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**B.E. DEGREE EXAMINATIONS: APRIL / MAY 2010**

Fourth Semester

**CIVIL ENGINEERING**

U07CE402: Strength of Materials

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

**Answer ALL the Questions:-**

**PART A (10 x 1 = 10 Marks)**

1. The strain energy stored by the body within elastic limit, when loaded externally is called -----

   A. Resilience        B. Proof resilience        C. Modulus of Resilience        D. Strain Energy.

2. Proof resilience is the mechanical property of the material which indicates their capacity to

   bear-----

   A. Static tensile load        B. Static compressive load        C. Shocks.        D. Torsion.

3. A beam fixed in position and direction is termed as -----

   A. Fixed beam        B. Encastre beam        C. Built-in beam        D. All the above.

4. The example for indeterminate beam is -----

   A. Doubly over hanging beam                B. Cantilever beam

   C. Propped cantilever.                D. Single over hanging beam.

5. If the compressive member is not vertical, it is called as -----

   A. Strut        B. Column        C. Stanchion        D. All the above.

6. The cross section of the column is assumed to be -----

   A. Small        B. Large        C. Uniform        D. Non uniform

7. At any point in the material, there exists a ----- state of stress.

   A. Complex        B. Normal        C. Tangential        D. Simple.

8. Failure will occur in a body because of

   A. Tearing off        B. Crushed off        C. Shearing off        D. Any of the above.

9. If the plane of bending does not lie in the plane contains the principal centroidal axis, the

   bending is called as -----

   A. Symmetrical bending                B. Un symmetrical bending

   C. Uni axial bending                D. Bi axial bending.

10. Theory of simple bending is derived for -----

    A. Large initial curvature   B Small initial curvature C. Medium Curvature D.Any curvature.

## PART B (10 x 2 = 20 Marks)

11. Define strain energy.

12. What are the types of loads a body may be subjected to?

13. What are the advantages of Continuous beam over simply supported beam?

14. How to draw SFD for a fixed beam?

15. Write short note on failure of s short column.

16. Give the sign convention for bending of the column.

17. Sketch the 3D stress tensor.

18. What do you mean by dilation?

19. What are the assumptions made in winkler-Bach theory?

20. Mention the sign convention adopted in the curved beams.

## PART C (5 x 14 = 70 Marks)

21. a) A wagon weighing 40 kN is attached to a wire rope and moving down an incline at a speed of 3.6 kmph when the rope jams and wagon is suddenly brought to rest. If the length of the rope is 50 m at the time, calculate the maximum instantaneous stress and maximum instantaneous elongation produced. Diameter of the rope is 36 mm. E = 205GPa

**[OR]**

b) Describe the principle of virtual work with a practical example.

22. a) Draw SFD and BMD for a fixed beam with noncentral concentrated load.

**[OR]**

b) A continuous beam ABCDE carrying a udl rests on three supports B,C and D all at the same level. It has two equal overhangs at length 'a'. Assuming constant EI, find the ratio of a/l for the three support reactions to be equal.

23. a) Derive Euler's formula and Rankin's formula to determine critical load for column.

**[OR]**

b) A compound cylinder is made by shrinking a cylinder of external diameter 300 mm and internal diameter 250 mm over another cylinder of external diameter 250 mm and internal diameter 200 mm. The radial pressure at the junction after shrinking is 8 MPa. Find the final stresses set up across the section, when the compound cylinder is subjected to an internal fluid pressure of 84.5 MPa.

24. a) Explain Energy of distortion theory with an example problem.

**[OR]**

b) Describe Tresca's theory with an example problem.


25. a) Derive Winkler-Bach Theory.

**[OR]**

b) Discuss in detail the basic concepts involved in Fatigue, Fracture and Creep.



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