Name:	Roll No:

Advances in welding (MEL-336)	B.Tech. (P&I Engg.) Second Sem., Major Exam.,2006-2007
Max. Marks : 130	Time : 2 hr.

- Mark true or false.
- Every wrong answer carries two negative mark.
- If the answer is false then it is mandatory to underline the wrong word(s) in the statement.

	1. True or false statements : 50	
1	The no-load or open circuit voltage of constant-eurrent arc welding power sources is considerably lower than the arc voltage.	
2	Arc welding involves low-voltage, high-current arcs between an electrode and the work piece.	
3	Most welding arcs operate in continually fixed conditions.	
4	Fundamentally, the duty cycle is a ratio of the load-on time allowed to a specified test interval time.	
5	The fluctuation in molten pool size and penetration is related independently to the pulsing variables, travel speed, the type, thickness, and mass of the basc metal, filler metal size, and position of welding.	
6	Fluxes don't establish the electrical characteristics of the electrode.	
7	The presence of iron powder in the covering also makes more efficient use of the arc energy.	
8	The thick coverings on electrodes with relatively large amounts of iron powder increase the depth of the crucible at the tip of the electrode.	
9	Iron powder electrodes with thick coverings increase the level of skill needed to weld.	
10	Heavy iron powder electrodes frequently called as drag electrodes.	
11	Electrodes which produce a heavy slag can carry high amperage and provide high deposition rates, making them ideal for heavy weldments in the flat position.	
12	Cold cracking is the result of inadequate ductility or the presence of hydrogen in hardenable steels.	
13	Preheat are required for those materials which are naturnlly high in ductility or toughness.	
14	TIG has no difficulty in shielding the weld zone properly in drafty environments.	
15	GTAW process can be used for dissimilar metal joints.	
16	A given GTAW electrode diameter on DCEP would be expected to handle only 90 percent of the current possible with the electrode negative.	
17	In some materials, gas backup reduces root cracking and porosity in the weld.	
18	In GTAW, For given values of welding current and arc length, argon transfers more heat into the work than helium.	
19	Submerged Arc Welding (SAW) produces coalescence of metals by heating them with an arc between a bare metal electrode and the work.	
20	Submerged arc welding is a process capable of making welds with currents up to 2000 amperes, ac or dc.	
21	There are no positional constraints in SAW process.	
22	SAW use constant potential power source.	
23	Iron is body centered cubic near the melting temperature and again at low temperatures, but at intermediate temperatures ion is face-cantered cubic.	

24	Coarse-grained metals generally have better mechanical properties for service at room and low temperatures.	
25	The microstructure is largely responsible for the physical and mechanical properties of the metal.	
26	The crystalline structure of pure iron at temperatures up to 1670°F (910°C) is face-centered cubic	
27	A phase change in crystal strueture in the solid state is known as an allotropic transformation.	
28	Pure metals melt and solidify at a single temperature; alloys melt and solidify over a range of temperatures.	
29	Pearlite is a mixture of austenite and ferrite that forms in plates or lamellae	
30	The metallurgy of each weld area is related to the base and weld metal compositions; the welding process and the procedures have no effect on the metallurgy of weld metal.	
31	Sometimes, the weld metal composition is deliberately made significantly different from that of the base metal.	
32	There is significant difference in hardfacing and cladding on process parameter wise.	
33	Weld metal solidification of most commercial metals involves micro segregation of alloying and residual elements.	
34	The strength and toughness of the heat-affected zone in a welded joint are not dependent on the type of base metal, the welding process, and the welding procedure.	
35	Lack of fusion is a Welding Process or Procedure Related weld defect.	
36	Cracks or fissures are metallurgical related defects in welding.	
37	Slag inclusion is GTAW process related defects.	
38	Porosity in weld metal is due to absorption of hydrogen in weld metal.	
39	The welding conditions that principally contribute to incomplete fusion are insufficient welding current and lack of access to all faces of the weld joint that should be fused during welding.	
40	Overlap is metallurgical defect in welding.	
41	Cracks will occur in weld metal and base metal when localized stresses exceed the ultimate strength of the metal.	
42	Under bead cracks are generally cold cracks that form in the base metal.	
43	Both hot cracks and cold cracks can form in the root of the weld.	
44	Toe cracks are generally the result of thermal shrinkage strains acting on a weld heat-affected zone that has been embrittled.	
45	Some rolled structural shapes and plates are susceptible to a cracking defect known as lamellar tearing.	
46	When cracks occur during or as a result of welding, they usually show evidence of deformation.	
47	Hot cracking results from the combined effects of strain and metallurgy.	
48	Metallurgical considerations generally favor high arc energy input.	
49	Alloy display one or more of the phases that are characteristic for the alloy.	
50	Alloying alloy dissolve completely in the base parent metal.	

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2	Explain the possible cause and cure for hot and cold cracking, why cold cracking is catastrophic in nature explain?	15
3	Describe the different type of microstructure available in ferrous weld metal?	10
4	Write down the name of defects coded in figure 1?	15
5	Classify the different types of DT and NDT used in welding?	10
6	Explain the different modes of metal transfer in welding?	10
7	A single full penetration weld pass is made on using the following parameters: Voltage 25 V ρC 0.0044 J/mm^3.°C I 225 A t 6 mm V 5 mm/s f_l 0.9 T_0 30 °C H_{net} 800 J/mm Tm 1510 °C Tp 750 °C Calculate the peak temperature at distance of 2.0 and 3.0 mm from the weld fusion boundary? Calculate the width if heat affected zone at peak temperature 750 °C?	20

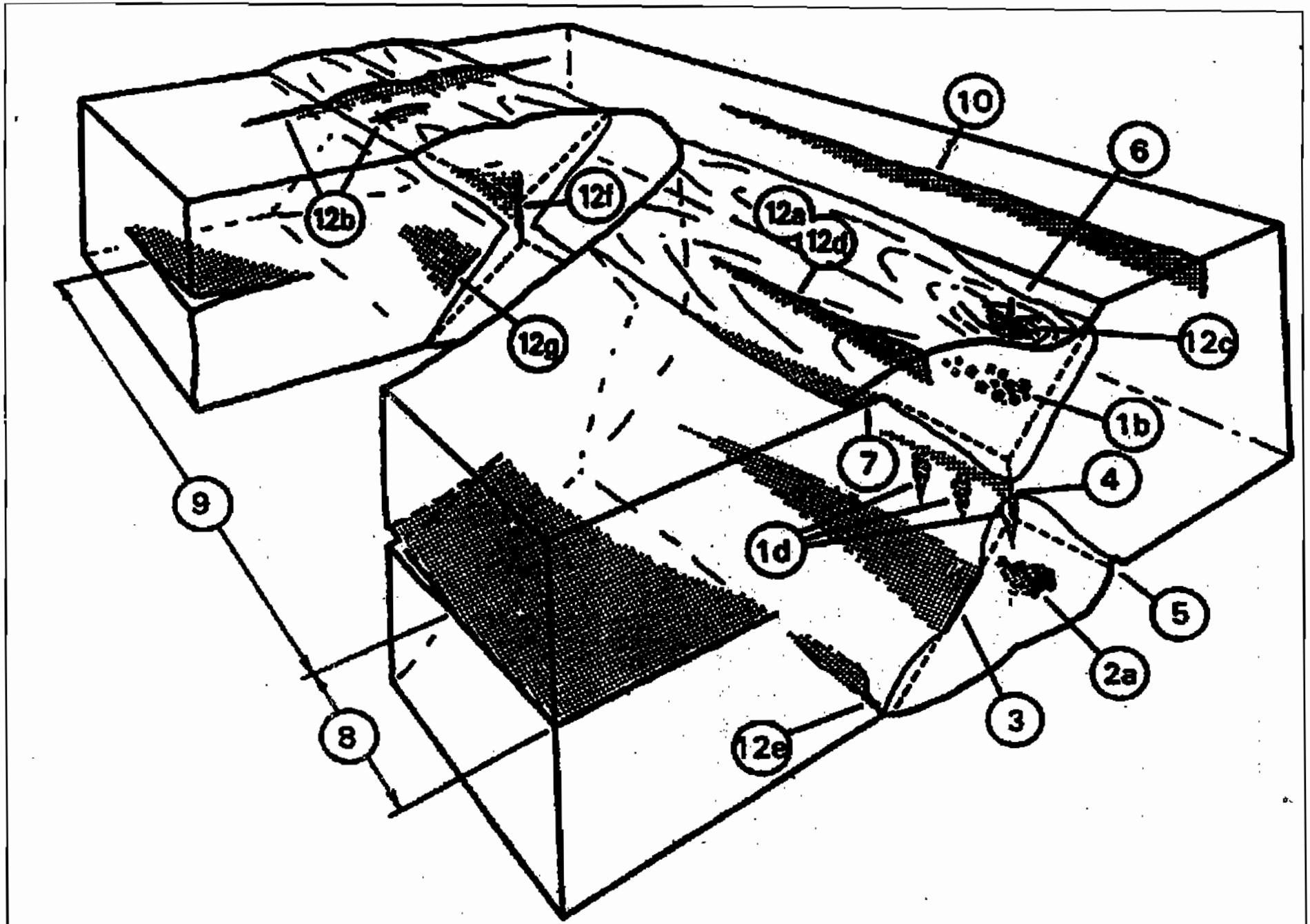

Figure 1