Seat No.: ___

Enrolment No.

GUJARAT TECHNOLOGICAL UNIVERSITY ME – SEMESTER-1 (NEW) EXAMINATION – WINTER 2016

Subject Code: 2711001 Subject Name: CRYOGENIC FUNDAMENTAS

Time: 2:30 pm to 5:00 pm

Total Marks: 70

Date:04/01/2017

Instructions:

- 1. Attempt all questions.
- 2. Make suitable assumptions wherever necessary.
- 3. Figures to the right indicate full marks.
- Q.1 (a) Explain the significance of the Strength to weight ratio and Strength to 07 thermal conductivity ratio as related to the properties of metals at cryogenic temperatures.
 - (b) Write important properties to be considered for selection of insulation. 07 Explain merits and demerits of following cryogenic insulations, along with their applications.
 - 1. Opacified powder 2. Expanded foam
- Q.2 (a) Discuss the construction of Multi Layer Insulation. How all the modes of 07 heat transfer would get controlled in MLI. State its applications also.
 - (b) Discuss the Meissner effect, critical current and flux density in reference 07 to superconducting materials.

OR

(b) For helium –II discuss phenomenon like fountain effect, roll-in effect and 07 second sound.

Q.3 (a) Explain in detail Metallic resistance thermometer. 07

(b) Compare how the pressure measurement at low temperature is differ from 07 the pressure measurement at room temperature. Briefly discuss how you will carry out the measurement?

OR

- Q.3(a) Discuss fluid quality measurement.07(b) Explain construction and working of Turbine flow meter.07
- Q.4 (a) Describe the safety precautions to be taken during handling cryogen in 07 industry.
 - (b) Discuss the Physiological hazards associated with cryogen. 07

OR

Q.4 (a) Explain physical and chemical hazards observed in cryogenic plant. 07 Suggest some preventive steps used to control these hazards.

- (b) Compare the performance of gas filled & fibrous insulation, evacuated 07 powdered & fibrous insulation and vacuum insulation.
- Q.5 (a) What do you mean by superconductivity and superconducting materials? 07 Explain in detail about cryotones.
 - (b) How cryogenics engineering is useful in the field of metal forming, **07** improving tool life and improving the properties materials?

OR

Q.5 (a) Discuss the application of cryogenics in nuclear propulsions and chemical 07 propulsions.
(b) Write note on Space simulation chamber 07

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