

No. of Printed Pages : 4 180331/120331/031731/32233  
Roll No. .... /30332/105232

3rd Sem / Auto, Mech, Mechatronics, Prod, T&D, Plastic, GE, CNC,  
CAD/CAM, Found & Forg, Metallurgy, Print Making Tech., Mech  
(Ad. Manu. Tech.), Mech Engg (Fabrication Tech), Rubber Tech,  
Polymer Tech, AME, MEch. Engg. (Prod.)

**Subject:- Strength of Material /Basic Mech. Engg**

Time : 3Hrs.

M.M. : 100

### SECTION-A

**Note:** Multiple choice questions. All questions are compulsory (10x1=10)

- Q.1 For an incompressible material the Poisson's ratio is equal to  
a)  $1/4$  b)  $1/3$   
c)  $1/2$  d) 1
- Q.2 Modulus of rigidity is a ratio between  
a) Stress/Strain  
b) Compressive Stress and Compressive strain  
c) Shear stress and shear strain  
d) None of the above
- Q.3 Product of bulk modulus of elasticity and:  
a) Strain is equal to longitudinal stress  
b) Volumetric strain is equal to normal stress  
c) Strain is equal to longitudinal stress  
d) Volumetric strain is equal to lateral strain
- Q.4 Proof resilience is  
a) Strain energy  
b) Strain energy within elastic limit  
c) Max. strain energy up to elastic limit  
d) Max. strain energy within elastic limit per unit volume
- Q.5 In case of thin walled cylinder the correct ratio of hoop stress to longitudinal stress is

(1) 180331/120331/031731  
/32233/30332/105232

- a) 2 b)  $1/2$   
c) 4 d) None of the above
- Q.6 The centre of area of a plane lamina will not lie at its geometrical centre is a  
a) Rectangle  
b) Square  
c) Right angled-triangle  
d) Circle
- Q.7 Which of the following is correct  
a) Point load, concentrated load and isolated load means the same thing  
b) Point load and concentrated load means different  
c) Point load and isolated load means different  
d) Isolated load and concentrated load means different.
- Q.8 Neutral axis always passes through  
a) Centroid of the beam  
b) Middle of the beam section  
c) Centre of the beam  
d) None of the above
- Q.9 In the given shaft of given materials subjected to given torsion shear stress produced will be  
a) More if its length is more  
b) Less if length is less  
c) More if the length is less  
d) None of the above
- Q.10 Initial radius of curvature of a given leaf spring is kept depending upon  
a) Maximum load on the spring  
b) Maximum deflection of the spring  
c) Its proof load  
d) Kind of its use

(2) 180331/120331/031731  
/32233/30332/105232

### SECTION-B

**Note:** Objective type questions. All questions are compulsory. (10x1=10)

- Q.11 What is the intensity of stress?
- Q.12 Nominal stress is obtained by dividing load by \_\_\_\_\_ cross sectional area.
- Q.13 What is meant by impact load?
- Q.14 When do we take a shell as thin shell?
- Q.15 Unit of Section modulus is \_\_\_\_\_
- Q.16 Max.bending moment occurs in a beam where the shear force is \_\_\_\_\_ (maximum, minimum)
- Q.17 Define the bending stress.
- Q.18 In hollow shaft max.shear stress will be induced at \_\_\_\_\_ radius.
- Q.19 What is torsional rigidity?
- Q.20 What is spring constant?

### SECTION-C

**Note:** Short answer type questions. Attempt any twelve questions out of fifteen questions. (12x5=60)

- Q.21 Define strain and its various types.
- Q.22 Explain stress & strain diagram for ductile materials.
- Q.23 A mild steel rod 20mm diameter is subjected to an Axial pull of 45kN. Determine the tensile stress induced in the rod and elongation, if the original length is 4m and  $E=2 \times 10^5 \text{ N/m}^2$
- Q.24 Prove that the longitudinal stress is half of the circumferential stress in thin shell.
- Q.25 Drive an expression strain energy stored in a body due to suddenly applied load.
- Q.26 Define parallel axis and perpendicular axis theorems.
- Q.27 Define a beam and various types of load on the beam.

(3) 180331/120331/031731  
/32233/30332/105232

- Q.28 What are the various assumptions are made in the theory of simple bending?
- Q.29 Define the moment of resistance and section modulus.
- Q.30 Explain the various end conditions in the column.
- Q.31 What are the various factors on which strength of column is depend? Explain in brief.
- Q.32 A hollow shaft of external and internal diameter of 80 mm and 50mm is required to transmit torque. What is the safe torque, which it can transmit if the allowable shear stress is 50M pa?
- Q.33 Drive the formula for power transmitted by a solid shaft and define the torsional rigidity of a shaft.
- Q.34 Find out the stiffness of two springs, when they are used in series.
- Q.35 Define thermal stress and thermal strain.

### SECTION-D

**Note:** Long answer type questions. Attempt any two questions out of three questions. (2x10=20)

- Q.36 A tensile load of 50 KN is applied suddenly to a circular rod of 3.5 cm diameter and 5m long. if the value of  $E=2 \times 10^5 \text{ N/mm}^2$ . then determine the strain energy absorbed by rod.
- Q.37 Find the M.O.I of T-section (20X2) cm & (20X2) cm about its horizontal & vertical centroidal axes.
- Q.38 Draw SFD and BMD for a cantilever beam of 4m long carries a udl of 2KN/m and a additional point load of 3 KN at a distance of 3 m from the its free end.

(5600)

(4) 180331/120331/031731  
/32233/30332/105232