

**ADVANCED WELDING TECHNOLOGY
(MECH 3222)**

Time Allotted : 3 hrs

Full Marks : 70

Figures out of the right margin indicate full marks.

***Candidates are required to answer Group A and
any 5 (five) from Group B to E, taking at least one from each group.***

Candidates are required to give answer in their own words as far as practicable.

**Group – A
(Multiple Choice Type Questions)**

1. Choose the correct alternative for the following: **10 × 1 = 10**
- (i) The depression in the weld metal pool at the point where the arc strikes the base metal is called
(a) puddle (b) crater (c) weld bead (d) weld pass.
 - (ii) FCAW is advantageous in the context of efficient shielding and quality than
(a) TIG (b) MIG
(c) submerged arc welding (d) electroslag welding.
 - (iii) For resistance spot welding which time, pressure is not applied
(a) squeeze time (b) weld time (c) hold time (d) off time.
 - (iv) The coherent source of light is used in
(a) laser beam welding (b) electron beam welding
(c) plasma arc welding (d) ultrasonic welding.
 - (v) In diffusion welding, welding time will be reduced if
(a) temperature increases (b) temperature decreases
(c) both temperature and pressure decrease (d) only pressure decreases.
 - (vi) Which one of the following is not a heat affected region?
(a) Grain growth region (b) Grain refined region
(c) Grain enlarged region (d) Transition region.
 - (vii) Which of the following term is not associated with weldability of a material?
(a) Metallurgical compatibility (b) Electrode length
(c) Mechanical soundness (d) Serviceability factor.
 - (viii) Which of the carbon steel is easy to weld?
(a) Low carbon steel (b) Medium carbon steel
(c) High carbon steel (d) Stainless steel

- (ix) Which is not a non-destructive test for welding?
(a) Liquid penetration test (b) Magnetic particle test
(c) Eddy current test (d) Tensile test.
- (x) In which welding arc cannot be seen from outside
(a) MIG (b) submerged arc welding
(c) MMAW (d) carbon arc welding.

Group – B

2. (a) Explain the principle of arc generation in arc welding process.
(b) If variable speed motor is used to provide the electrode in MIG, which type of arc length control system is normally used and why? Write down the name of the equipment used in MIG.

5 + (5 + 2) = 12

3. (a) To steel sheets of 1.8 mm thickness are resistance welded in a lap joint with a current of 9500A for 0.15s. The effective resistance of the joint can be taken as 100 $\mu\Omega$. The joint can be considered as a cylinder of 5 mm diameter and 1.5 mm height. The density of steel is 0.00786 g/mm³ and heat required for melting steel is 10 J/mm³. Find out the heat requirement for welding and melting efficiency.
(b) Discuss the type of inert gas and type of electrode used in TIG welding. Write down the working principle of flux cored arc welding

4 + (4 + 4) = 12

Group – C

4. (a) Write down the working principle of laser beam welding with a neat sketch.
(b) Write down the basic aspects of cavity welding type in underwater welding.
5. (a) Write down the effect of pressure, temperature and time on diffusion welding process.
(b) Which types of materials are used in transducer coupling in USW? What are the advantages of USW?

8 + 4 = 12

6 + (3 + 3) = 12

Group – D

6. (a) Explain the characteristics of different regions on HAZ.
(b) What will be the effects of changing welding speed on weldment?

6 + 6 = 12

7. (a) What are the necessities and advantages of “preheating” and “post welding heat treatment”?
- (b) Explain the procedure which should be followed for metal arc welding of gray cast iron.

(3 + 3) + 6 = 12

Group – E

8. (a) What is the use of Weld Positioner? Explain the differences between welding mechanization and welding automation.
- (b) What is teach pendant? Discuss a robotic work cell configuration with diagram used in welding.

(2 + 4) + (2 + 4) = 12

9. (a) Discuss magnetic particle test to find out the welding defects with a neat sketch.
- (b) Write down the safety principle generally practiced in arc welding process.

6 + 6 = 12

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ME	https://classroom.google.com/c/Mjk5MzY2NTQxODY1/a/MzQ5Nzc3MDgyMzYw/details