

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY
M. E. - SEMESTER – I • EXAMINATION – WINTER • 2013

Subject code: 711004N

Date: 30-12-2013

Subject Name: Elements of Cryogenic Engineering

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 mark.

Q.1 (a) What is cryogenics and cryogenic engineering? Discuss the scope of cryogenic engineering. **07**

(b) Discuss the variation of fatigue strength, impact strength and hardness and ductility of material at cryogenic temperature. **07**

Q.2 (a) Which one property of certain materials that appears only at very low temperature? Define and discuss it. **07**

(b) How the specific heat of solids, liquids and gas vary at cryogenic temperature? **07**

OR

(b) Discuss the variation of thermal conductivity and electrical conductivity of material at cryogenic temperature. **07**

Q.3 (a) With neat sketch explain the vapor pressure thermometer and also mention how will you measure the temperature with it? **07**

(b) Discuss with neat sketch turbine flow meter and explain how will you measure the flow? **07**

OR

Q.3 (a) Discuss fluid quality measurement in cryogenic engineering. **07**

(b) Discuss which factors you will consider while selecting the cryogenic insulations. **07**

Q.4 (a) Write note on Multilayer insulation. **07**

(b) Write note on opacified powder insulation and expanded foam insulation. **07**

OR

Q.4 (a) Discuss vacuum alone as insulation. **07**

Q.4 (b) What kinds of hazards possible in the field of cryogenic engineering and how will you prevent them? **07**

Q.5 (a) Write note on space simulation chamber. **07**

(b) Discuss the superconducting devices. **07**

OR

Q.5 (a) Explain the application of cryogenic engineering in the field of biology and medicines. **07**

(b) Which are the safety aspects to be considered in the field of cryogenic engineering? **07**
