Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V • EXAMINATION – WINTER 2013

Subject Code: 151901 Date: 27-11-2013

Subject Name: Manufacturing Processes - II

Time: 10.30 am - 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.**

Q.1 **(a)** For each of the following applications, suggest most suitable major manufacturing process or combination of major manufacturing processes (like welding, casting, forming, heat treatment etc.): **07**

1. A power transmission gear of a reduction gear box
2. Housing of a reduction gear box (gear case)
3. Automobile body
4. A comb
5. Inner race/Outer race of a ball bearing
6. Lathe bed
7. A ceramic tipped cutting tool

(b) (i) Why the following allowances are provided on the patterns in sand moulding? **03**

(1) Draft (2) Contraction (3) Shaking

(ii) Why the properties like Permeability, Compressive strength, Flowability and Hardness are required in a moulding sand? Explain with appropriate reasons for each of them. **04**

Q.2 **(a)** (i) Why a downsprue is made tapered in a gating system? **02**

(ii) What is function of a feeder (riser) in casting? How the riser shape and size shall be chosen and where the riser shall be located on the casting such that riser is able to fulfill its function? Explain with appropriate reasons. **05**

(b) Draw neat, labeled sketches of top gating, bottom gating and part gating methods. Compare advantages and disadvantages of top, bottom and part gating methods. Hence bring out their applications. **07**

OR

(b) Explain investment casting process. Compare its capabilities and applications in the context of weight (size), dimensional tolerance, and economic quantity with sand casting and die casting processes. **07**

Q.3 **(a)** (i) What is difference between nozzles of Oxy-acetylene gas welding process and Oxy-acetylene gas cutting process? Why? Explain with help of neat sketches. **03**

(ii) Manual metal arc welding is preferred for applications like repair & maintenance work and structural work. Justify with the help of welding requirements of these applications and capabilities of MMAW. **04**

	(b)	(i) Sketch and label four positions of welding.	**02**
		(ii) With the help of a neat sketch describe operation of CO_2-MIG welding process in the light of working principle, electrode & consumables used, arc initiation & maintenance method and type of current and type of power source used, process variables and their effect.	**05**
		OR	
Q.3	**(a)**	(i) What is the working principle of brazing and soldering?	**02**
		(ii) State and explain the functions performed by coating of a stick electrode.	**05**
	(b)	(i) The welding arc being submerged is advantageous as well as disadvantageous, in Submerged arc welding process. Justify.	**02**
		(ii) With the help of a neat sketch describe operation of resistance spot welding process in the light of working principle, electrodes used, process variables and their effect. Which materials are weldable by RSW? State the thickness range and joints welded. State typical applications of RSW.	**05**
Q.4	**(a)**	(i) Differentiate between punching and blanking.	**02**
		(ii) Explain phenomenon of work hardening in a ductile metal with the help of a stress-strain diagram. What is the effect of strain hardening on the properties of deformed metal?	**05**
	(b)	Explain principle and operation of rolling process.	**07**
		OR	
Q.4	**(a)**	(i) When the metal working is termed as cold working? And when it is termed as hot working?	**02**
		(ii) Explain what springback in bending is. With the help of neat sketches explain methods to counter springback.	**05**
	(b)	Differentiate between forward extrusion and backward extrusion.	**07**
Q.5	**(a)**	Explain Injection moulding process stating its principle of operation, different aspects, advantages, limitation and applications.	**07**
	(b)	Write short note on the following: (i) Grinding (ii) Chemical-Mechanical Polishing	**07**
		OR	
Q.5	**(a)**	With the help of neat sketches explain principle of operation for different types of compression moulding and their applications. Also explain transfer moulding process and its applications.	**07**
	(b)	Write short note on the following: (i) Honing (ii) Lapping	**07**

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