

GUJARAT TECHNOLOGICAL UNIVERSITY**M. E. - SEMESTER – II • EXAMINATION – SUMMER • 2014****Subject code: 1722802****Date: 18-06-2014****Subject Name: Advance Welding Technology****Time: 02:30 pm - 05:00 pm****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

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|------------|-----|--|-----------|
| Q.1 | (a) | What is arc blow? Discuss the mechanism of arc blow. State knowledge and skills required for production engineer to prevent the arc blow. | 07 |
| | (b) | State the factors affecting the metal transfer in an automatic welding process? Describe the special features of spray metal transfer and short circuited metal transfer in MIG | 07 |
| Q.2 | (a) | Explain three factors affecting the weldability. What is the purpose of weldability test? Explain controlled thermal severity (CTS) test with neat sketch. | 07 |
| | (b) | Describe sensitization with respect to weldability of austenitic stainless steel SS 304. and explain preventive measures for the same. Describe in brief the process used for welding stainless steel. | 07 |
| | | OR | |
| | (b) | Define the term post weld heat treatment of weld of high thick SA 516 material. Differentiate between heat input and heat intensity with respect to conventional and modern welding processes. | 07 |
| Q.3 | (a) | What is the importance of heat flow concept and cooling rate in SMAW process? Describe the term heat flow analysis with suitable example. | 07 |
| | (b) | Write down procedure for determination of preheat temperature | 07 |
| | | OR | |
| Q.3 | (a) | Explain the Schaeffler's diagram with neat sketch. And give Comparison between Schaeffler and Delong diagram. | 07 |
| | (b) | Discuss welding parameters of heat distribution on thin plate and thick plate. | 07 |
| Q.4 | (a) | Residual stresses in weldments can have two major effects namely, they may produce distortion or cause premature failure in weldments, or both- Explain. | 07 |
| | (b) | Describe the significance of material properties, influence of welding process and process parameters for welding distortions such as transverse shrinkage and longitudinal shrinkage. | 07 |
| | | OR | |
| Q.4 | (a) | Explain in detail the general principles of following weld joint design.
(A) 50 mm thick two carbon steel plates (B) 25 mm and 50 mm thick two carbon steel plates. | 07 |
| | (b) | (i) What maximum output current can be drawn at 100 % duty cycle from a welding power source rated at 500 A at 60 % duty cycle?
(ii) Calculate transverse shrinkage of carbon steel welds having cross sectional area of weld is 50 mm ² , thickness of plate 10 mm and root opening is 3.15 mm. | 07 |

- Q.5** **(a)** Write role of WPS, WPQ and PQR in quality assurance in welding. **07**
Prepare WPS for 20 mm thick SA 515 Gr 60 plate material, SMAW process, 1G weld position.
- (b)** Explain with neat sketch the Electron Beam Welding process and discuss **07**
its principle process Parameters, advantages, limitations and applications.
- OR**
- Q.5** **(a)** Explain factors affecting on implementation of automation in welding. **07**
Describe role of computer technology in welding automation.
- (b)** Write brief note on process parameters, advantages and limitations of **07**
welding of composite materials.
