Enrollment No: _____ Exam Seat No:_____

C.U.SHAH UNIVERSITY

Summer Examination-2017

Subject Name : Basics of Civil & Structural Engineering

Subject Code : 4TE02BCS1 **Branch: B.Tech (All)**

Semester : 2 **Date : 16/05/2017** **Time : 02:00 To 05:00** **Marks : 70**

Instructions:

(1) Use of Programmable calculator & any other electronic instrument is prohibited.
(2) Instructions written on main answer book are strictly to be obeyed.
(3) Draw neat diagrams and figures (if necessary) at right places.
(4) Assume suitable data if needed.

Q-1 Attempt the following questions: **(14)**

a) Surveys which are carried out to depict mountains, valleys, rivers, forests and other details of a country are known as 1
(a) Cadastral surveys (b) Engineering surveys (c) Mine survey (d) Topographical survey

b) Which of the following scale is the smallest. 1
(a) 1cm = 5m (b) RF = 1/5000 (c) 1:10,000 (d) 1cm = 5km

c) What is the principle of chaining? 1

d) The angle of inclination of the two plain mirrors of the optical square is (a) 30˚ (b) 45˚ (c) 60˚ (d) 90˚. 1

e) If the FB of a line is zero degree, its BB is (a) 0˚ (b) 90˚ (c) 180˚ (d) 270˚ 1

f) A good brick when immersed in water bath for 24 hours, should not absorb water more than 1
(a) 20% of its dry weight (b) 15% of saturated weight
(c) 10% of saturated weight (d) 20% of saturated weight

g) Tungsten steel is normally used in the manufacture of 1
(a) drilling machines (b) heavy earth equipment
(c) heavy mining equipment (d) delicate instruments

h) The longest chain line passing through the center of the area is known as 1
(a) Base line (b) Check line (c) Tie line (d) None of the above

i) If M.I of a rod is 7853.98mm^4 then what is its diameter? 1
(a) 18mm (b) 20mm (c) 22mm (d) 16mm

j) The point in the body where the entire weight is assumed to be concentrated is known as (a) M.I (b) C.M (c) C.G (d) C.R 1

k) Write the condition for a truss to be termed stable. 1

l) The scalar quantity from the following is (a)velocity (b)speed (c)force (d)weight 1

m) The MKS unit of force is _____. 1

n) If you are standing on earth and on moon, what is the approximate ratio of weight of your body (a) 3 (b) 2 (c) 6 (d) 4 1

Attempt any four questions from Q-2 to Q-8

Q-2 Attempt all questions **(14)**

a) Define the following terms (i) Datum (ii) Reduced Level (iii) Mean sea level (iv) Station (v) GDP (vi) Benchmark 6

b) The paper of an old map drawn to a scale of 100m to 1cm has shrunk, so that a line originally 10cm has now become 9.6cm. The survey was done with a 20m chain 10cm too short. If the area measured now is 71sq.m find the correct area on the ground. 4

c) Write and explain the law of parallelogram of forces. 4

Q-3 Attempt all questions **(14)**

a) Define the following (i) Force (ii) Rigid body (iii) Mass (iv) Centroid (v) Mechanics (vi) Newton's third law of motion. 6

b) The following interior angles were measured with a sextant in a closed traverse. The bearing of the line AB was measured as 60˚00' with prismatic compass. Calculate the bearings of all other line if, ∟A = 140˚10' ; ∟B = 99˚8' ; ∟C = 60˚22' ; ∟D = 60˚10' 6

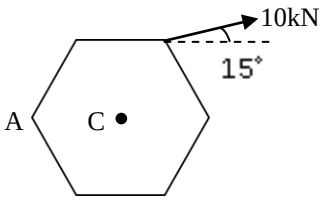
c) State Lami's theorem. 2

Q-4 Attempt all questions **(14)**

a) The following observations were taken with dumpy level and four-meter levelling staff. The instrument was shifted after the fourth and seventh readings. The first reading was taken on a bench mark whose RL is 15.575m. Prepare a page of level book and calculate RLs of all the points. The observations were taken at a every 30m interval. Also find out the gradient between first and last point. Also draw the profile of ground. Use H.I method. Observations are: 0.565; 1.250; 1.675; 3.695; 0.125; 2.345; 3.245; 0.500; 1.785; 2.535. 7

b) Find the magnetic declination at a place if the magnetic bearing of the sun at noon is (a) 184˚ and (b) 350˚20'. 2

c) A regular hexagon of dimension 100mm is subjected to a 10kN force. Find the moment of this force about (a) vertex A and (b) centre C. 5

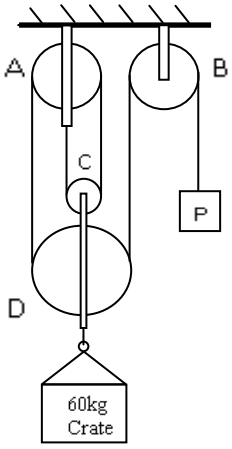


Q-5 Attempt all questions **(14)**

a) Give difference between fat lime and hydraulic lime. 5

b) Give difference between moment and couple. 4

c) Sketch the free body diagram of a system of 60kg crate and the pulley arrangement shown in figure below. Neglect the mass and the friction of the pulleys. Compute the effort 'P' required to keep the system in equilibrium. 5



Q-6 Attempt all questions **(14)**

a) Write short note on GIS. 5

b) Explain the types of bricks used for construction. Mention the use and size of frog. 5

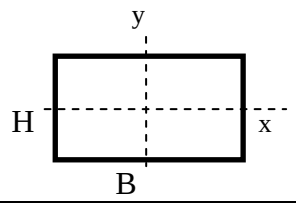
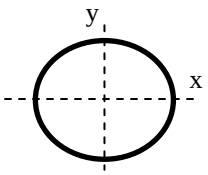
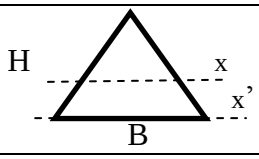
c) Define surveying and explain the fundamental principles of surveying. 4

Q-7 Attempt all questions **(14)**

a) Explain the characteristic of contour with neat sketch. Also mention the uses of contour 6

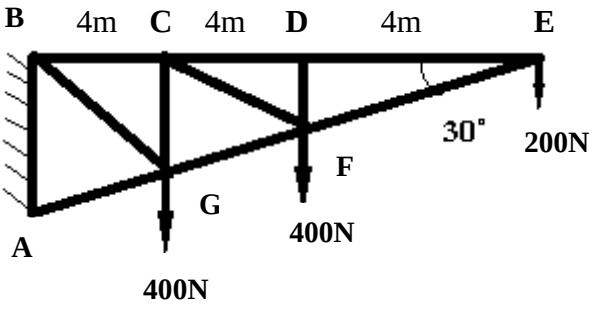
b) Draw the figure of a chain and give the length of (a) Metric chain and (b) Gunter's chain. 2

c) Write the formula for moment of inertia of the following shapes. 6

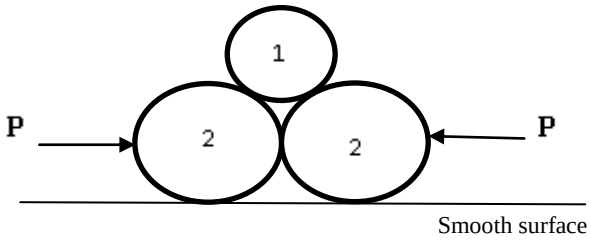
Sr.No.	Shape	Figure	Formula
1	Rectangle (B x H)		Ixx Iyy
2	Circle (d – dia.)		Ixx Iyy
3	Triangle (B x H)		Ixx Ixx'

Q-8 Attempt all questions **(14)**

a) Analyze the truss below using the suitable method and find all member forces. Also find if the truss is stable or not. 9



b) Find the minimum value of force P to keep the spheres in the position as shown in figure below. The radius of sphere-1 is 5cm and of sphere-2 is 10cm. The weight of sphere-1 is 100N and of sphere-2 is 200N. 5



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