Roll No. .....

22616

M. Tech. 1st Semester (MAE)
CBCS Scheme
Examination – February, 2022

WELDING & ALLIED PROCESSES

Paper : MTMA21C4

Time : Three Hours] *[Maximum Marks : 100*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt *five* questions in all, selecting *one* question from each Unit. Question No. 1 is ***compulsory***. All questions carry equal marks.

1. Explain the following : $4 \times 5 = 20$

(a) Weld dilution

(b) Epitaxial solidification

(c) Arc efficiency

(d) Automatic welding

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UNIT – I

2. (a) How welding processes are classified ? What is weld ability ? Explain. 8

(b) Explain constant voltage characteristics of arc welding. 6

(c) Discuss weld thermal cycle. 6

3. (a) Discuss metallurgy of fusion weld. 6

(b) Explain recrystallization and grain growth of Heat affected zone. 8

(c) State solidification mechanism and micro structural products in welding metal. 6

UNIT – II

4. (a) Define welding arc. Explain the mechanism of arc initiation and its maintenance. 6

(b) What is arc blow ? Describe in brief the factor which causes the arc blow. 6

(c) What should be the basic characteristics of a power source used for arc welding ? Explain a thyristor controlled rectifier. 8

5. (a) Explain the constant current and constant voltage characteristics of arc welding machines. Give applications of each of them. 8

(b) What are shielding gases ? Discuss their need. 6

(c) Explain role of arc polarity on arc behavior and arc stability. 6

UNIT – III

6. (a) Explain submerged are welding process with suitable sketch. What are the fluxes used in submerged welding process ? 10

   (b) Discuss in detail the mechanism and modes of metal transfer in GMAW process. What is the effect of polarity on metal transfer and melting rate of this process ? 10

7. (a) Differentiate CO_2 welding and GMAW with respect to their parameters. 10

   (b) Explain the TIG system of arc welding. Describe the features of the power supply used in TIG welding and give the applications of this process. 10

UNIT – IV

8. (a) Explain flexible automated welding. 6

   (b) Principle of robotic welding. Classify welding robots. 8

   (c) Discuss explosive welding with its main characteristics and applications. 6

9. (a) State *two* examples of underwater welding process. 6

   (b) Describe ultrasonic welding with *two* suitable examples. 6

   (c) State the principle behind Friction stir welding. 8
