Name: ……..

Student no.: ……...

Test 2

Course: Production of Aerospace Systems (AE3211-II) – Part 2
Date: Thursday, March 20, 2014
Location: LR, Room A
Time: 10.45-11.30 hrs

Multiple Choice questions (**ONE correct answer at each question**)

Question 1.
The rigid/flexible assembly concept in aircraft assembly is used
a) To eliminate or reduce the residual stresses in the structure
b) To enable the joining of dissimilar materials
c) To avoid the occurrence of corrosion between dissimilar materials
d) To enable bonding and welding in the assembly lines

Question 2.
The most important reason to use elaborate surface treatments for bonded joints is:
a) To achieve a high strength bond
b) To achieve a durable bond
c) To remove all dirt and surface irregularities
d) None of the previous answers is correct.

Question 3
When solid rivets in a riveted joint are replaced by Titanium rivets (same diameter), than
a) The rivet pitch can be decreased
b) The edge distance of the rivets can be decreased
c) The number of rivets in the joint can be decreased
d) The total sheet thickness in the joint can be decreased.

Question 4
Preloading of a bolt is effective because:
a) The friction in the joint is eliminated
b) The total applicable load is increased
c) The average stress in fatigue loading is most dominant
d) The stress amplitude in fatigue loading is most dominant

Question 5
Which of the following statements is true?
a) Adhesive bonding becomes more difficult when the adherents' thickness increase
b) Adhesive bonding could be a joining method for assembly if the cure time was short
c) Welding does not require surface treatments
d) Welding of metals and thermoplastics is based on the same principle

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Question 6

What is the origin of the "bath tub curve"-like stress distribution in a bonded joint?

a) The bath-tub-shape is created by the flexibility of the adhesive
b) The stiffness difference between the adhesive and the adherents
c) The peel stresses that are present at the ends of the bond line
d) The differences in deformations in adherents opposite of the bond line

Question 7

A double lap joint has rivets of 4 mm in diameter, sheet thickness of t_1=t_3 = 0.6 mm and t_2= 1.0 mm. The joint load per rivet is 2500 N. What is the largest shear stress in the rivet?

a) 100 MPa
b) 200 MPa
c) 625 MPa
d) 284 MPa

Question 8.

The following statements are about comparing integral and assembled substructures:

I. Integral parts are advantageous with respect to manufacturing costs, but are a disadvantage with respect to performance
II. An assembled substructure has a disadvantage with respect to tooling costs, but has an advantage with respect to damage containment

a) Both statements are true
b) Statement I is true but statement II is false
c) Statement I is false, but statement II is true
d) Both statements are false.

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Open question

Assembly of aircraft

a. What is the difference between mounting divisions and manufacturing divisions?
b. What joining methods are used for mounting divisions and for manufacturing divisions?
c. Assembly jigs should have specific properties to result in high quality (sub)structures. Mention at least four properties or features and explain you answers.
d. Make a sketch of an assembly jig for a flap (consists of skin, spar, stringers, ribs)
e. Explain the concept of "hole-to-hole"; how does it work and what are the advantages?
f. Mention (and describe briefly) at least two differences between the assembly of composite structures and the assembly of metal structures.

Open space to write your answer.