Enrolment No.____

GUJARAT TECHNOLOGICAL UNIVERSITY ME – SEMESTER II– EXAMINATION – WINTER - 2016

Subject Code: 2722802

Subject Name: Advanced Welding Technology

Time: 2:30 pm to 5:00 pm

Total Marks: 70

07

07

Date: 17/11/2016

Instructions:

- 1. Attempt all questions.
- 2. Make suitable assumptions wherever necessary.
- 3. Figures to the right indicate full marks.
- Q.1 (a) Compare the power sources for manual metal arc (MMAW), TIG and submerged arc 07 welding (SAW) processes.
 - (b) Describe sensitization with respect to weldability of austenitic stainless steel SS 304 07 and explain preventive measures for the same. Describe in brief the process used for welding stainless steel.
- Q.2 (a) Discuss the selection factors for power sources.
 - (b) Explain with neat sketch the Plasma Arc Welding process. Compare and contrast between un-transferred and transferred plasma arc process and discuss its process parameters, merits-demerits and applications.

OR

- (b) What is OCV? Discuss its significance in arc welding. Also discuss Arc 07 characteristics in contest of OCV.
- Q.3 (a) Discuss electrode coding systems as per IS and AWS. Explain in brief its 07 significance in the industry.
 - (b) What is the use of schaeffler's diagram

OR

- Q.3 (a) Describe fatigue mechanism observed in welded joints. Explain in brief the factors 07 affecting the fatigue life of welded joint.
 - (b) How can we calculate cooling rate in welding? Explain in detail with example. 07
- Q.4 (a) Determine the cost per meter of an 8mm fillet weld made manually, in two runs, with rutile coated electrodes of 4 mm diameter at a travel speed of 25cm/min. The operator factor is 25% and the filler metal yield is 60%. The weight of the weld metal deposited is 0.125 kg/m. Take welder pay rate at Rs. 15/h, power cost at Rs. 5/KWh and cost of covered electrodes as Rs. 50/kg. Take "on cost" as 300%.
 - (b) Explain in detail the general principles of following weld joint design. (i) 50 mm thick two carbon steel plates (ii) 25 mm and 50 mm thick two carbon steel plates. Suggest suitable edge preparation in each case with justification.

OR

- Q.4 (a) Define weldability. Explain effects of alloying elements on weldability. What is the 07 purpose of weldability test? Explain hot cracking test with neat sketch.
 - (b) What is the importance of heat flow phenomena and cooling rate in resistance 07 welding process? Describe the heat flow analysis for the same.
- Q.5 (a) Describe fatigue mechanism observed in welded joints. Explain in brief the factors 07 affecting the fatigue life of welded joint.
 - (b) Explain three factors affecting the weldability. What is the purpose of weldability 07 test? Explain controlled thermal severity (CTS) test with neat sketch.

OR

- Q.5 (a) With a schematic diagram, explain how ceramics can be welded with metal. State 07 the major difficulties in welding of dissimilar metals.
 - (b) 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.
