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BTECH
(SEM VIII) THEORY EXAMINATION 2021-22
ADVANCE WELDING

Time: 3 Hours

Total Marks: 70

Notes:

- Attempt all Sections and Assume any missing data.

SECTION A

1. **Attempt All** **2x7=14**

a.	Explain the concepts of weld thermal cycles?
b.	What is weld metal solidification?
c.	Define the heat-affected zone. What are the different regions of HAZ?
d.	Why is A.C. Potentially power source more dangerous than D.C at the same nominal voltage?
e.	List the various factors leading to distortion in a welded joint.
f.	What is the common difference between longitudinal and transverse shrinkage in welded joints?
g.	What is brazing and what are the methods that are used for it?

SECTION B

2. **Attempt any 3 parts of the following:** **3x7=21**

a.	Give the comparison of welding processes with the other joining processes
b.	Discuss MIG Welding in detail along with various metal transfer modes in this process
c.	What do you mean by heating and cooling rate? Also, explain the role it plays in the metallurgical properties of HAZ.
d.	What is meant by hard-facing? What welding process may be used for hard-facing? Enumerate the advantages and applications of hard-facing.
e.	Discuss in detail how weld defects can be avoided?

SECTION C

3. **Attempt any 01 part of the following:** **7x1=7**

(a)	What is arc efficiency? Discuss the phenomena of heat Generation at cathode and anode
(b)	Explain the various characteristics of a power source with variation of current and voltage

4. **Attempt any 01 part of the following:** **7x1=7**

(a)	What is meant by "fluxing" Why is it done? What are the properties which a good flux should possess
(b)	Sketch the two polarities of D.C. supply and compare these for welding process

5. **Attempt any 01 part of the following:** **7x1=7**

(a)	What is microwave welding? Give advantages, disadvantages, and applications.
(b)	Explain with a sketch the process of underwater welding. Give its types and applications.

6. **Attempt any 01 part of the following:** **7x1=7**

(a)	What are the causes of residual stress in welding? Explain the different types of residual stress generated in welded joint
(b)	Calculate cooling rate from following data. $T_o = 25\text{ }^\circ\text{C}$, $T_c = 550\text{ }^\circ\text{C}$ $t = 6\text{ mm}$ $f = 0.9$ $E = 25\text{ V}$, $v = 8\text{ mm/sec}$. $I = 300\text{ A}$ $\rho C = 0.0044\text{ J/mm}^3\text{ }^\circ\text{C}$, $k = 0.0281\text{ J/min s }^\circ\text{C}$

7. **Attempt any 01 part of the following:** **7x1=7**

(a)	What do you understand by weldability? How do the alloying elements affect the weldability of the material?
(b)	Explain the metal surfacing. What are the various methods of depositing metal? Explain any one in detail