Uva Wellassa University, Sri Lanka
End Semester Examination – January 2010
SCT 368-1 Strength of Material (Repeat)

Time: One (01) hour

Total 04 Questions
Answer **three (03)** questions only

01) A loading crane consisting of a steel girder *ABC* supported by a cable *BD* is subjected to a load *P* (see Fig Q1). The cable has an effective cross-sectional area A = 481 mm^2. The dimensions of the crane are H = 1.6 m, L_1 = 3 m, and L_2 = 1.5 m.

(a) If the load P = 32 kN, what is the average tensile stress in the cable?

(50 marks)

(b) If the cable stretches by 5.1 mm, what is the average strain?

(50 marks)

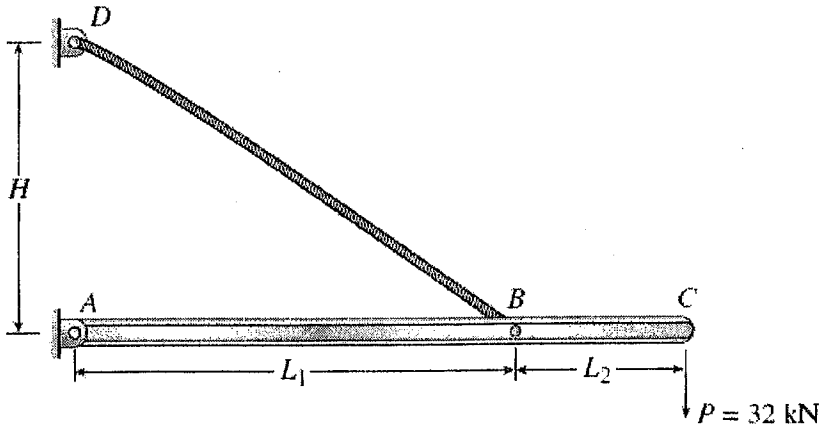

Fig Q1

02) Three steel plates, each 16 mm thick, are joined by two 20 mm diameter rivets as shown in the Fig Q2.

(a) If the load P = 50 kN, what is the largest bearing stress acting on the rivets?

(50 marks)

(b) If the ultimate shear stress for the rivets is 180 MPa, what force P_{ult} is required to cause the rivets to fail in shear? (Disregard friction between the plates.)

(50 marks)

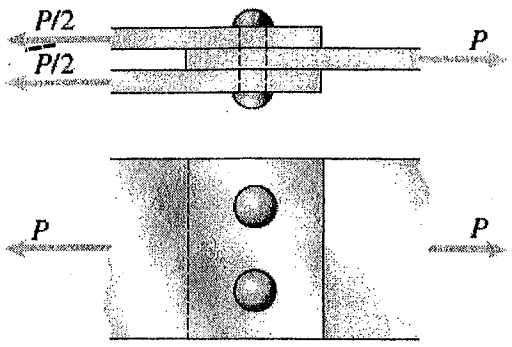

Fig Q2

03) Under cruising conditions the distributed load acting on the wing of a small airplane has the idealized variation shown in the Fig Q3. Calculate the shear force V and bending moment M at the inboard end of the wing.

(100 marks)

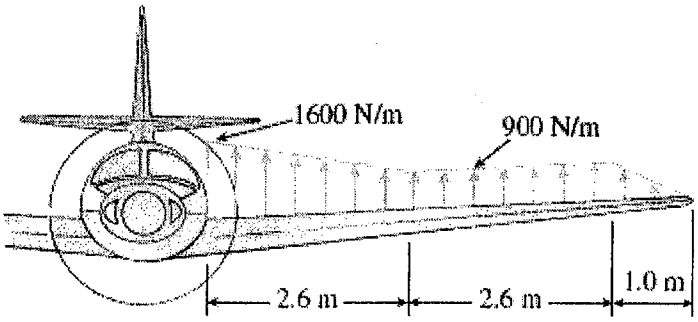

Fig Q3

04) Draw the shear-force and bending-moment diagrams for a cantilever beam AB carrying a uniform load of intensity q over one-half of its length (see Fig Q4).

(100 marks)

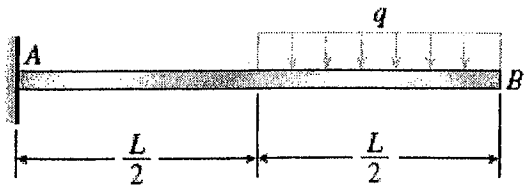

Fig Q4