

GUJARAT TECHNOLOGICAL UNIVERSITY
DIPLOMA ENGINEERING – SEMESTER –V • EXAMINATION – SUMMER-2015

Subject Code: 3355503**Date: 07/05/2015.****Subject Name: Welding Metallurgy****Time: 02:30 P.M TO 05:00 P.M****Total Marks: 70****Instructions:**

1. Attempt any five questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Each question carry equal marks (14 marks)

- Q.1 (a) Explain heat flow in and around weld metal with neat sketch. 07
 (b) Calculate cooling rate of weld joint from following data. 07
 $T_o=25^{\circ}\text{C}$, $T_c = 550^{\circ}$, $t= 8 \text{ mm}$, $f=0.85$, $E = 21\text{V}$, $v=6\text{mm/sec.}$, $I = 120\text{amps}$ and $PC=0.0044\text{J/mm}^3$, $K = 41 \text{ J/M.s } ^{\circ}\text{C}$
- Q.2 (a) Explain list different gases absorb by welds. List different defects produce in weld due to it. Explain different sources of gas absorption. 07
 (b) Draw iron carbon diagram and show different micro structures observed in it. Show paratactic point, eutectic point and eutectoid point. Write reaction of this three point. 07
 OR
 (b) Explain porosity formation with neat sketch in weld and suggest its remedies. 07
- Q.3 (a) Draw neat sketch of TTT diagram use for welding and show different microstructure observed in it. 07
 (b) Explain effect of increase in heat input on weld joint. 07
 OR
- Q.3 (a) Draw neat sketch of different zones of steel weld melts as represents on IC diagram. 07
 (b) Prepare WPS from given data. 07
 1. Design code : ASME section VIII Div.1
 2. Specification standard : ASME section IX
 3. Base metal : 8 mm thick SA515 GR 60
 4. Welding process : SMAW
 5. Joint Design : Single "V"
 6. Filler metal : AWS SFA 5.1 E-7018
 7. PWHT : NIL
- Q.4 (a) Explain different types of stainless steel. 07
 (b) list different welding techniques used for austenitic stainless steel and explain any one. 07
 OR
- Q.4 (a) Explain weldability of precipitation hardening stainless steel. 07
 (b) List different processes used for welding aluminum and its alloys. Explain any one with neat sketch. 07
- Q.5 (a) Explain different problems associated with welding of titanium 07

(b) Explain mechanical residual stresses, metallurgical residual stresses and reaction stresses with neat sketch. 07

OR

Q.5 (a) Explain different methods of relieving welding residual stresses. 07

(b) Explain concept and types of distortion with neat sketch 07
