Menofiya University	Department: Prod. Eng.& Mech. Des.
Faculty of Engineering	Year: 4th Production
Shebin El- Kom	Subject / Code: Welding Tech. /415C
1St.Semester. Exam.	Time Allowed: 3 hrs.
Academic Year 2014-2015	Date: 20/01/2015
Total mark: 70	

This exam. Measures ILOS no. (a1, a12, b7, c4, d3......)

Note: Any data required, but not given, may be reasonably assumed.

Answer all the following questions:

Question (1) (20 Mark)

A) Outline the items and variables for estimating welding cost. Show how you can save 20% on welding costs.

B) A mild steel pressure vessel 1m in diameter and 2m long is to be fabricated with sheets 5mm thick by welding on both sides. The available sheets have sizes of 1mx3m. The following data are given:
- mild steel sheet costs 700 LE / 100Kg,
- electrode costs 8 LE /m,
- welding rate 1.5 m/h,
- power consumption is 4 Kw/m of weld,
- labor charges 15 LE/h,
- overhead costs equals 250% on labor.

The required: Find the cost of manufacturing this pressure vessel.

C) Describe the nature, causes and remedies for the following welding defects: underbead cracking, knife-line attack, centerline cracking, weld decay, SCC

Question (2) (20 Mark)

A) Compare with sketches between dry and wet underwater welding process. Mention their capabilities.

B) Mention the fundamental difficulties and factors affecting wet underwater welding quality as well as the classification of welds accuracy to AWS D3.6 2010 code.

C) With proper reasoning, cite the suitable welding processes for the following industrial applications:

1- Railroad rails   2- Hacksaw blades   3- Leads for integrated circuits

4- Honeycomb panels

Question (3) (15 Mark)

A) Explain with neat sketches the principles and applications of the following welding   processes: FCAW,   EGW,   LBW,   USW,   SW.

B) Write shorts notes on:
   1) Welding process modelling   2) Brazing and soldering   3) Weldability
   4) Deposition efficiency and operating factor   5) Duty cycle

Question (4) (15 Mark)

A) Calculate the peak temperature attained by steel plates 6mm thickness at a distance of 3mm from fusion zone, while welding at 30V, 300 amps with a speed of 5 mm/s. Then calculate the width of HAZ and the cooling rate at a temperature of 550^0C. Assume any missing data.

B) Discuss with proper reasoning, the processes you would select for welding the following materials:
1) cast iron   2) copper alloys   3) high strength Al alloys

Good Luck