Quality Checkers Only way to fulfill your dreams	XI-SCI : Physics Mechanical Properties of Solids,	**DATE:** **TIME: 1 hour 30 minutes** **MARKS: 25** SEAT NO:

Note:-

1. All Questions are compulsory.
2. Numbers on the right indicate full marks.

Section A

Q.1 Select and Write the correct answer. **(4)**

1. The ability of a material to resist fracturing when force is applied to it, is called

   A) toughness B) hardness

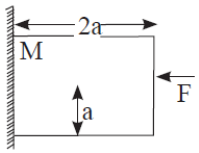
   C) elasticity D) plasticity

2. Change in dimensions is known as

   A) deformation B) formation

   C) contraction D) strain

3. A cubical block of mass m is held stationary against a rough wall by, applying horizontal force F, as shown in fig.



   Which of the following statement is incorrect?

   A) frictional force, f_s = mg B) normal reaction N = F

   C) F will not produce torque D) N will not produce torque

4. A block of mass 2 kg is placed on a plane surface. The coefficient of static friction is 0.4 when, 2.8 N force is applied on the block parallel to the surface, the force of friction between the block and the surface is

   A) 2.8 N B) 7.84 N

   C) 19.6 N D) zero

Q.2 Answer the following. **(3)**

1. Define : Strain.
2. Define : Friction.
3. Define : Volume Stress.

Section B
Attempt any Four

Q.3 State the laws of static friction. **(2)**

Q.4 Distinguish between Young's modulus, Bulk modulus and Modulus of Rigidity. **(2)**

Q.5 What is rolling friction? How does it arise? **(2)**

Q.6 State any four methods to reduce friction. **(2)**

Q.7 A 20 kg metal block is placed on a horizontal surface. The block just begins to slide when, horizontal force of 100 N is applied to it. Calculate the coefficient of static friction. If coefficient of kinetic friction is 0.4 then find minimum force to maintain its uniform motion. **(2)**

Q.8 A rubber band originally 30 cm long is stretched to a length of 32 cm by certain load. What is the strain produced? **(2)**

Section C
Attempt any Two

Q.9 Explain tensile stress and strain. How are they produced? **(3)**

Q.10 Why force of static friction is known as 'self-adjusting force'? **(3)**

Q.11 Two wires of equal cross section one made up of Aluminium and other of brass are joined end to end. When the combination of wires is kept under tension the elongation in wires are found to be equal. Find the ratio of lengths of two wires. **(3)**

($Y_{Al} = 7 \times 10^{10}$ N/m_2 and $Y_{Brass} = 9.1 \times 10^{10}$ N/m^2)

Section D
Attempt any One

Q.12 What do you mean by elastic hysteresis? **(4)**

A metal block of mass 8 kg can just be held pressed against a rough vertical wall by applying a force of 196 N perpendicular to the wall. Find the coefficient of static friction between the two surfaces in contact.

Q.13 Derive an expression for strain energy per unit volume of the material of a wire. **(4)**