USN ☐☐☐☐☐☐☐☐☐☐

Seventh Semester B.E. Degree Examination, June/July 2017
Aircraft Structure – II

Time: 3 hrs.   Max. Marks:100

Note: *Answer FIVE full questions, selecting*
at least TWO questions from each part.

PART – A

1 a. Explain the different types of loads acting on an aircraft. **(10 Marks)**

  b. An aircraft having weight of 250kN and a tricycle undercarriage lands at a vertical velocity of 3.7m/s. such that the vertical and horizontal reaction on the wheels are 1200kN and 400kN respectively at this instant the noise wheel is 0.1m from the ground shown in Fig Q1(b). If a moment of inertia of aircraft about its <g is $5\ 65\times10^8$ Ns^2 mm. Determine the inertia force on the a/c the time taken for its vertical velocity to become zero and its angular velocity at this instant. **(10 Marks)**

Geometry of the aircraft Fig Q1(b)

2 a. What are the assumptions of symmetric bending? Explain the asymmetric bending? Explain the asymmetric bending with associated equation? **(10 Marks)**

  b. If the B.M. is applied in in horizontal plane and is a clockwise sense about 'cy' when viewed in the direction 'yc'. Find the direct stress distribution of the beam? **(10 Marks)**

Fig Q2(b)

3 a. What is shear flow? List he assumption of shear flow analysis.   (08 Marks)
   b. Find the position of shear centre and shear flow between the stringers under the given load.
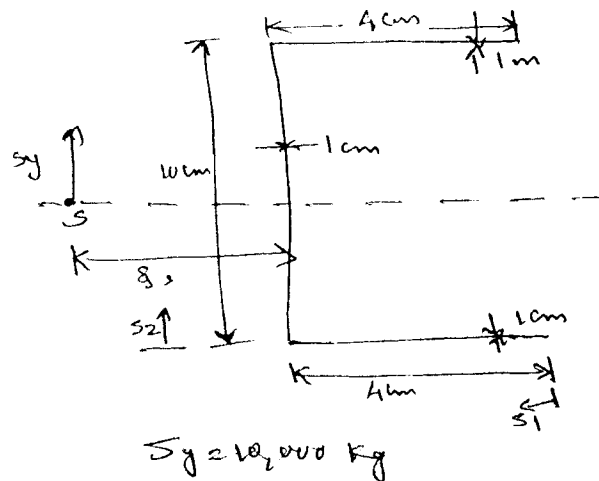   (12 Marks)

Fig Q3(b)

4 a. Explain Bredt –Batho theory and derive Bredt Batho formula.   (06 Marks)
   b. Calculate the shear flow distribution in the channel section in Fig Q4(b) produced by a vertical shear load of 4.8kN acting through its shear center. Assume that the walls of the section are only effective is resisting shear stresses while the booms, each of area 300mm^2, carry all the direct stresses.   (14 Marks)
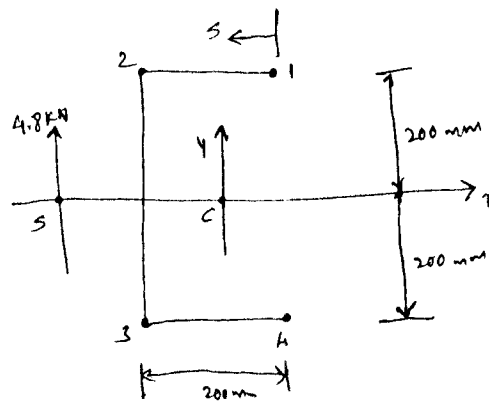
Fig Q4(b)

PART – B

5 a. Explain Buckling and crippling stress? Bring out essential difference between then?
                                                                                (08 Marks)
   b. Define the explain : i) Effective skin width   ii) primary buckling of stiffened Parels
       iii) Inter rivet and sheet wrinking.   (12 Marks)

6　Calculate the shear flows in the web panels and the axial loads in the flanges of the wing rib show in Fig Q 6 . Assume that the web of the rib is effective oly in shear while the resistance of the wing to bending moment in provided entirely by the three flanges 1, 2, and 3.
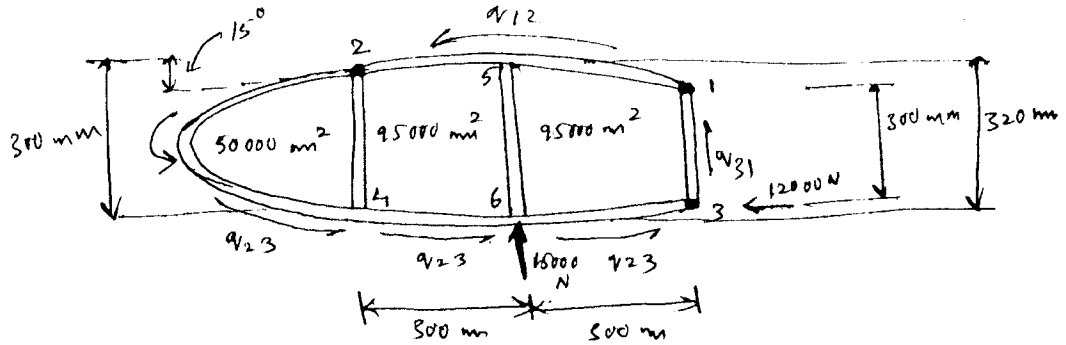
(20 Marks)

Fig Q6

7　a.　Describe the design criteria applicable to aircraft structures.　(10 Marks)

　b.　What are future airworthiness requirement? Explain :
　　　i) Two bay crack criteria　ii) Widespread fatigue damage.　(10 Marks)

8　a.　Explain the general rules for using bolts in aerospace design.　(06 Marks)

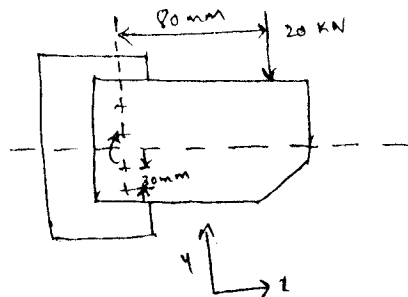　b.　A bracket is supported by means '4' rivets of same size in differential load method?

Fig Q8(b)

(14 Marks)

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