

GUJARAT TECHNOLOGICAL UNIVERSITY
ME- SEMESTER II- EXAMINATION – SUMMER 2015

Subject Code: 2722802**Date: 26/05/2015****Subject Name: Advanced Welding Technology****Time: 2:30 PM – 5:00 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) Give reasons as to why acetylene is most popular as fuel gas in Oxy-fuel gas welding. Discuss the unique characteristics of acetylene, the problems encountered in its storage, and the methods adopted to overcome them. **07**
- (b) Write various types of fluxes with its effect on welding. **07**
- Q.2** (a) Discuss the concept of heat input and heat intensity with respect to the development of conventional and modern welding processes. **07**
- (b) What are the important factors that influence the metal transfer in an automatic welding process? Discuss the special features of spray metal transfer and short Circuited metal transfer in MMAW process. **07**

OR

- (b) The static V-I characteristic of a welding power source is given by the parabolic equation $V = -400(I - 70)$, and the arc characteristic is represented by the straight line equation $V = 21(I - 16)$. Determine (1) the power of a stable arc, and (2) if the arc length (l) and arc voltage (V) are related by the equation $V = 20 + 4.5l$. Determine the optimum arc length for maximum power. **07**
- Q.3** (a) Discuss the different types of electrode coatings. Differentiate between cellulosic electrodes and rutile electrodes. **07**
- (b) Define weldability with reference to electric resistance welding. Determine the relative weldability of the materials listed in the table considering their relevant data mention in table. **07**

Sr. No	Material	Electric Resistivity () (ohm/cm)	Relative thermal Conductivity (K)	Melting Point (°C)
1	Monel	48.2	0.07	1318
2	Inconel	98.1	0.04	1390
3	Austenitic Stainless Steel	75.0	0.12	1395
4	Tin	11.0	0.15	231
5	Zinc	5.9	0.27	419

OR

- Q.3** (a) Write short note on Effect of various defects on fatigue strength of welded joints. **07**
- (b) What do you mean by Joint preparation in the welding? Explain with example, what are the influences of joint preparation on distortion. **07**
- Q.4** (a) Discuss the Schaeffler's diagram with neat sketch along with their limitation. Compare Schaeffler and Delong diagram. **07**

- (b) What is inter-granular and Intra-granular cracking in stress corrosion cracking? 07
- OR**
- Q.4** (a) What are the important variables in arc welding and how do they affect penetration, bead width and reinforcement? How does the selection of a flux affect the chemistry and mechanism of weld metals? 07
- (b) What is the importance of heat flow concept and cooling rate in SMAW process? Describe the term heat flow analysis with suitable example. 07
- Q.5** (a) Write brief note on process parameters, advantages and limitations of welding of composite materials. 07
- (b) Explain factors affecting on implementation of automation in welding. Describe role of computer technology in welding automation. 07
- OR**
- 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 in brief: Welding of composite materials. 07
