

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY**BE- SEMESTER-VII (NEW) EXAMINATION – WINTER 2020****Subject Code:2172111****Date:21/01/2021****Subject Name:Advances in Welding Metallurgy****Time:10:30 AM TO 12:30 PM****Total Marks: 56****Instructions:**

1. Attempt any FOUR questions out of EIGHT questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

		MARKS
Q.1	(a) State the requirement of advances in welding Power sources giving suitable examples.	03
	(b) Enlist Process variables of GTAW process and discuss Why high frequency arc starting is required in GTAW Welding?	04
	(c) Draw schematics comparing DCEN, DCEP and AC welding characteristics with 1. Heat balance 2. Penetration characteristics 3. Oxide cleaning action and 4. Electrode size and current carrying capacity.	07
Q.2	(a) Calculate heat Input for SMAW Process Current- 150 A, Voltage- 22 V, Travelling Speed- 150 mm/min, process efficiency η 60%.	03
	(b) Critically Compare Argon, Helium Argon-helium mixtures and CO ₂ shielding gases.	04
	(c) Justify the following development with filler Wire/Consumable a) Addition of Fe Powder in SAW Flux b) Rutile based Flux coating in SMAW Electrodes c) Titanium Boron micro alloying in SAW Wire d) Low hydrogen electrodes.	07
Q.3	(a) Explain Specifications of following Consumables : - (1) E 6013 (2) F70A2-EL8 (SAW FLUX + WIRE) (3) ER 70 -S6 / ER 70-S2 (4) E71T - 1	03
	(b) Classify the Low hydrogen electrodes and state their requirements.	04
	(c) Enlist the various parameters of Friction Stir Welding and state the merits-demerits and application.	07
Q.4	(a) Draw schematic of various modes of metal transfers in GMAW.	03
	(b) Evaluate Flux core wire gives higher penetration compared to solid wire.	04
	(c) Draw schematic of plasma key hole welding and state the applications of this process.	07
Q.5	(a) Differentiate between agglomerated and fused fluxes used	03

	for SAW Process.	
	(b) State the applications of Friction Stir surfacing.	04
	(c) Explain Narrow Gap Welding Processes for High Thickness joints with schematics. How can NGW joints save consumable, time and labour? Justify	07
Q.6	(a) What are the benefits of Pulse TIG welding technology? Only draw pulse wave form.	03
	(b) Why Ac welding is preferred for welding of Aluminium /aluminium alloys ?	04
	(c) Explain the process of Activated Flux TIG Process & state the merits & demerits. How much plate thickness it can weld in one pass?	07
Q.7	(a) Draw schematics of Hot Wire TIG Welding Process the state the benefits of this process.	03
	(b) Low heat input and less weld metal volume is preferred to obtain sound mechanical properties of the weld? Justify with suitable example	04
	(c) What is Cold Metal Transfer Technology? What are the process benefits of this process?	07
Q.8	(a) Enlist Salient features of intelligent welding Power source system based on Fuzzy logic and Artificial intelligence.	03
	(b) Differentiate between self-shielded and externally shielded electrodes.	04
	(c) Write short note on (i) Robots in Welding automation (ii) Modelling and simulation of welds	07
