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 **Reg. No. :**

**Question Paper Code: 52099**

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2017

Second Semester

Chemical Engineering

15UCH209 - PRINCIPLES OF MECHANICS

(Regulation 2015)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. Steel containing 0.8 to 1.5% carbon, is known as

(a) mild steel (b) dead mild steel (c) medium carbon steel (d) high carbon steel

2. Stainless steels contains

(a) Chromium and Nickel (b) Copper (c) Aluminium (d) Vanadium

3. According to Hooke’s law, *E* = \_\_\_\_\_\_\_\_\_

 (a)  (b)  (c)  (d) 

4. The value of Poisson’s ratio always remains

 (a) equal to one (b) less than one (c) greater than one (d) none of these

5. Hot riveting is used for

 (a) structural joints (b) leak proofs (c) welding (d) soldering

6. The distance a screw thread advances axially in one turn is the:

(a) Lead (b) Pitch (c) Turn (d) Crest

7. Moment of inertia is measured in

 (a) g/s (b) m/s (c) Kg/m (d) g.cm2

8. Moment of inertia is measured in

 (a) *g / cm* (b) *kg. m2* (c) *kg / m* (d) *g / cm2*

9. The minimum number of rivets for the connection of a gusset plate, is

 (a) 2 (b) 3 (c) 1 (d) 4

10. At the neutral axis of a beam

 (a) the layers are subjected to maximum bending stress (b) the layers are subjected to minimum bending stress (c) the layers are subjected to compression (d) the layers do not undergo any strain

PART - B (5 x 2 = 10 Marks)

11. What is the composition of cast iron?

12. Define Poisson ratio.

13. What is meant by “Caulking”?

14. Define the radius of gyration?

15. Write about compression members.

PART - C (5 x 16 = 80 Marks)

16. (a) (i) What is the effect of alloying elements in steels? (4)

 (ii) What is the classification of steels? (4)

 (iii) Briefly explain any four non ferrous metals. (8)

Or

 (b) Summerize non-ferrous metals and alloys with their importance as engineering materials. (16)

17. (a) (i) Explain the factors of safety in detail. (8)

 (ii) Analyze the stress-strain relation diagram. (8)

Or

(b) (i) Write short notes on (i) Stress due to impact load (ii) Temperature stresses. (8)

 (ii) What are the assumptions made in theory of pure torsion? (8)

18.(a) Recall the types of welded joints with suitable diagrams. (16)

Or

 (b) Discuss in detail about the stresses in thin walled cylindrical vessels. (16)

19. (a) Determine the moment of inertia of the given I-Section as shown in figure. (16)



Or

 (b) (i) Enumerate the stresses in beams. (8)

 (ii) Describe the deflection of beams. (8)

20. (a) (i) Describe the procedures involved in design of tension members. (10)

 (ii) Write short notes on stiffness. (6)

Or

(b) Enunciate shear and buckling in structural beams. (16)