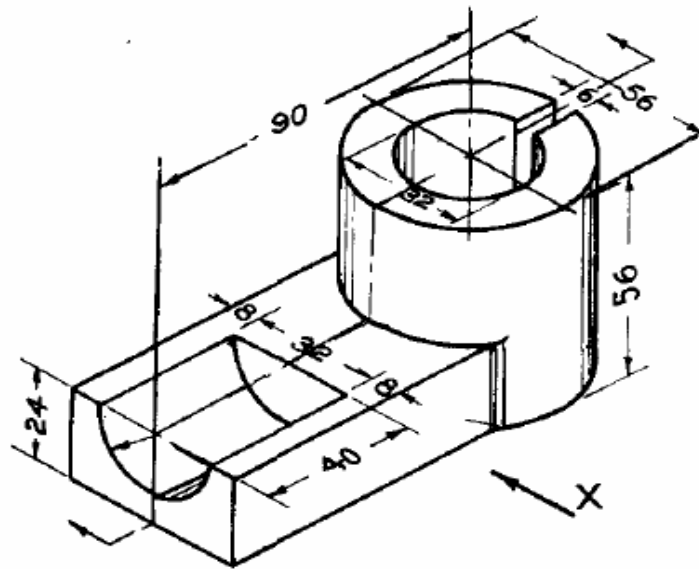


GUJARAT TECHNOLOGICAL UNIVERSITY
B. E. - SEMESTER – IV • EXAMINATION – WINTER 2012

Subject code: 141403**Date: 28/12/2012****Subject Name: Materials and Manufacture of Food Equipment****Time: 02.30 pm - 05.00 pm****Total Marks: 70****Instructions:**

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

- Q.1 (a)** Observe the figure given below and draw the following using appropriate scale by first angle method: **07**
- (i) Front view (ii) Top view (iii) Sectional front view.



- (b)** What is the difference between annealing and tempering? Discuss different annealing process in detail. **07**
- Q.2 (a)** Differentiate between single and multiple start threads with the help of a neat labeled diagram. The number of threads in a M25 external ISO metric screw thread bolt are 20 per inch. Calculate the following: **07**
- (i) Slope of the screw in mm if it is a single start thread
 - (ii) Nominal diameter in mm.
 - (iii) Lead in mm if it is a double start thread.
 - (iv) Pitch in mm.
- (b)** Explain any two with the help of a neat labeled diagram and mention their engineering applications: **07**
- (i) Socket and spigot joint. (ii) Gib-head key. (iii) Interference fit.
- OR**
- (b)** Explain any two with the help of a neat labeled diagram and mention their engineering applications: **07**
- (i) Foundation bolts
 - (ii) Tolerance of straightness or flatness.

- (iii) Right and left handed threads.
- Q.3 (a)** Draw neat sketches of any three types of prominent triangular threads. Mention threads angle and depth in each case. Take thread pitch as 20mm. **07**
- (b)** Write brief notes on the following: **07**
- (i) Geometric tolerances and its types.
 - (ii) Plate heat exchangers and its applications.
 - (iii) Polymers and its uses in food industry.
- OR**
- Q.3 (a)** Draw neat sketches of the following indicating critical dimensions: **07**
- (i) Acme thread (ii) Knuckle thread (iii) Buttress thread
- (b)** Answer the following questions briefly and to the point: **07**
- (i) What are composite materials?
 - (ii) What are washers? Where are they used and why?
 - (iii) What are elastomers and rubbers?
 - (iv) Define thermosetting plastics and give examples.
 - (v) What are evaporators? State their types.
 - (vi) What is the purpose of assembly drawings?
 - (vii) What is Spot facing?
- Q.4 (a)** What is cooling curve? Explain iron allotropy in detail with diagram. Also discuss micro constituents of iron and steel. **07**
- (b)** Write short notes on the following: **07**
- 1. Puddle and Root 2. Porosity and Inclusion
 - 3. Natural flame and Oxidizing flame 4. Rated current and Duty cycle
- OR**
- Q.4 (a)** What is phase diagram? List out the importance of heat treatments. Explain cooling curve with diagram. **07**
- Q.4 (b)** Explain different engineering properties of materials. Discuss hardness, toughness, ductility, fatigue and creep. **07**
- OR**
- Q.5 (a)** What is Plate Heat Exchanger (PHE)? Why it is popular in food industry? With the help of a neat diagram show different parts of plates in PHE. **07**
- (b)** Explain the principle of tungsten inert gas welding with diagram. Also show different types of welding joints with diagram. **07**
- OR**
- Q.5 (a)** What is the application of evaporators in food industry? Differentiate between single effect and multiple effect evaporators. With the help of a neat diagram indicate different methods of feeding in evaporators. **07**
- (b)** Differentiate between nitriding and cyaniding. Discuss different methods of carburizing. **07**
