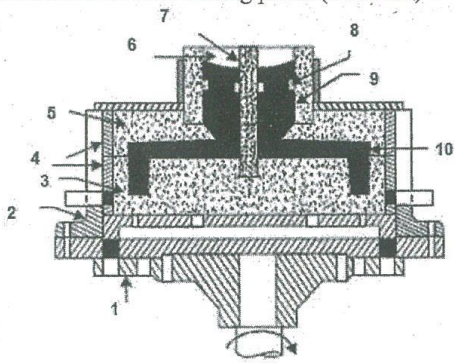
Kafrelsheikh University	Final Term Exam 11/06/2016	2nd year
Faculty of Engineering		Production eng.(2) (MDP2210)
Mechanical engineering		Time Allowed: 3 Hrs. Total marks = 60

Answer all the questions:

QUESTION (1):

a- Classify casting processes according to type of mold and give an example. **(5 marks)**

b- Determine the name of process and fill the missing parts. **(6 marks)**



c- One cubic meter of a certain eutectic alloy is heated in a crucible from room temperature to 100°C above its melting point for casting. The alloy's density = 7.5 g/cm^3, melting point = 800°C, specific heat = 0.33 J/g°C in the solid state and 0.29 J/g°C in the liquid state; and heat of fusion = 160 J/g. How much heat energy must be added to accomplish the heating, assuming no losses? 4 marks

d- Determine the two general types of pressure die casting and show the difference between them. **(5 marks)**

e- Determine the advantages and disadvantages of each of the following processes: **(10 marks)**

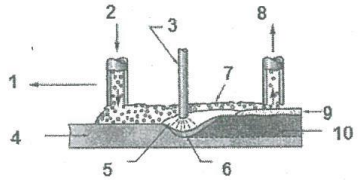
- Pressure die casting
- Shell casting
- Continuous casting
- Centrifugal casting

QUESTION (2)

a- Determine the two major groups of welding processes showing the difference between them. **(3 marks)**

b- Define the following using neat sketches: **fusion zone, weld interface, heat affected zone** and **unaffected base metal zone. (3 marks)**

c- Determine the name of process and fill the missing parts. **(4 marks)**



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d- With neat sketches determine the difference between SMAW and GMAW. **(4 marks)**

e- Define the process of resistance welding using neat sketch. **(4 marks)**

f- Determine types of flame in oxyactylene welding using neat sketches. **(3 marks)**

g- Give examples for solid state welding processes. **(3 marks)**

h- An oxyacetylene torch supplies 0.3 m^3 of acetylene per hour and an equal volume rate of oxygen for an OAW operation on 4.5-mm-thick steel. Heat generated by combustion is transferred to the work surface with a heat transfer factor $f_1 = 0.20$. If 75% of the heat from the flame is concentrated in a circular area on the work surface that is 9.0 mm in diameter, find (a) rate of heat liberated during combustion, (b) rate of heat transferred to the work surface, and (c) average power density in the circular area. 3 marks

i- A gas tungsten arc-welding operation is performed at a current of 300 A and voltage of 20 V. The melting factor $f_2 = 0.5$, and the unit melting energy for the metal $U_m = 10$ J/mm^3. Determine (a) power in the operation, (b) rate of heat generation at the weld, and (c) volume rate of metal welded. 3 marks

With my best wishes
Dr. Eng. Fatma Elerian