

2112E015

DIPLOMA OF VOCATION
Mechanical Manufacturing
Subject: Strength of Materials
Subject Code: ME-508
Semester: Fifth
December 2021
Theory (External): 35 Marks
Time: 03 Hours

Instructions to the Students

1. This Question paper consists of two Sections. All sections are compulsory.
2. Section A comprises 10 questions of objective type in nature. All questions are compulsory. Each question carries 1 mark.
3. Section B comprises 8 essay-type questions out of which students need to do any 5. Each question carries 5 marks.
4. Read the questions carefully and write the answers in the answer sheets provided.
5. Do not write anything on the question paper.
6. Wherever necessary, the diagram drawn should be neat and properly labelled

Roll Number									

SECTION -A (SHORT/OBJECTIVE TYPE QUESTIONS)
(10x1=10 Marks)

- A. Differentiate between long column and short column
- B. Define Torsion
- C. Why hollow circular shafts are preferred when compared to solid circular shafts?
- D. What is spring index?
- E. What is solid length?
- F. Define stiffness
- G. Define the elasticity
- H. Define elastic limit
- I. Define moment of resistance
- J. Define the application of strain energy

SECTION -B (ESSAY TYPE QUESTIONS)
(5x5=25 Marks)

1. Draw and explain stress strain curve with neat and clean diagram
2. Write the assumptions in the simple bending theory, and derive bending formula.
3. A hollow circular shaft 20 mm thick transmits 294 kW at 200 rpm. Determine the diameter of the shaft if shear strain due to torsion is not to exceed 8.6×10^{-4} . Take, modulus of rigidity as 80 GN/m²
4. Derive the torsion equation, also state the assumption made for derivation of torsion equation.
5. Draw and explain Euler formula with suitable assumptions
6. The stiffness of spring is 10N/mm. What is the axial deformation in the spring when a load of 50N is acting?
7. A closely coiled helical spring of mean diameter 20cm is made of 3cm diameter rod and has 16 turns. A weight of 3kN is dropped on this spring. Find the height by which the should be dropped before striking the spring so that the spring may be compressed by 18cm. take $C=8 \times 10^4$ N/mm²
8. Derive and explain Hooks Law with suitable assumptions and applications

===END OF PAPER===