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32233

3rd Sem. / Plastic Tech.

Subject : Mechanics of Solids

Time : 3 Hrs. M.M. : 100

SECTION-A

Note: Very Short Answer type questions. Attempt any 15 parts. (15x2=30)

Q.1 a) Stress and its unit

b) Strain

c) Load

d) Types of Load.

e) Define force

f) Young's modulus of Elasticity

g) Define Friction

h) Define Hook's Law

i) Define torque and its units.

j) Define Mechanical advantages.

SECTION-C

Note: Long answer type questions. Attempt any three questions. 3x10=30

Q.3 The following forces are acting simultaneously on a body.

i) 50 N pull due East

ii) 140 N pull due North-East

iii) 105 N pull due North 45 degree West

iv) 65 N pull at 60 degree West of South

v) 45 N pull at 30 degree East of South

Find the forces which will keep the body in equilibrium.

Q.4 Find the MOI of T-section 100X150X30 mm about its horizontal and vertical centroidal axis.

Q.5 Derive Torsion equation for shaft with diagram.

Q.6 Derive Bending equation.

Q.7 State and explain parallelogram law of forces.

k) Define Efficiency of machine

l) Define Co-planer forces.

m) Define Reversible machine

n) Define centroid

o) Define simple machine

p) Angle of Repose

q) Lever

r) Torsion.

SECTION-B

Note: Short answer type questions. Attempt any ten parts 10x4=40

Q.2 i) State and prove lami's theorm.

ii) Derive Relationship between M.A, V.R and efficiency of a machine.

iii) What is the Law of machine

iv) Prove the statement, "Friction is a Necessary Evil".

v) A square steel rod 20mm x 20mm, section is to carry and axial compressive load of 10K.N Find the stress induced in KN/m^2

vi) What is machine. Also describe between reversible and irreversible machine.

vii) Define Ultimate stress, working stress and factor of safety.

viii) What are the characteristics of a force

ix) Write down torsion equation and give S I units of each term.

x) What are the different types of strains? Explain.

xi) What is angle of repose and angle of friction.

xii) Write a short note on pure bending.

xiii) Where does the controid of the following figure lie:

a) Rectangle b) Triangle

xiv) Explain "Varigon's Theorm of Moments",

xv) Two forces of 8N and 6N are acting on a body such that the angle between them is 60 degree, what will be the resultant.