Prince of Songkla University

Faculty of Engineering

Midterm examination: Semester 2 Academic year: 2006

Date: 17th December 2006 Time: 09.00-12.00

Subject: 226-211 Welding and Joining Technology Room: A401

ทุจริตในการสอบ โทษขั้นต่ำคือพักการเรียน 1 ภาคการศึกษาและปรับตกในรายวิชาที่ทุจริต

Instruction: Attempt all questions, totaling 100 marks.

1. Describe the advantages and limitations of welding as compared to other joining processes, such as mechanical joints or adhesive joints. (10 marks)

2. One of the well-known problems of arc welding is the magnetic arc blow. Explain the possible causes, the defective results and the recommended remedies. (10 marks)

3. Give concise discussion on the following topics: (35 marks, 7 marks each)

   3.1 Duty cycle of an arc welding machine.

   3.2 Benefits and drawbacks of welding with flux cored wire.

   3.3 Advantages of oxy-acetylene gas welding over other gas welding processes.

   3.4 Application of the square wave and balance in TIG welding.

   3.5 Inverter as the arc welding power unit.

4. Describe the effects of the following parameters to the characteristics of the submerged arc welds: wire size, welding current, arc voltage, electrical polarity, and the welding speed. (10 marks)

5. As far as the laser welding is concerned, compare the CO_2 laser and the Nd:YAG laser in their characteristics, advantages and drawbacks. (10 marks)

6. Select the appropriate welding processes for each of the following items: (15 marks)

   a) Fabricating a steel boiler.

   b) Welding copper to aluminium.

   c) Welding structural steel sections of a steel bridge, in an overhead position.

   d) Welding automobile bodies.

   e) Fabricating stainless steel sinks.

   f) Welding bolts or studs on a thin steel plate.

g) Welding to repair a deep vertical crack of a thick pressure vessel.

h) Welding thick steel plates to form a tanker in a shipyard.

i) Butt welding two 40 mm. diameter, 5 mm. thick steel pipes.

j) Welding of aluminium on a steel hull for a vessel.

7. Explain the similarities and the difference of the explosion welding and the magnetic pulse welding. Also describe the advantages of the magnetic pulse welding over the explosion welding. (10 marks)

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