GUJARAT TECHNOLOGICAL UNIVERSITY

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

Subject Code: 2141403   Date: 05/12/2018

Subject Name: Materials & Manufacture of Food Equipment

Time: 02:30 PM TO 05:00 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)**	What is the purpose of heat treatment of metals?	**03**
	(b)	Differentiate between first and third angle of projection.	**04**
	(c)	Describe the mechanical properties of materials discussing strength, ductility, toughness, stiffness, malleability, plasticity and elasticity.	**07**
Q.2	**(a)**	Draw a phase diagram indicating triple point and critical point	**03**
	(b)	Define stress and strain. Discuss tensile, compressive and shear stress with suitable diagram.	**04**
	(c)	Draw and describe in detail stress strain curve for material under load.	**07**

OR

	(c)	Draw the stress strain curve for material exhibiting following properties:	**07**

       (i)   Stiff, ductile and strong
       (ii)   Stiff, brittle and strong
       (iii)   Stiff, ductile and weak
       (iv)   Stiff, brittle and weak
       (v)   Flexible, brittle and strong
       (vi)   Flexible, ductile and weak
       (vii) Flexible, brittle and weak

Q.3	**(a)**	Show diagrammatically eutectic and peritectic reaction in metals.	**03**
	(b)	Describe oxy-fuel welding.	**04**
	(c)	Answer the following with the help of eutectic phase diagram of Sn-Pb alloy shown below:	**07**

       (i)   The melting point of Sn and Pb.
       (ii)   Maximum solubility of Sn in Pb and Pb in Sn.
       (iii)   For a 40 wt% Sn–60 wt% Pb alloy at 150^0C (300^0F),

           1) What phase(s) is (are) present?
           2) What is (are) the composition(s) of the phase(s)?
           3) The relative amount ofeach phase present?

1
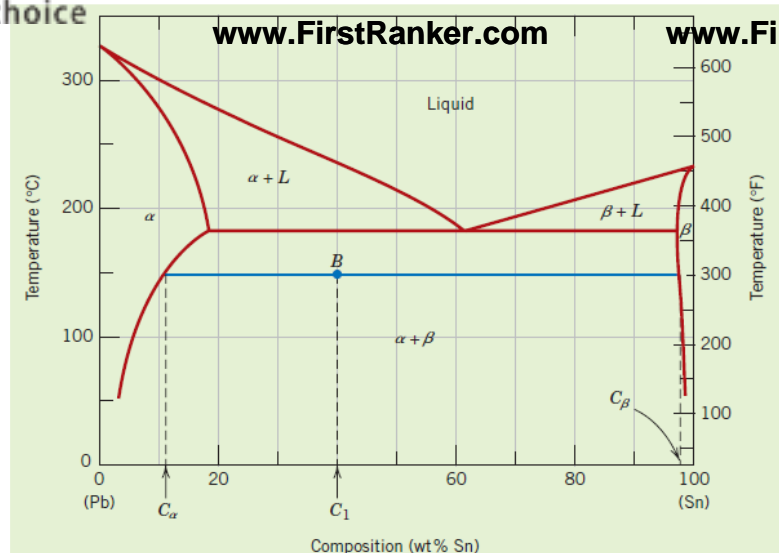
OR

Q.3	**(a)**	What are screw threads?	**03**
	(b)	What are the information present in production drawing? Discuss geometric deviation in brief.	**04**
	(c)	Write short notes on (i) Pin and cotter joint (ii) Half sectional view (iii) Metric thread	**07**
Q.4	**(a)**	Draw the cooling curve of pure iron.	**03**
	(b)	What are the conventions to draw sectional lines? Draw different types of sectional lines.	**04**
	(c)	What is annealing? Describe annealing for ferrous and non ferrous metals.	**07**

OR

Q.4	**(a)**	What are composite materials?	**03**
	(b)	Draw a assembly drawing of plate heat exchanger.	**04**
	(c)	What are natural and synthetic polymers? Describe the mechanism of polymerization. Write the application of polymers in food industry.	**07**
Q.5	**(a)**	What is friction welding?	**03**
	(b)	Describe the stages of heat treatment process for metals.	**04**
	(c)	Describe the principle, components and application of	**07**
		(i) Electron beam welding.	
		(ii) Electric arc welding	

OR

Q.5	**(a)**	Enlist the sanitary design features of food contact surfaces.	**03**
	(b)	Discuss the types of case hardening	**04**
	(c)	Describe the food equipment standards with regard to surface texture and fabrication. Draw acceptable and unacceptable self-drainage design for tanks and vessels.	**07**

2