Total No. of printed pages = 5

CE 131206

Roll No. of candidate

2017

B. Tech 2nd Semester End-Term Examination

BASIC CIVIL ENGINEERING

Full Marks–100   Pass Marks–35   Time–Three hours

The figures in the margin indicate full marks
for the questions.

1. Answer any *ten* from the following questions :
$2 \times 10 = 20$

   (a) Define stress. Write its MKS and SI units.

   (b) What are the various types of strains that can be applied on a body ?

   (c) Define Hook's Law and Young's Modulus.

   (d) Write the assumptions made in Euler's Formula Theory.

   (e) Write the principle of Surveying.

   (f) What do you mean by the term 'Blasting of rocks' ?

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(g) What are the different chemical compounds of cement ?

(h) Write the difference between State Highway and National Highway.

(i) Define soil. Who is the father of soil mechanics ?

(j) Distinguish between cantilever beam and overhanging beams. Draw neat sketches of each.

(k) Define differential settlement. Write three causes of failure of soil.

2. Answer any *ten* from the following questions :

$3 \times 10 = 30$

(a) Define long-column and short-column. Write the end conditions for long-column.

(b) Define Structural Engineering. Explain the importance of Structural Engineer in the field of civil engineering.

(c) Write the principle of chain survey and explain one method of ranging in chain surveying.

(d) What are the different types of instruments used in surveying ? Explain each in brief.

(e) Explain the Stepping Method or Direct Method of chaining on sloping ground.

(f) Write the different types of bricks along with their classes. What are the characteristics of good bricks ?

(g) Write the difference between mortar and cement.

(h) Draw the ideal cross-section of road, showing all geometric elements.

(i) Write short note on safety measures to be taken in buildings against Earthquake.

(j) Define RL, benchmark and datum.

(k) What do you mean by the term 'Local Attraction' ? Suggest some measures how can it be minimized.

3. Answer any *five* from the following questions :

$5 \times 10 = 50$

(a) Define longitudinal strain and lateral strain. Find the minimum diameter of a steel wire, which is used to raise a load of 4000N if the stress in the rod is not to exceed 95 MN/m^2. $\quad 2+8=10$

(b) Define Elasticity and Elastic Limit.

A tensile test was conducted on a mild steel bar. The following data was obtained from the test :

Diameter of the steel bar is 3 cm, gauge length of the bar is 20 cm, load at elastic limit is 250KN, extension at the load of 250KN is 0.21mm, maximum load is 380 KN, total extension is 60mm and diameter of the rod at failure is 2.25cm. Determine Young's Modulus, the stress at elastic limit, the percentage elongation and the percentage decrease in area. 2+8=10

(c) What do you mean by the term 'Civil Engineering' ? Write the important functions and role of a Civil Engineer. 4+3+3=10

(d) What are the sources of errors in chaining ? Write the corrections for chain and tape while surveying.

The true length of a line is 500m. The line was again measured with a 20m tape and found to be 502m. What is the correct length of the 20m tape ? 4+6=10

(e) A 30m steel tape was standardized at a temperature of 20°C and under a pull of 5 kg. The tape was used in centenary at a temperature of 25°C and under a pull of P kg. The cross-sectional area of the tape is 0.02cm², its weight per unit length is 22 g/m, Young's Modulus is 2×10^6 kg/cm², α is 11×10^{-6} per °C. Find the correct horizontal distance, if P is equal to → (a) 5 kg and (b) 15 kg. 10

(f) Define rocks and classify its various types. 10