

**Roll No.**

**Total No. of Pages : 02**

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**M.Tech. (ME)**

**(Sem.-2)**

## ADVANCED WELDING TECHNOLOGY

**Subject Code : MTME-205**

**M.Code : 74981**

**Date of Examination : 12-12-2022**

**Time : 3 Hrs.**

**Max. Marks : 100**

**INSTRUCTIONS TO CANDIDATES :**

1. Attempt any FIVE questions out of EIGHT questions.
2. Each question carries TWENTY marks.

1.
  - a) What are various factors that define the quality of weld? Explain in detail with diagram.
  - b) Explain various destructive and non-destructive testing techniques for welding joints. Out of these two broad categories, which one is better and why? Justify your answer.
2.
  - a) What are various allied welding processes? Explain each with suitable application.
  - b) What is the mechanism of arc initiation and maintenance?
3.
  - a) A welding operation is being performed with 30V and 150A on carbon steel sheet with carbon steel electrode. The cross-sectional area of weld bead is  $25\text{mm}^2$ . Estimate the weld speed if efficiency is 75%. Take sp. Energy for A1 as  $9.7\text{J/mm}^3$
  - b) What is preheating of welding? For what material and for which process, it is necessary? Justify your answer.
4.
  - a) Explain the principle, theory and technique of Electron beam welding process.
  - b) Explain influence of temperature distribution across a welded structure based on weld geometry.
5.
  - a) What is effect of thermal conductivity of work-piece on *kerf width* in oxy-fuel gas cutting? Explain.
  - b) Could you use oxyfuel gas cutting for stack of sheet metals? Explain and justify.

6.
  - a) Assume two 1mm steel sheets are being spot welded at a current of 5000A and for a current flow time of 0.1s. Using 5mm diameter electrode estimate the heat generated and its distribution in weld zone.
  - b) If a material to be welded is preheated, is the likelihood for porosity increases or decreases? Explain.
7.
  - a) A welding operation is being performed with 20V and 200A on aluminum sheet with aluminum electrode. The cross-sectional area of weld bead is  $30\text{mm}^2$ . Estimate the weld speed if efficiency is 75%. Take sp. Energy for Al as  $2.9\text{J/mm}^3$ .
  - b) Rank all the welding processes in terms of i) cost and ii) weld quality.
8.
  - a) How do you select the electrodes for different welding processes? What are the factors needed to be take care into consideration in selection of electrodes?
  - b) What are advantages of electron-beam and laser-beam welding over arc welding?

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**