NETTUR TECHNICAL TRAINING FOUNDATION

DIPLOMA IN TOOL ENGINEERING & DIGITAL MANUFACTURING – CP01

IV SEMESTER REGULAR & SUPPLEMENTARY EXAMINATION-JULY 2023

Subject: Strength of Materials **Total Time: 2 Hr.**

Subject Code: CP01403T **Total Marks: 50**

PART B

1.0 ANSWER ANY EIGHT OF THE FOLLOWING **2*8=16**

1.1 Define Pure Bending.

1.2 Find the maximum stress if bending moment M = 4 X 10^6 N mm, Z = 24000 mm^3

1.3 Why “Moment Of Inertia" is an important value.

1.4 When a member is said to be in pure torsion?

1.5 What is Torque in simple sentence?

1.6 What is Polar Modulus?

1.7 What are the different forms of spring?

1.8 Determine the torque of a solid shaft which will transmit 105 kW power at 160 rpm

1.9 What do you understand by Neutral Layer in Bending?

1.10 If the Diameter of the steel rod is 4mm. What will be the moment of inertia of the rod?

2.0 ANSWER ANY SIX OF THE FOLLOWING **3*6=18**

2.1 List down the types of beams with neat sketch.

2.2 Write the section Modulus formula for the following

a) Circular Rod b) Hollow Circular Rod.

2.3 A close coiled helical spring is to carry a load of 120 N and the mean coil diameter is to be 9 times the wire diameter. Calculate these diameters if the maximum shear stress is 100 N/mm^2

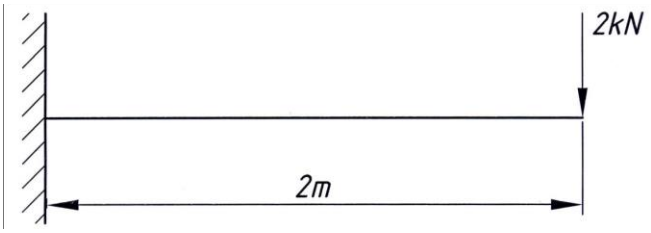
2.4 Find the power transmitted by a 75 mm diameter shaft at 140 rpm at a maximum shear stress of 60 N/mm^2.

2.5 Explain the spring used for suspension in Trucks? Draw a neat sketch of the spring.

2.6 Write the formula for power transmitted by the shaft and explain its terms with units.

PTO

2.7 A cantilever of length 2 meter fails when a load of 2 kN is applied at the free end. If the section of the beam is 40 mm × 60mm, find the stress at the failure.



2.8 Explain about angle of twist with a neat sketch.

3.0 ANSWER ANY FOUR OF THE FOLLOWING 4*4=16

3.1 Draw a neat sketch of closed coil & open coiled helical spring and explain

3.2 Explain the assumptions made in theory of simple bending.

3.3 Calculate the maximum stress induced in cast iron pipe of external diameter 40 mm, of internal diameter 20 mm and of length 4 meter when the pipe is supported at its ends and carries a point of 80 N at its center.

3.4 Find the diameter of the shaft required to transmit 60 KW at 150 rpm. If the maximum torque is likely to exceed the mean torque by 25% for a maximum permissible shear stress of 60 N/mm^2 . Also find the angle of twist of a length of 2.5 meter
Take modulus of rigidity = $8x10^4$ N/mm^2

3.5 A close coiled helical spring of 100 mm mean diameter is made of 10 mm diameter rod and has 20 turns. The spring carries an axial load of 200 N. Determine the shear stress and also calculate the stiffness of the spring.

3.6 Write the assumptions made in theory of Pure Torsion

List of formulae

Subject: Strength of Materials **Semester: IV**

1. $P = \frac{2\pi NT}{60000}$

2. $T = f_s \times \frac{\pi d^3}{16}$

3. $Z = \frac{bd^2}{6}$

4. $M = \frac{wl^2}{8}$

5. $M = f \times Z$

6. $I_p = \frac{\pi(D^4 - d^4)}{32}$

7. $\frac{T}{Ip} = \frac{C\theta}{l}$

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