KUMARAGURU
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Register Number: …….

B.TECH DEGREE EXAMINATIONS: NOV/DEC 2014

(Regulation 2013)

Third Semester

TEXTILE TECHNOLOGY

U13CET311: Basics of Civil Engineering and Mechanics

Time: Three Hours **Maximum Marks: 100**

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. Determining the difference in elevation between two points on the surface of the earth, is known as
   a) Leveling b) Simple leveling
   c) Differential leveling d) Longitudinal leveling
2. Ultimate strength to cement is provided by ……
3. The foundation in which a cantilever beam is provided to join two footings, is known as
   a) Strip footing b) Strap footing
   c) Combined footing d) Raft footing
4. The columns of multi-storeyed buildings are designed to withstand the forces due to ……
5. The ratio between lateral strain to linear strain is called
   a) Poisson's ratio b) True strain
   c) volumentric strain d) strain ratio
6. A rod of length L and area of cross section A, whose material has a modulus of elasticity E and coefficient of thermal expansion α is subjected to a change in temperature ΔT, then the change in length is ……
7. A cantilever of length (l) carries a point load (W) at the free end. The bending moment diagram will be a
   a) Parabola with maximum ordinate at the centre of the beam b) Triangle with maximum ordinate at the free end
   c) Parabola with maximum ordinate at the cantilever end d) Triangle with maximum ordinate at the cantilever end

8. The point of contra-flexure occurs only in ……beams.
9. In a simple bending theory, one of the assumptions is that the material of the beam is isotropic. This assumption means that the
   a) Normal stress remains constant in all directions
   b) Normal stress varies linearly in the material
   c) Elastic constants are same in all the directions
   d) Elastic constants varies linearly in the material
10. The polar modulus for a solid shaft of diameter (*D*) is ……

PART B (10 x 2 = 20 Marks)

(Not more than 40 words)

11. State the principles of surveying.
12. Define workability of concrete.
13. Differentiate between shallow foundation and deep foundation.
14. What are the basic components of a bridge?
15. State Hook's law.
16. Define thermal stress and strain.
17. List the various types of beams and loads.
18. Draw the BM diagram of a simply supported beam of length 12 m carrying UDL 10 kN/m throughout its length.
19. Draw the shear stress distribution across a flanged section.
20. State the assumptions for finding out the shear stress in a circular shaft, subjected to torsion.

PART C (5 x 14 = 70 Marks)

(Not more than 400 words)

Q.No. 21 is Compulsory

21. A beam overhangs 1 m and 2 m to the left and right of the respective supports, carries an UDL of 10 kN/m throughout the beam together with two concentrated loads 20 kN and 50 kN placed at the left and the right extreme ends, respectively.The distance between the supports being 7 m. Draw SF and BM diagrams.

22. a) The following perpendicular offset were taken at 10 m intervals from an Survey line to an irregular boundary line 3.145 m, 4.30 m, 8.20 m, 5.60 m,7.60 m, 4.2 m, 5.6 m, 4.3 m

Calculate the area enclosed between the survey line, the irregular boundary line, and first and last offsets by the application of

(i) Average ordinate method (4)

(ii) Trapezoidal rule and (5)

(iii) Simpson's rule (5)

(OR)

b) (i) What are the requirements of good building stone and state important varieties of Building stones? (7)

(ii) What are the different types of steel? Explain the properties and uses. (7)

23. a) Explain different types of foundations you would recommend under different situations and soil conditions.

(OR)

b) (i) Explain reinforced concrete column with suitable sketch. (7)

(ii) Explain about the different types of pitched roof coverings. (7)

24. a) A metallic bar 500 mm × 200 mm × 50 mm is subjected to a force of 10 kN (tensile), 15 kN (tensile), and 10 kN (tensile) along x, y and z directions respectively. Determine the change in the volume of the block. Take $E=2.1 \times 10^5$ N/mm^2 and Poisson's ratio = 0.3

(OR)

b) A steel bar is placed between two copper bars each having the same area and length as the steel bar at 15°C. At this stage they are rigidly connected together at both the ends. When the temperature is raised to 315°C, the length of bars increased by 1.5 mm. Determine the original length and final stresses in the bars. Take $E_s= 2.1 \times 10^5$ N/mm^2, $E_c=1 \times 10^5$ N/mm^2, $\alpha_s = 0.000012/ °C$ and $\alpha_c = 0.0000175/ °C$.

25. a) A T - section of a beam has the following dimensions.

Width of the flange = 200 mm,

Overall depth = 150 mm,

Thickness of the web = 20 mm,

Thickness of the flange =20 mm.

Determine the maximum bending stress in the beam, when a bending moment of 250 N-m is acting on the section.

(OR)

b) A solid cylindrical shaft is to transmit 300 kW power at 100 r.p.m.

(a) If the shear stress is not to exceed 80 N/mm^2, find its diameter. (b) What percent saving in weight would be obtained if this shaft is replaced by a hollow one whose internal diameter equals to 0.6 of the external diameter, the length, the material and maximum shear stress being the same?

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