

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE - SEMESTER– VII (New) EXAMINATION – WINTER 2019****Subject Code: 2172111****Date: 26/11/2019****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.

		<b>MARKS</b>
<b>Q.1</b>	(a) Expand the following terms: 1) SMAW, 2) PTAW and 3) FCAW.	<b>03</b>
	(b) Discuss the effect of heat input and inter pass temperature on mechanical properties of steel.	<b>04</b>
	(c) State the various advances in the welding processes in terms of productivity and quality.	<b>07</b>
<b>Q.2</b>	(a) What are static and dynamic characteristics of power sources?	<b>03</b>
	(b) Sketch V-I characteristic of CC and CV type welding power source.	<b>04</b>
	(c) Enlist the electronic power regulation systems and explain the salient features available in latest welding equipment.	<b>07</b>
	<b>OR</b>	
	(c) Compare Thyristor Control – Synergic Pulse Control – Inverter Control Power Sources in terms of features.	<b>07</b>
<b>Q.3</b>	(a) What are low hydrogen electrodes and the need for their development?	<b>03</b>
	(b) Explain Specifications of following Consumables: 1) E 6013 and 2) ER 70 -S6 / ER 70-S2.	<b>04</b>
	(c) Write in detail about the type of shielding gases used in arc welding processes. Give examples of three possible combination of shielding gas mixtures for specific applications.	<b>07</b>
	<b>OR</b>	
<b>Q.3</b>	(a) Differentiate between agglomerated and fused fluxes.	<b>03</b>
	(b) Justify or refute the following statement: "Friction stir welding is ideally suited for welding of Aluminum and its alloys".	<b>04</b>
	(c) With suitable sketches, explain different variants of friction welding.	<b>07</b>
<b>Q.4</b>	(a) Discuss the effect of various welding parameters on weld bead profile.	<b>03</b>
	(b) Explain for which metals DC electrode positive (reverse polarity) is suitable to use with GTAW Process?	<b>04</b>

- (c) Explain the process of Hot Wire Tungsten Inert Gas Welding. **07**  
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- OR**
- Q.4** (a) Justify or refute the following statement: "MIG welding requires DC electrode positive (reverse polarity)". **03**
- (b) Explain why in welding of certain materials, preheating and post-heating are essential? **04**
- (c) Explain with schematic, pulsed spray transfer and explain merits and de-merits of Pulsed GMAW. **07**
- Q.5** (a) Why vacuum is important in producing a good quality weld in EBW? **03**
- (b) Explain the principle behind Laser Beam Welding. Write some applications. **04**
- (c) Explain the process of Plasma Keyhole Welding. **07**
- OR**
- Q.5** (a) Explain the need for automation in welding. **03**
- (b) Explain the process of Needle Arc Micro Plasma Welding. **04**
- (c) Write a note on the contribution and use of computational tools to simulate welding processes. **07**

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