

Seat No.: \_\_\_\_\_

Enrolment No. \_\_\_\_\_

**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**BE - SEMESTER- IV • EXAMINATION – SUMMER 2015**

**Subject Code: 141403**

**Date: 01/06/2015**

**Subject Name: Materials and Manufacture of Food Equipment**

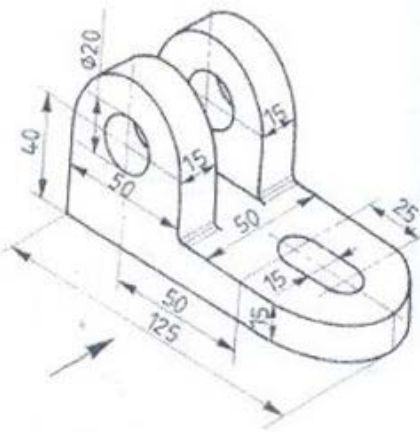
**Time: 10.30am-01.00pm**

**Total Marks: 70**

**Instructions**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Provide drawing supplementary sheet for Q.1(a)

- Q.1 (a)** Using first angle projection method draw sectional front view, top view, right hand side view. **14**



- Q.2 (a)** Draw the diagram of PHE with all labels. Explain the advantages and disadvantages of PHE. **07**
- (b)** Differentiate between **07**
1. Fusion zone and Heat affected zone
  1. Consumable and Non-Consumable electrode
  2. Liquid and Gas carburizing

**OR**

- (b)** Explain the applications of heat exchanger in food industry. Draw the temperature profile diagram for counter and parallel flow. **07**

- Q.3 (a)** Write a short note on Screw threads. What are composite materials? Give classification of composite materials. **07**
- (b)** What is the importance of geometric tolerance? List types of sectional views. Discuss in brief about each type. **07**

**OR**

- Q.3 (a)** Explain “S” curve in detail with diagram. List out its importance. **07**
- (b)** Explain any three with diagram **07**
- a) Gib head key
  - b) Tolerance of flatness

- c) Foundation bolts
- d) Dome nut

**Q.4 (a)** Discuss the followings **07**

- (a) Mechanical Properties
- (b) Flank
- (c) Upper deviation
- (d) normalizing
- (e) Properties of aluminum

**(b)** What is the symbol of flatness? How the perpendicularity of an object is illustrated? **07**  
Discuss in details about Resistance welding and Friction welding

**OR**

**Q.4 (a)** Calculate the melting efficiency in the case of arc welding of the steel with a potential of 20V and current of 200A, travel speed is 5mm/s and area of arc is 20mm<sup>2</sup>. Heat required to melt the steel is 10 J/mm<sup>2</sup> and the heat transfer efficiency is 0.85. **07**

**(b)** Following data for metal A and B is given below; **07**

1. Melting point of A = 650<sup>0</sup>C
2. Melting point of B = 450<sup>0</sup>C
3. Formation of eutectic composition at 40% A and 60% B
4. Solidification temperature = 300<sup>0</sup>C
5. Maximum solid solubility of B in A at 300<sup>0</sup>C = 20%B
6. Maximum solid solubility of A in B at 300<sup>0</sup>C = 10%B
7. Assume lines are straight

Draw the phase diagram from above data and calculate

- a. Temperature at which alloy 90% A and 10% B starts and completes freezing
- b. For same alloy amount of solid phase and liquid phase at 550<sup>0</sup>C

**Q.5 (a)** Discuss about different types of composite materials. Write in details about cermets. **07**

**(b)** Difference between annealing and tempering. What are the different annealing process in discuss in detail. **07**

**OR**

**Q.5 (a)** What do you understand by addition polymerization? Describe about vulcanization of rubber. **07**

**(b)** Explain with diagram of different welding joints? **07**

Define the followings with diagram.

1. Base metal,
2. Deposition rate,
3. Penetration,
4. Puddle,
5. Root,
6. Tack weld
7. Toe

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