(Following Paper ID and Roll No. to be filled in your Answer Books)

PAPER ID : MF9

M. TECH. (Sem.II)

THEORY EXAMINATION 2015-16

ADVANCED WELDING TECHNOLOGY

Time : **3** Hours Total Marks : **100**

Note : Attempt any five question. Each question carries equal marks.

1 (a) Define weldability. Discuss the effect of alloying elements on weldability of stainless steel.

(b) Explain Heat Affected Zone (HAZ) with neat sketch. Also discuss the characteristics of HAZ.

2. (a) Discuss the welding of low carbon steels. Cast iron is generally difficult to weld, Why?

(b) Distinguish between brazing and soldering from the point of view of the filler metals used, applications and the strength of the joint obtained.

3. (a) For the fillet welded structure as shown in Fig.1. Determine the size of the fillet welds. Permissible value of shear stress on section through the throat of fillet welds may be taken as 1000Kg/cm^2.

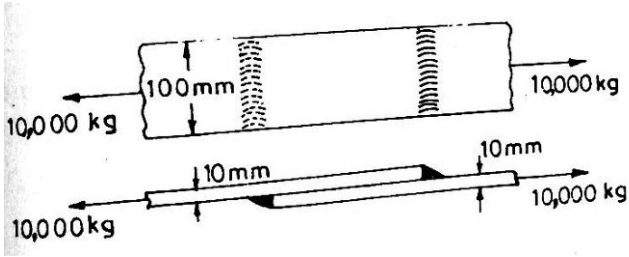

Fig.1

(b) How the discontinuities of the welds are classified? Eexplain their causes and remedies.

4. (a) What are the principle of sound welding design? Also discuss the different welding positions with the help of neat sketch.

(b) Find the best welding speed to be used for the welding of 6mm steel plates with an ambient temperature of 30 °C with the welding transformer set at 25 V and current passing is 300 A. The arc efficiency is 0.9 and the possible travel speeds are 6 to 9 mm/s. The limiting cooling rate for satisfactory performance is 6 °C /s at a temperature of 550°C .Take thermal conductivity of base metal = 0.028 J/mm. s. °C, and $\rho c = 0.0044 J/mm^3 °C$.

5. (a) Explain the working principle of electron beam welding process with suitable sketch. Also mention its advantages over other welding processes.

(b) Explain the principle of friction welding. Also discuss its advantages and applications.

6. (a) Explain the working principle of explosive welding. Also discuss its advantages, applications and limitations.

(b) Explain the principle of plasma arc welding. Also discuss its advantages, applications and limitations.

7. (a) What do you mean by Mechanisation in welding? Discuss the mechanisation of flat/circular joints.

(b) Discuss TIG welding process of spiral welded pipes.

8. Write short notes on the following
   (a) Metallurgical aspects of joining
   (b) Robots applications in welding
   (c) Leadthrough Programming of robot
   (d) Microelectronic welding and soldering.

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