

No Preview  
Available

Total No. of Question : [4]

Registration No. : 

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**Programme Name : Bachelor of Chemical Engineering**  
**Regular S.Y.B.Tech. ESE ( A.Y. 2023-24) Sem. III Nov.2023**  
**III SEMESTER ( 2022 BATCH)**  
**201CHL203-Mechanics of Material (TH)**

Duration : [ 11:00 AM - 01:00 PM ]

Date : 28 Nov, 2023

Day : Tuesday

Marks : 50

**Instructions :**

**1.Read questions carefully.**

**(Q1) All Questions are compulsory** [20.0]

(1.1) Derive an expression for stress on oblique section of body subjected direct stress on mutually perpendicular planes. [7.0]

**CO :- C203.2**

**Blooms Taxonomy :- Analyze**

(1.2) Explain types of stress in detail with neat diagram [6.0]

**CO :- C203.1**

**Blooms Taxonomy :- Remember, Understand**

(1.3) A thin cylindrical tube with closed ends has an internal diameter of 50 mm and wall thickness of 2.50 mm. The tube is axially loaded in tension with load of 10 KN and subjected to axial torque of 500 Nm under an internal pressure of 6 N/mm<sup>2</sup>. Determine maximum and minimum principal stress on outer surface of tube [7.0]

**CO :- C203.3**

**Blooms Taxonomy :- Understand**

**(Q2) Attempt any two of the following** [10.0]

(2.1) Explain middle third rule for rectangular section [5.0]

**CO :- C203.4**

**Blooms Taxonomy :- Understand**

(2.2) Draw neat sketch of kernel of following sections [5.0]

1. Rectangular section 200 mm X 300 mm

2. Square with 400 cm<sup>2</sup> area

**CO :- C203.4**

**Blooms Taxonomy :- Understand**

**OR [ 2.2 / 2.3 ]**

- (2.3) Derive an expression for resultant stress when column of rectangular section subjected to an eccentric load about one axis. [5.0]

**CO :-** C203.4

**Blooms Taxonomy :-** Understand

- (Q3) Attempt any two of the following.** [10.0]

- (3.1) Explain Maximum strain energy theory [5.0]

**CO :-** C203.5

**Blooms Taxonomy :-** Understand

- (3.2) If  $\sigma_1=200$  N/mm<sup>2</sup> (tensile) ,  $\sigma_2 =100$  N/mm<sup>2</sup> (tensile),  $\sigma_3 = 50$  N/mm<sup>2</sup> (compressive),  $\tau^* = 200$  N/ mm<sup>2</sup> find whether failure of material will occur or not according to maximum principal shear stress theory [5.0]

**CO :-** C203.5

**Blooms Taxonomy :-** Understand

**OR [ 3.2 / 3.3 ]**

- (3.3) Determine the diameter of the bolt which is subjected to an axial pull of 9 KN together with transverse shear force of 4.5 KN using maximum principal strain theory. [5.0]

**CO :-** C203.5

**Blooms Taxonomy :-** Understand

- (Q4) Attempt the following.** [10.0]

- (4.1) What is non destructive testing? [5.0]

**CO :-** C203.6

**Blooms Taxonomy :-** Apply

- (4.2) Explain Mechanical properties of material. [5.0]

**CO :-** C203.6

**Blooms Taxonomy :-** Apply

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