Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII (NEW) EXAMINATION – WINTER 2018

Subject Code: 2172111 **Date: 19/11/2018**

Subject Name: Advances in Welding Metallurgy

Time: 10:30 AM TO 01:00 PM **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

			MARKS
Q.1	**(a)**	State the various advances in the Welding Power sources In terms of process capabilities.	**03**
	(b)	Define Power density . Arrange different welding processes in scale of increasing power density.	**04**
	(c)	Compare AC and DC Welding Power sources in terms of factors listed below 1. Arc Stability 2. Distribution of arc heat 3. Efficiency 4. Power factor 5. Cleaning action 6. Maintenance 7. Cost	**07**
Q.2	**(a)**	Calculate heat Input for SMAW Process Current- 200 A, Voltage- 14 V, Travelling Speed- 200 mm/min, process efficency η = 60%.	**03**
	(b)	Explain the Limitations of Conventional Power Sources & discuss the salient features available with the Latest power source equipment.	**04**
	(c)	Which shielding gases are used for following processes? (i) MS welding using MIG (ii) SS Welding using TIG (iii) SS Welding using MAG (iv) PAW key hole mode	**07**
		OR	
	(c)	Compare Thyristor Control - Synergic Pulse Control - Inverter Control Power Sources in terms of features	**07**
Q.3	**(a)**	State development in MMAW Electrodes for Improved toughness and Improved hydrogen control.	**03**
	(b)	What is Low Hydrogen Electrodes? Why they are developed?	**04**
	(c)	Explain Specifications of following Consumables : - (1) E 6013 (2) F70A2-EL8 (SAW FLUX + WIRE) (3) ER 70 -S6 / ER 70-S2 (4) E71T - 1	**07**

OR

Q.3	**(a)**	Draw schematic of various modes of metal transfers in GMAW.	**03**
	(b)	Evaluate Flux core wire gives higher penetration compared to solidwire.	**04**
	(c)	Compare Argon, Helium, Co2 Shielding gases in terms of properties & suggest suitable combinations of gas mixtures for welding of HSLA, S.S and Nickel based Alloys.	**07**
Q.4	**(a)**	Differentiate between agglomerated and fused fluxes used for SAW Process.	**03**
	(b)	Explain for which metals DCEP is suitable to use with GTAW Process? How problem of Tungsten over heating is taken care of?	**04**
	(c)	Explain Narrow Gap Welding Processes for High Thickness joints with schematics. How can NGW joints save consumable, time and labour? Justify	**07**

OR

Q.4	**(a)**	What are the benefits of Pulse TIG welding technology? Only draw pulse wave form.	**03**
	(b)	Explain the process of Activated Flux TIG Process & state the merits & demerits. How much plate thickness it can weld in one pass ?	**04**
	(c)	Explain the Principles, Operation & merits & demerits of Friction Stir Welding.	**07**
Q.5	**(a)**	Draw schematic of Hot-wire TIG Welding Machine what is the source of pre-heating of auto feed wire?	**03**
	(b)	Define Plasma Welding. How Plasma Key-hole welding is done? How much power density PAW offer ?	**04**
	(c)	What is the function of flux coated on the shielded electrodes? what do you mean by E 316-**15**, E 316-**16** & E 316-**17** ?	**07**

OR

Q.5	**(a)**	Write Salient features of Fuzzy logic based intelligent Power Systems	**03**
	(b)	Differentiate between self-shielded and externally shielded electrodes.	**04**
	(c)	Write short note on (i) Robots in Welding automation (ii) Welding Simulation.	**07**