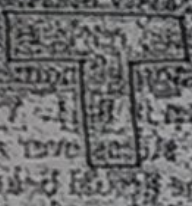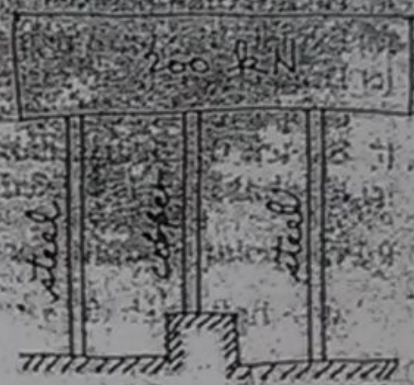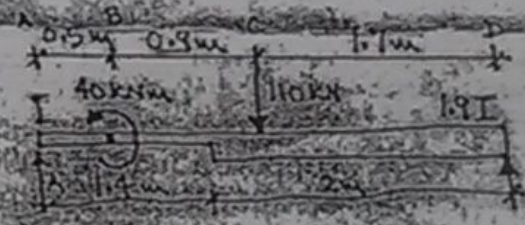

Fig 1

Fig 2

Fig 3

Fig 4
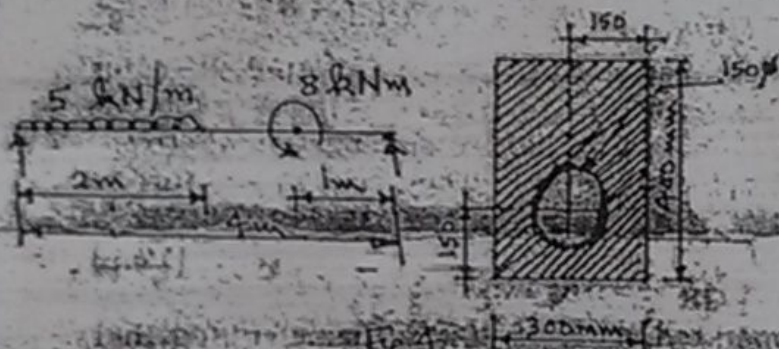
Fig 5

Fig 6
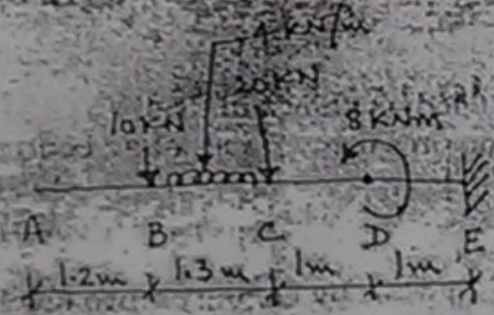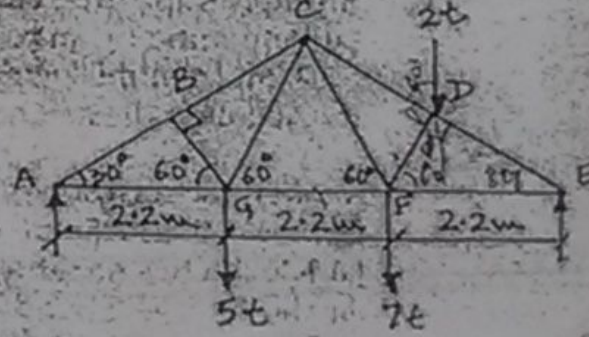
Fig 7

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III SEM **END TERM EXAMINATION**

16/

THIRD SEMESTER [B. TECH.] DECEMBER-2012

Paper Code: ETCE205   Subject: Fluid Mechanics & Hydraulics

Time : 3 Hours

Maximum Marks :75

Note: Attempt five questions including Q.no. 1 which is compulsory.
Select one question from each unit.

Q1. Attempt **any five** of the following:-

(5x5=25)

(a) (i) What is meta centre and how stability of floating body is associated with metacentric height?

(ii) Explain stability conditions of floating and submerged bodies.

(b) (i) What is flow net? Write its limitations.

(ii) Draw flow net for flow through reservoir to channel.

(c) Write limitations of Bernoulli's theorem.

(d) Explain hydraulic gradient and total energy line and their engineering significance.

(e) Derive expression for force exerted by a jet on stationary inclined plate.

(f) Prove that $\frac{\partial \psi}{\partial y} = -u$ and $\frac{\partial \psi}{\partial x} = v$.

UNIT - I

Q2. (a) (i) Define total pressure and centre of pressure.

(ii) Classify manometers.   (6) —

(b) 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 the gate as 8m.   (6.5)

OR

Q3. (a) Obtain an expression for the Bulk modulus of Elasticity K of a Fluid in terms of Pressure P and the mass density ρ.   (2.5)

(b) A caisson for closing the entrance to a dry dock is of trapezoidal form 16m wide at the top and 10m wide at the bottom and 6m deep. Find the total pressure and centre of pressure on the caisson if the water on the outside is just level with the top and dock is empty.   (10)

UNIT-II

Q4. (a) Explain Linear translation, Linear deformation, Angular deformation, Rotation with neat sketches. (6)

(b) An open circular cylinder of 15 cm diameter and 100 cm long contains water upto a height of 80 cm. Find the maximum speed at which the cylinder is to be rotated about its vertical axis so that no water spills.   (6.5)

OR

Q5. (a) Define stream line, path line and streakline with neat sketches.   (5)

(b) Derive continuity equation in polar coordinate system.   (7.5)

P.T.O.

UNIT III

Q.6 (a) Explain siphon with neat sketch. (4)

(b) A 300mm x 150mm venturimeter is fitted in a 300mm diameter pipe which is set at 30° to the horizontal Distance between the throat and inlet is 1m and oil of specific gravity 0.8 flows through the pipe. Pressure gauges connected at inlet and throat read 150 kPa and 75 kPa respectively. If $C_d = 0.98$, find the flow rate in m³/s and in lpm. Oil flows up the inclined venturimeter.
If a mercury differential manometer is fitted between the inlet and throat, what would be its deflection. (8.5)

OR

Q.7 (a) Derive Expression for discharge through Cipolletti weir, (6)

(b) The water is flowing through a pipe having diameters 20cm and 10cm at section 1 and 2 respectively. The rate of flow through pipe is 35 litres/s. The section 1 is 6m above datum and section 2 is 4m above the datum. If the pressure at section 1 is 39.24 N/cm², find the intensity of pressure at section 2. (6.5)

UNIT IV

Q.8 (a) State Buckingham's π theorem. Write method of selection of repeating variables. (5)

(b) A pipe of diameter 1.5 m is required to transport an oil of sp. gr. 0.90 and viscosity 3×10^{-2} poise at the rate of 3000 litre/s. Tests were conducted on a 15 cm diameter pipe using water at 20°C. Find the velocity and rate of flow in the model. Viscosity of water at 20°C=0.01 Poise. (7.5)

OR

Q.9 (a) Define and Explain Reynold's no., Froude's no., Mach's no. and Weber's no. and derive expression for these dimensionless no. (6)

(b) The efficiency η of a fan depends on density ρ. Dynamic viscosity μ of fluid, angular velocity ω, diameter D of the rotor and the discharge Q. Express η in terms of dimensionless parameters. (6.5)

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END TERM EXAMINATION

THIRD SEMESTER [B. TECH.] DECEMBER 2010

Paper Code: ETCE205	Subject: Fluid Mechanics & Hydraulics
Time : 3 Hours	Maximum Marks :75

Note: Q.1 is compulsory. Attempt one question from each unit. Calculator is permitted.

Q1 Attempt any five of the following:-   [5x5=25]

(a) State Newton's Law of viscosity and give examples of its application. Also, comment on variation of viscosity with temperature.

(b) Differentiate between:-
  (i) Absolute and gauge pressure
  (ii) Simple manometer and differential manometer
  (iii) Piezometer and pressure gauges

(c) For a two dimensional potential flow, the velocity potential is given by $\phi = 4x(3y-4)$. Determine the velocity at the point (2,3).

(d) What is Euler's equation of motion? How will you obtain Bernoulli's equation from it?

(e) Explain the terms-
  (i) Dynamic viscosity and
  (ii) Kinematic viscosity. Give their S.I. and C.G.S. units.

(f) What do you understand by-
  (i) Hydrostatics Law
  (ii) Temperature Lapse Rate

UNIT-I

Q2 (a) Define surface tension. Prove that the relationship between surface tension and pressure inside a hollow bubble (both the surfaces in contact with air) is given by $P = \dfrac{8\sigma}{d}$.   [5]

(b) A 150mm diameter vertical cylinder rotates concentrically inside another cylinder of diameter 151mm. Both the cylinders are of 250mm height. The space between the cylinders is filled with a liquid of viscosity 10 poise. Determine the torque required to rotate the inner cylinder at 100 r.p.m. [7.5]

OR

Q3 (a) State and prove Pascal's Law.   [6]

(b) An inverted differential manometer containing an oil of sp.gravity 0.9 is connected to find the difference of pressures at two points of a pipe containing water. For the manometer readings shown in the figure, find the difference of pressure head between A and B. Also, write one advantage of using inverted differential manometer over simple U-Tube differential manometer.   [6.5]
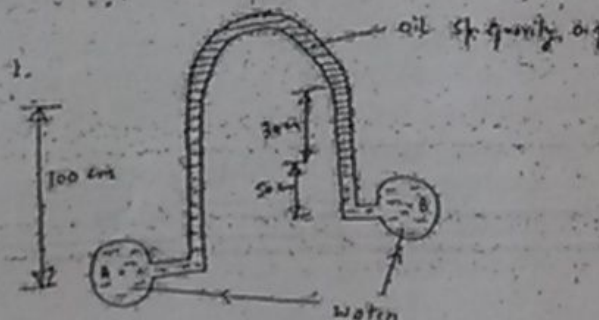
UNIT-II

Q4 (a) Define the term Hydrostatic Paradox.   [2]

(b) Derive an expression for the force exerted on a submerged vertical plane surface by the static liquid and locate the position of centre of pressure.   (4)

(c) Find the magnitude and direction of the resultant water pressure acting on a curved face of a dam which is shaped according to the relation $y = \dfrac{x^2}{4}$. The height of water retained by dam is 12m. Take width of dam as unity. (6.5)

OR

Q5 (a) Explain the term 'metacentre' and 'metacentric height' of a floating body. Also, write the expression for metacentric height. (5)

(b) A circular opening of 3m. diameter, in a vertical side of a tank is closed by a disc of 3m. diameter. Calculate the- (7.5)
   (i) Force on the disc.
   (ii) Torque required to maintain the disc in equilibrium in the vertical position when the head of water above the horizontal diameter is 6m.

UNIT-III

Q6 (a) Explain the terms (i) Path Line (ii) Streak Line (iii) Stream Line. (3)

(b) A 40cm diameter pipe, conveying water, branches into two pipes of diameter 30cm and 15cm respectively. If the average velocity in the 40cm pipe is 3m/s. Find-
   (i) The discharge in this pipe. (3)
   (ii) Determine the velocity in 15cm pipe if average velocity in 30cm diameter pipe is 2m/s.

(c) An oil of sp.gravity 0.8 is flowing through a venturimeter having inlet dia-meter 20cm and throat diameter 10cm. The oil mercury differential manometer shows a reading of 20cm. Calculate the discharge of oil through the horizontal venturimeter. Take $C_d=0.98$, specific gravity of mercury=13.6. (6.5)

OR

Q7 (a) What is a venturimeter? Derive an expression for the rate of flow of fluid through it. (6)

(b) A pipe of 20mm diameter conveying 20m³/s of water has a right angled bend in a horizontal plane. Find the resultant force exerted on the bend if the pressure at inlet and outlet of the bend are 23.525N/cm² and 22.544N/cm². (6.5)

UNIT-IV

Q8 (a) Define and explain Reynold's no., Froude's no. and Mach no.. Derive expressions for any above two numbers. (6)

(b) A vessel, cylindrical in shape and closed at the top and bottom, contains water upto a height of 90cm. The diameter of the vessel is 20cm and length of vessel is 130cm. the vessel is rotated at a speed of 600rpm. about its vertical axis. Find the height of paraboloid formed. (6.5)

OR

Q9 (a) A fluid of density ρ and viscosity μ, flows at an average velocity V through a circular pipe of diameter D. Show by dimensional analysis, that the shear stress at pipe wall is given by $\tau = \rho V^2 \phi\left[\dfrac{\rho V D}{\mu}\right]$ (6.5)

(b) (i) What do you understand by fundamental units and derived units? Give examples.
   (ii) State Buckingham's π theorem. (2)
   (iii) Explain the terms: distorted models and undistorted models. (2)

(2)

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END TERM EXAMINATION

THIRD SEMESTER [B.TECH]- DECEMBER 2009

Paper Code: ETCE-205

Subject: Fluid Mechanics and Hydraulics-I

Paper ID: 34205

Maximum Marks :75

Time : 3 Hours

Note: Q.No.I is compulsory. Attempt one question from each unit.

Q.1 (a) Draw a stress-strain relationship for the following fluids and discuss the behaviour of each fluid under an external shear force (i) An ideal Fluid (ii) A Newtonian Fluid (iii) Thinotropic Fluid and (iv) A plastic. (5)

(b) For the stream function of $\psi = 3x^2y - y^3$, calculate the velocity at a point (2, 3). (5)

(c) Describe briefly the Theoretical method of determination of the metacentric height of a floating object. (5)

(d) State and derive Bernoull's Theorem, mention clearly the assumptions underlying it. (5)

(e) What are the various methods of dimensional analysis to obtain functional relationship between various parameters affecting a physical phenomenon? Describe with an illustration. (5)

UNIT-I

Q.2 (a) Obtain an expression for the Bulk modulus of Elasticity "K" of a Fluid in terms of Pressure 'P' and the Mass Density "ρ". (2.5)

(b) A Cylindrical Gate of diameter 2.5 m retains two liquids on either side of it. The depth of Fluid at one side (of relative density of oil 0.9) of gate is 2.5 m and the another side of cylindrical gate of depth of fluid (Relative density of oil is 0.8) is 1.25 m. Estimate the resultant Fluid Force acting on unit length of the gate. (10)

OR

Q.3 (a) Define the terms Buoyancy, Meta centre and Metacentric height.(2.5)

(b) An Open Cylinder of 30 cm in diameter and 50 cm high is filled with water and rotated about its axis. Calculate the amount of water spilled when the speed of rotation is (i) 180 rpm and (ii) 240 rpm. (10)

UNIT-II

Q.4 (a) Differentiate between the Eulerian and Lagrangian method of representing Fluid motion. Also differentiate between a Free Vortex Flow and Forced Vortex Flow. (5)

(b) For the following flows, determine the components of rotation about the various axes (7.5)

(i) $\mu = xy^3z$, $\upsilon = -y^2z^2$, $w = yz^2 - \dfrac{y^3z^2}{2}$

(ii) $\mu = 3xy$, $\upsilon = \dfrac{3}{2}x^2 - \dfrac{3}{2}y^2$

OR

P.T.O.

Q.5 (a) What is meant by one-dimensional, two-dimensional and three-dimensional flows of fluid? (2.5)

(b) The velocity components in a two-dimensional flow field of an incompressible fluid are expressed as

$$u = \frac{y^3}{3} + 2x - x^2 y; \quad v = xy^2 - 2y - \frac{x^3}{3}.$$ (10)

(i) Show that these functions represent a possible case of an irrotational flow.

(ii) Obtain an expression for stream function ψ and velocity potential ϕ.

UNIT-III

Q.6 (a) State and derive Bernoullis Theorem, mentioning clearly the assumption underlying it. (4)

(b) A pipeline is 15 cm in diameter and is at an elevation of 100m at section 'A'. At section 'B' it is at an elevation of 107 m and has a diameter of 30 cm. When a discharge of 50 lit/s of water is passed through this pipe the pressure at section 'A' is observed to be 30 KPa. The energy loss in the pipe is 2m. Calculate the pressure at B when the flow is (i) From A to B and (ii) From B to A. (8.5)

OR

Q.7 (a) Define vena contracta. Why is so much importance attached to it?(2.5)

(b) A discharge of 100 lit/s is to be measured by Triangular notch of vertex angle 60°. What would be the head over the vertex of the notch? If the accuracy of reading of the head is 1 mm. what error in discharge can be expected at this level? Assume cd = 0.58. (10)

UNIT-IV

Q.8 (a) State Momentum equation and mention some of its Engineering applications. (3)

(b) A 7.5 cm diameter water jet having a velocity of 12 m/s impinges on a plane, smooth plate at an angle of 60° to the normal to the plate. What will be the impact force when (i) The plate is stationary and (ii) When the plate is moving in the direction of the jet at 6 m/s. Estimate the work done per unit time on the plate in each case. (9.5)

OR

Q.9 (a) Briefly explain Geometric, Kinematic and Dynamic similarities. (4)

(b) Estimate for a 1/20 model of a spillway (i) The prototype velocity corresponding to a model velocity of 1.5 m/s. (ii) The prototype discharge per unit width of 0.2 m³/s per metre. (iii) The pressure head in the prototype corresponding to a model of pressure head of 5 cm of mercury at a point. (8.5)

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END TERM EXAMINATION

THIRD SEMESTER [B.TECH] DECEMBER 2010

Paper Code: ETCE207	Subject: Geo-Informatics-I
Time : 3 Hours	Maximum Marks :75

Note: Attempt all five questions as per internal choice, indicated. Q.1 is compulsory.

Q1   (a) Explain the various types of errors and their sources.   (3)
     (b) Differentiate between prismatic and surveyor's compass.   (3)
     (c) Explain the two methods of orientation of plane table.   (3)
     (d) Explain the working of a hand level. How would you do leveling with a hand level?   (3)
     (e) List down the fundamental lines of a Theodolite.   (3)
     (f) What are the characteristics of contours?   (3)
     (g) Write short notes on Anallactic lens.   (3)
     (h) What are the various elements of simple curve? Explain with the help of neat sketch.   (4)

Q2   (a) List out the various obstacles in chaining.   (4.5)
     (b) The following continuously sloping ground at common interval of 20m: (8)
     0.385, 1.030, 1.925, 2.825, 0.625, 2.005, 3.110. The RL of 1st point was 200m. Calculate the RL of each point by rise and fall method. Calculate gradient of sloping ground. Draw the profile of ground.

OR

Q3   (a) A chain was tested before starting the survey and was found to be exactly 20m. At the end of the survey it was found to be 20.12m. Area of the plan of the field drawn to a scale 1cm=6m was 50.4cm. Find the true area of the field in m².   (4.5)
     (b) The following FB & BB were observed in a compass traverse. Find which of the stations are affected by local attraction and compute the correct bearing in tabular form?   (8)

Line	FB	BB
AB	38°30'	219°15'
BC	100°45'	278°30'
CD	25°45'	207°30'
DE	325°15'	145°15'
EA	190°30'	10°15'

Q4   (a) What are the temporary and permanent adjustment of theodolite? (4.5)
     (b) Define contours and describe the various methods to compute the volume of earth from contours with neat sketches.   (8)

OR

Q5   (a) Explain the methods of contouring.   (4.5)
     (b) Explain the various parts of vernier theodolite with the help of neat sketches.   (8)

Q6   (a) Derive the expression for distance and elevation for inclined sight when staff is held vertical.   (4.5)
     (b) Explain plane table surveying, its advantages, disadvantages and list of accessories used.   (8)

OR

P.T.O.

Q7   (a) Explain Three Point Problem. Explain its Bessel's graphical solution. (4.5)
     (b) The following data were obtained in a tacheometric survey. The staff
         was held vertical. Assume K=100 and C=0. Height of axis at
         instrument P was 1.562 and the RL of P was 130.0m.   (8)

Instrument at	Staff at	WCB	θ	Staff Reading		
P	Q	12º25'	0º0'	1.88	2.25	2.62
	R	60º45'	15º0'	1.83	2.15	2.47

         Determine the distance QR and the difference in elevation between Q
         and R.

Q8   (a) Explain the various methods used in base line measurement.   (4.5)
     (b) Tabulate the necessary data to set out a right handed simple circular
         curve of radius 250m connecting two straight having a point of
         intersection at a chain age 3450m by Rankine method. ($\Delta = 50º$ given)
         Assume peg interval as 20m.   (8)

                                   OR

Q9   (a) Explain the linear methods of setting out simple circular curves. (4.5)
     (b) A distance of 30m was set out with a steel tape on the top of two pegs
         i.e. A & B. The tape was in catenary under a pull of 160N and at a
         temperature of 25ºC. The top of peg B was 0.3m below A. Calculate
         AB and reduce it to mean sea level. Following data is given:-   (8)
         (i) Tape was standardized in catenary at 20ºC under 80N.
         (ii) Area of cross section of tape=3.5mm².
         (iii) Unit weight of material of tape=78.6KN/m³.
         (iv) Young's Modulus E=2x105N/mm2.
         (v) Coefficient of thermal expansion $\alpha = 11 \times 10^{-6} /º C$.
         (vi) Mean elevation of the base=163.8m.

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END TERM EXAMINATION

THIRD SEMESTER [B.TECH.]– DECEMBER 2009

Paper Code: ETCE-207   Subject: Geoinformatics
Paper ID: 34207

Time : 3 Hours   Maximum Marks :75

Note: Q.No.1 is compulsory. Internal choice is indicated.

Q.1 (a) A line was measured with a steel tape which was exactly 30 m long at 18°C and found to be 452.343 m. The temperature during measurement was 32°C. Find the true length of the line. Take co-efficient of expansion of the tape per °C = 0.0000117.   (3)

(b) Point out any five differences between surveyors and prismatic compass.   (2)

(c) A page from an old leveling book is shown below. Some reading not clearly decipherable. Compute the missing readings from the available data.   (3)

Staff Station	Back sight	Intermediate sight	Fore sight	Height collimation	Reduced levels	Remarks
A				101.605	100.000	BM
B		1.285				
C	1.305				100.620	
D					99.060	
E	2.135				99.940	
F			1.045			
G						

(d) Explain characteristic features of some of the electronic theodolites.   (3)

(e) Explain with neat sketches the characteristics of contours (ex. For a steeper slopes, for a pond, for a ridge).   (3)

(f) In a telescope the focal lengths of the objective and analectic lens are 22.5 and 11.25 respectively and the constant distance between these is 20 cm for a multiplier of 100. Determine the error that would occur in horizontal distance D when reading intercepts S also in m, with an error of 1/500 of a cm in the 0.175 cm interval between the sub tense lines.   (3)

(g) What do you understand by strength of fix? Explain with the help of neat sketches, the terms good fix, bad fix and failure of fix.   (3)

(h) In improving an existing railway curve by inserting transition curves 4 chains in length, 6 chains of the existing 25 chains radius curve are taken up at each end and replaced in part by curves of sharper radius. Determine the radius of the sharpened curves also the total centre line length of track to be relaid.   (3)

(i) Explain the basic concepts (law) and resolution in remote sensing.   (2)

Q.2 (a) Describe briefly the care and maintenance of a compass.   (3.5)

(b) The bearings observed at the stations of a closed traverse are given below. Check whether the bearings are correct. If not, correct the bearings by the methods of induced angles.   (9)

AB : 122° 15'   BA : 302° 15'
BC : 66° 00'   CB : 243° 45'
CD : 308° 15'   DC : 133° 00'
DA : 198° 00'   AD : 15° 30'

OR

P.T.O.

Q.3 (a) Explain other methods in leveling (fly, check, profile, cross-sectioning, reciprocal leveling). (4.5)

(b) Readings taken in order during a leveling work are given in table 2. Tabulate them suitably and find the reduced levels of all the points if the RL of the first point A is assumed to be 100.000. (8)

Staff station	A	B	C	D	E	F	G
BS	0.684		0.864			2.845	
IS		1.246		1.684	0.964		
FS			1.105			1.368	0.748

Table 2

Q.4 List the fundamental lines of a theodolite. Explain briefly the desired relationships between these lines and the effects if such relationships are not maintained. (12.5)

OR

Q.5 (a) Explain in detail with help of neat sketches, the uses of contours maps. (9)

(b) In the grid shown in fig (3-b), find the positions of the contour lines of deviation 100.2, 100.1 and 100.6m. (3.5)
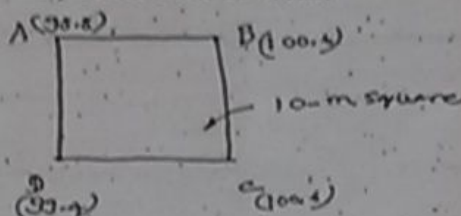

Fig 3-b

Q.6 (a) What are the common errors and mistakes encountered in tachometry? Explain the precautions to be taken to eliminate them. (8.5)

(b) The vertical angle of the line of sight to B from a tachometer kept at A was $8°30'$. The staff was supposed to be held vertical at B. The readings taken at the outer cross hairs were 2.385 m and 1.063m. It was found that the staff 4 m long, was kept out of plumb by 120 mm. Find the error in the horizontal distance calculated due to the non-verticality of the staff. (4)

OR

Q.7 (a) Explain the specific use at the accessories required for plane table surveying, with suitable sketches. (3.5)

(b) Enumerate the methods of plane tabling and state the conditions under which each one is preferred. (5.5)

(c) Describe the methods of orienting a plane table. (3.5)

Q.8 (a) Draw a neat sketch and show the various elements of a simple circular curve. (2.5)

(b) What is a transition curve and where it is used? (2.5)

(c) Two straight T_1P and PT_2 are intersected by a third line AB such that $\angle PAB = 46°24'$, $\angle PBA = 32°36'$ and distance AB = 312m. Calculate the radius of the simple circular curve which will be tangential to the three lines T_1P, AB and TP_2 and the chainage of the point of the curve (T_1) and point of tangency (T_2), if the chainage of the point P is 2857.5m. (7.5)

OR

Q.9 (a) Define remote sensing and illustrate with some example. (3)

(b) Describe briefly the arreal photographic method and the satellite-based method of remote sensing. (9.5)

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END TERM EXAMINATION

THIRD SEMESTER [B.TECH.] DECEMBER-2012

Paper Code: ETCE-209   Subject: Engineering Geology

Time : 3 Hours   Maximum Marks:75

Note: Attempt any five question including Q.No.1 which is compulsory. Attempt one question from each unit.

Q.1   Write down the short notes on the following:-
(a) Minerals in the Crust of the Earth   (3)
(b) Minerals in the Mantle of the Earth   (3)
(c) Minerals in the Core of the Earth   (3)
(d) Primary –Waves   (4)
(e) Secondary   (4)
(f) Igneous Rocks   (4)
(g) Metamorphic Rocks   (4)

UNIT-1

Q.2   (a) Discuss the Internal; Constitution of the Earth   (4)
(b) Discuss the difference between Mechanical and Chemical Weathering   (4.5)
(c) Discuss the Physical properties of Minerals   (4)

OR

Q.3   (a) Discuss Metallic and Non Metallic Minerals   (4.5)
(b) Discuss the properties of Aggregates   (4)
(c) Discuss the Physical properties of Rocks.   (4)

UNIT-2

Q.4   (a) Discuss with neat sketches about various types of Folds   (6)
(b) Discuss the Geometry and types of faults.   (6.5)

OR

Q.5   (a) Discuss Geometry of Folds with their significance in Civil Engineering.   (6)
(b) Discuss Step Fault and Radial Fault with their Civil Engineering Significance.   (6.5)

UNIT-3

Q.6   (a) Differtiate Between Sub Surface Water and ground water? Explain various type of geological formation as water bearing formation   (6)
(b) Explain the Unconfined and Confined aquifer system   (6.5)

OR

Q.7   (a) Discuss the Volcanic and Tectonic Earthquakes..   (6)
(b) Discuss the Earthquake Structures. Find out the relationship between Epicenter and Focus. Explain also the Surface and Boady Waves.   (6.5)

UNIT-4

Q.8   (a) Discuss the site investigation techniques of a Bridge using geological criterion.   (6)
(b) Discuss the site selection of Metro tunnel and compare between Hand Rock tunneling and soft Rock tunneling in Delhi.   (6.5)

OR

Q.9   (a) What is Land Subsidence? Discuss the prevention of a Land Settlement   (6)
(b) Discuss the site investigation of a High Way based on geology of the site. (5)

END TERM EXAMINATION

THIRD SEMESTER [B.TECH.] DECEMBER-2012

Paper Code: ETCE207   Subject: Geoinformatics-I

Time : 3 Hours   Maximum Marks :75

Note: Attempt five questions including Q.no.1 which is compulsory. Select one question from each unit.

Q1   Answer the following:-   (5x5=25)

(a) Explain various methods for determining the width of a river.

(b) What is Local attraction? How is it detected and eliminated?

(c) What are the different methods employed in a Tacheometric Survey? Describe any two methods most commonly used.

(d) Describe with the help of neat sketches the characteristics of Contours.

(e) Two straight lines AB and BC intersect at a chainage of 510.23m, the angle of intersection being 126°48'. The radius of the curve is 300m. Calculate all data necessary for setting out the curve by the method of offsets from the chord produced. Assume a peg interval of 30m.

UNIT-I

Q2 (a) What is field book? What kind of field book would you prefer and why? Explain the field procedure of Chain Survey.   (5.5)

(b) P and Q are two points 517m apart on the same bank of a river. The bearings of a tree on the other bank observed from P and Q are N33°40'E and N43°20'W respectively. Find the width of the river if the bearings of PQ are N78°E.   (7)

Q3 (a) Describe the various difficulties faced during the Levelling with neat sketches.   (6)

(b) A Levelling Instrument was set up exactly mid-way between two pegs A and B, 100m apart. The staff readings on A and B were 1.875 and 1.790 respectively. The instrument was then set up at a distance of 10m from A on the line AB. The respective staff readings were 1.630 and 1.560. Calculate the correct staff readings on A and B when the line of collimation is exactly horizontal.   (6.5)

UNIT-II

Q4 (a) Explain how you would take field observations with a theodolite so as to eliminate the following verniers:-

(i) Error due to eccentricity of verniers.   (6.5)

(ii) Error due to non-adjustment of line of sight.   (iii) Error due to slip.

(b) State what errors are eliminated by repetition method. How will you set out a horizontal angle by method of repetition?   (6)

Q5 (a) Describe various methods of Contouring. Also, explain with neat sketches, the uses of Contour maps.   (7)

(b) Discuss various methods of Interpolating the contours.   (5.5)

UNIT-III

Q6 (a) Explain how you would determine the constants of a Tacheometer.   (6)

(b) To find the RL of station B, two observations are taken by a theodolite from station A-one to a BM and the other to the station B. The records are as follows:-

Inst. Station	Staff station	Target	Vertical angle	Staff reading	Remarks
A	BM	Lower	-10°0'	0.665	R.L of BM=510.500m
		Upper	-7°0'	2.655	
B	B	Lower	-5°0'	1.250	
		Upper	+4°0'	3.200	

Find the RL of B and the distance between the BM and station B.   (6.5)

Q7 (a) Describe with the help of neat sketches, Lehman's Rules.   (6.5)

(b) What are the different sources of errors in plane tabling? How are they eliminated? (6)

UNIT-IV

Q8 (a) What is meant by the eccentricity of signal? How would you correct the observations when made upon an eccentric signal?   (6)

(b) What is meant by 'base net'? Explain how you would extent a Base Line?   (6.5)

Q9 (a) What are the common difficulties and methods employed in overcoming them in setting out a simple curves?   (6)

(b) A compound curve is to connect two straights having a deflection angle of 90°. As determined from the plan, the lengths of the two tangents are 350m and 400m respectively. Calculate the lengths of the two arcs if the radius of the first curve is to be 300 meters.   (6.5)

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END TERM EXAMINATION

THIRD SEMESTER [B.TECH.] DECEMBER 2010

Paper Code: ETCE209	Subject: Engineering Geology
Time : 3 Hours	Maximum Marks : 75

Note: Attempt any five questions including Q.1 which is compulsory. Attempt one question from each unit.

Q1 Write down the short notes on the following:-
- (a) Crust of the Earth (3)
- (b) Mantle of the Earth (3)
- (c) Core of the Earth (3)
- (d) Earthquake-waves (4)
- (e) Types of weathering (4)
- (f) Sedimentary rocks (4)
- (g) Criterion for Identification of minerals. (4)

UNIT-I

Q2 (a) Discuss the importance of Geology. (4)
(b) Discuss the difference between weathering and Erosion of rocks. (4.5)
(c) Discuss Mho's Scale of Hardness. (4)

OR

Q3 (a) Discuss internal constitution of Earth. (4.5)
(b) Discuss the properties of Building Stones. (4)
(c) Discuss Engineering properties of Rocks. (4)

UNIT-II

Q4 (a) Discuss with neat sketches about various types of Joints. (6)
(b) Discuss the geometrical classification of faults. (6.5)

OR

Q5 (a) Discuss types of Folds with their significance in Civil Engineering. (6)
(b) Discuss Normal Fault and Thrust Fault with their Civil Engineering significance. (6.5)

UNIT-III

Q6 (a) What is ground water? Explain various types of geological formation as water bearing formation. (6)
(b) Explain the role of ground water in Hydrologic cycle. (6.5)

OR

Q7 (a) Discuss the Earthquake classification. How the Earthquakes are related to Faults. (6)
(b) Discuss the Earthquake zooning in India. (6.5)

UNIT-IV

Q8 (a) Discuss the site investigation techniques of a dam using geological criterion. (6)
(b) Discuss the site selection of a tunnel and compare between Hand Rock tunneling and Soft Rock tunneling. (6.5)

OR

Q9 (a) What is Land Slide? Discuss the prevention of a landslide. (6)
(b) Discuss the site investigation of a building based on geology of the site. (6.5)

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CIVIL III Sem 12

END TERM EXAMINATION

THIRD SEMESTER [B.TECH.] DECEMBER 2009

Paper Code: ETCE-209   Subject: Engineering Geology
Paper ID: 34209   (Batch: 2007-2008)

Time : 3 Hours   Maximum Marks :75

Note: Attempt five questions in all. Q.No.1 is compulsory. Attempt one question from each unit.

Q.1 Briefly explain the following terms: -
- (a) Building and Ornamental stone (4)
- (b) Products of weathering (4)
- (c) Faults, folds and joints in rocks (4)
- (d) Hot water springs (4)
- (e) Quality of ground water (3)
- (f) Types of land slides (3)
- (g) Purposes for tunneling (3)

UNIT-I

Q.2 (a) Draw and label the various parts of an interior of Earth? (4)
- (b) Write down various classification of rocks? (4)
- (c) What is soil-profile? Draw its x-section and label its various layers? (4.5)

OR

Q.3 (a) Explain in detail the physical properties of minerals? (4)
- (b) Explain in detail an erosion by running water, winds and glaciers. (6)
- (c) How do soils are formed? (2.5)

UNIT-II

Q.4 (a) What is the importance of faults, folds and joints in rocks? (5.5)
- (b) What is stratification of rocks? Write down various types of stratification and briefly explain it? (7)

OR

Q.5 Explain the following terms: - (3+3+3+3.5)
- (a) Dip
- (b) Strike
- (c) Apparent dip
- (d) Altitude of formation

UNIT-III

Q.6 (a) Write down various sources of ground water. Discuss about the storage of ground water. (6)
- (b) Write down various types of waves generated. Draw their diagrams and briefly explain them. (6.5)

OR

Q.7 (a) Discuss about "the quality of ground water". (6)
- (b) Draw hot water spring and label it and briefly explain it. (6.5)

P.T.O.

END TERM EXAMINATION

THIRD SEMESTER [B.TECH.] DECEMBER-2012

Paper Code: ETCE203　　　　　Subject: Building Construction, Material & Specification

Time : 3 Hours　　　　　　　　　　　　　　　Maximum Marks :75

**Note: Attempt five questions including Q.no.1 which is compulsory.
Select one question from each unit.**

Q1　(a) What are the factors influencing the choice of building material? Also, is it essential to make standards for building material?　　　　　　　　　　　(5x5=25)

　　(b) What suggestions do you propose for improvement in construction to avoid decay of timber and what measures are to be taken, when it has occurred?

　　(c) What are the properties of different artificial Puzzolanas? Also, state the uses for which different Puzzolanas can be considered.

　　(d) What are Screw Piles? With neat sketches state the circumstances under which they are used?

　　(e) Name the various types of doors. Give the criteria of classifying them and also mention where they are generally used.

UNIT-I

Q2　(a) What is meant by dressing of stones? Briefly describe the various types of dressing with neat sketches.　　　　　　　　　　　　　　　　　　　　　(7)

　　(b) Describe the following tests to be performed in case of burnt clay bricks (i) Efflorescence Test (ii) Test for warpage.　　　　　　　　　　　(5.5)

OR

Q3　(a) Explain with detailed flow chart a method of manufacturing of Portland cement. (6.5)

　　(b) Explain with neat sketches the various defects in timber.　　　　　(6)

UNIT-II

Q4　(a) What are the factors which affect strength of concrete? Explain their influence. (6.5)

　　(b) Determine quantum of each ingradient to make 100 parts of M_{15} grade cement concrete having voids in aggregate 40%.　　　　　　　　　　　(6)

OR

Q5　(a) What is Guniting? What are its uses? Write down its advantages and disadvantages.(7.5)

　　(b) Compare and contrast timber and steel formwork used for concrete work.　(5)

UNIT-III

Q6　(a) What is meant by safe bearing capacity of soil? Also, explain how it is determined by any one method?　　　　　　　　　　　　　　　　　　　(5.5)

　　(b) Name the different types of foundations you recommend under different situations and the soil. Explain them.　　　　　　　　　　　　　　　　(7)

OR

Q7　(a) What are the preferred locations of doors and windows in a building?　(5.5)

　　(b) What general principles would you keep in mind while supervising a (i) stone work (ii) brick work under construction? What guiding principles would you apply to ensure a structurally sound, aesthetically pleasing and comfort-cum-service type construction?　　　　　　　　　　　　　　　　　　　　　　(7)

UNIT-IV

Q8　(a) What are the essential qualities of a good covering material to be used in pitched roofs?　　　　　　　　　　　　　　　　　　　　　　　　　(5)

　　(b) What is centering? What are its requirements? Also, describe the construction procedure of Masonry arches giving special references to the centering used under different loading conditions and spans.　　　　　　　　　　　(7.5)

OR

Q9　(a) What are the requirements of a Stair Case in residential and Public buildings? Draw a section through R.C.C. Staircase showing Baluster, Newelpost and Landing.　(6)

　　(b) It is proposed to Locate a suitable stair in a staircase 6m long 3.6m wide and 3.6m high with a door 1.15m wide in each of the longitudinal walls. Design the stair by assuming that the doors face each other and are located with their centres at a distance of 1.08m from the respective corners of the staircase.　　　　(6.5)

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Please write your Exam Roll No.)   Exam Roll No. _____

END TERM EXAMINATION

THIRD SEMESTER [B.TECH] DECEMBER-2018

Paper Code: ETCE203   Subject: Building Construction, Material & Specification

Time: 3 Hours   Maximum Marks :75

Note: Attempt five questions including Q.1 which is compulsory. Select one question from each unit.

Q1   (a) Explain the difference between:-   (2x10=20)
    (i) Hydrophobic cement and Super Sulphate cement
    (ii) Rapid hardening cement and Low heat cement
    (iii) Initial Setting time and Final Setting time
    (iv) Paint and Varnish
    (v) Cup shakes and Ring shakes
    (vi) Rolling and Forging
    (vii) Grillage Foundation and Raft Foundation
    (viii) Quick lime and Hydrated lime
    (ix) Box caisson and Pneumatic caisson
    (x) Raking shores and Flying shores
    (xi) Flemish band and English band

(b) Write short note on the following:-   (1x5=5)
    (i) Expansion gap in building
    (ii) Clinker
    (iii) Light weight concrete
    (iv) Lean-to-roof
    (v) Clerestory windows

UNIT-I

2   (a) Explain with the help of neat sketches constructions and working of any two of the following:-   (3x2=6)
    (i) Bull's trench kiln (ii) Hoffman's kiln (iii) Allahabad kiln
(b) Describe some major defect of timber with help of neat sketches. (6.5)

OR

(a) (i) Explain important qualities of an ideal brick.   (2x3=6)
    (ii) How are Limes manufactured on a commercial scale?
(b) (i) Differentiate between Rubble and Ashlar masonary.   (3)
    (ii) Distinguish between White-Washing and distempering.   (3.5)

UNIT-II

3   (a) What do you understand by the term "water cement ratio"? Explain how the quantity of water affects the strength of a concrete?   (6)
(b) (i) What is meant by segregation of a concrete mix? How it is prevented?   (3)
    (ii) What is the mechanism of sulphate attack of concrete?   (3.5)

OR

4   (a) (i) Describe the corrosion of steel in concrete containing calcium chloride.   (3)
    (ii) What are the non-destructive tests for the determination of the strength of concrete?   (3)
(b) (i) Explain what is meant by polymer concrete?   (3)
    (ii) Discuss the use of glass fibre reinforced cement concrete.   (3.5)

UNIT-III

Q5 (a) Why surface exploration necessary? State the different methods of exploration of the sub-soil conditions and describe one of the methods in detail. (6.5)

(b) Draw neat sketches to explain the following types of foundations- (3)

(i) Combined footing for concrete column. (3)

(ii) Under-reamed pile foundation.

OR

Q6 (a) (i) What do you understand by damp-proof course? Where it is placed in a building and why? (3.5)

(ii) What is meant by safe bearing power of soil? Explain how it is determined by any one method? (3)

(b) Write short notes on **any three** of the following:- (2x3=6)

(i) Foundation sloping ground

(ii) Spread footing

(iii) Steel sheet piles

(iv) Cast-in-situ, concrete pile

UNIT-IV

Q7 (a) Differentiate between the following:- (1x6=6)

(i) Arches and lintel

(ii) Ex trades and intrades

(iii) Abutments and piers

(iv) Crown and key

(v) Spandril and haunch

(vi) Pre-cast and cast-in-situ lintels

(b) Explain how do you classify the doors and windows from viewpoint of their operational movements? (6.5)

OR

Q8 (a) Name the various types of doors. Given the criteria of classifying them and also mention where they are generally-used? (6.5)

(b) Define the following terms as used in pitched roof constructions:- (1x6=6)

(i) Pitch of a roof

(ii) Hipped end

(iii) Eaves board

(iv) Jack rafter

(v) Valley rafter

(vi) Post-plates

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