Seat No.: _____ Enrolment No._____

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.**

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 Schaefflerôs 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. Prepare WPS for 20 mm thick SA 515 Gr 60 plate material, SMAW process, 1G weld position.	**07**
	(b)	Explain with neat sketch the Electron Beam Welding process and discuss its principle process Parameters, advantages, limitations and applications.	**07**

OR

Q.5	**(a)**	Explain factors affecting on implementation of automation in welding. Describe role of computer technology in welding automation.	**07**
	(b)	Write brief note on process parameters, advantages and limitations of welding of composite materials.	**07**

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