3RD SEM./AERO./AIRCRAFT.MAINT./AUTO./ DIP IN MECH./ MECH(MAINT.)/MECH(PROD.) / MECH(SAND.) / MECH./ MECH.(IND. INT.) / 2024(W)

TH2 STRENGTH OF MATERIAL

Full Marks: 80 **Time- 3 Hrs**

Answer any five Questions including Q No.1& 2
Figures in the right hand margin indicates marks

1. Answer **All** questions 2 x10

a. Define stress and strain. Write down the SI units of stress and strain.

b. State Hooke's law.

c. Define point of contra-flexture.

d. Define cantilever beam with examples.

e. What is section modulus? Write down the expression for section modulus of rectangular section.

f. What is column? Write down with suitable example.

g. Define Torsion. Write down the formula Torque transmitted by a hollow circular shaft.

h. What is thin cylinder shell?

i. Write two assumptions in Theory of bending.

j. What is Mohr's circle?

2. Answer **Any Six** Questions 5 X 6

a. Show diagrammatically different types of beams and loads.

b. Derive the expressions for hoop stress for thin cylindrical shell.

c. Write down the assumption taken for finding out the torsion formula.

d. Find the young's modulus of a brass rod of diameter 25mm and of length 250mm which is subjected to a tensile load of 50KN when the extension of the rod is equal to 0.3mm.

e. The tensile stresses at a point across two mutually perpendicular planes are $120N/mm^2$ and $60N/mm^2$. Determine the normal, tangential and resultant stresses on a plane inclined at 30^0 to the axis of the minor stress.

f. Find the maximum shear stress induced in a solid circular shaft of diameter 15cm when the shaft transmits 150KW power at 180 r.p.m.

g Derive the relation between three elastic constants.