Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Seventh Semester B.Tech Degree Regular and Supplementary Examination December 2021 (2015 Scheme)

Course Code: ME467

Course Name: Cryogenic Engineering

Max. Marks: 100 Duration: 3 Hours

PART A

Answer any three full questions, each carries 10 marks.

			Marks
1	a)	Discuss the role of cryogenics in i) Biology and medicine ii) Food industry.	(3)
	b)	Differentiate between Type I and Type II superconductors. Briefly explain any three applications of superconductivity.	(7)
2	a)	Sketch and explain the p-T diagram of helium-4. Indicate lambda line, lambda point and critical point on the diagram and explain their significance.	(5)
	b)	Explain ortho-para conversion for hydrogen. Discuss the importance of a catalyst in the conversion process.	(5)
3	a)	Discuss the importance of inversion temperature in liquefaction of gases.	(3)
	b)	With a neat sketch explain the working of a cascade liquefaction system for nitrogen.	(7)
4		With a schematic and T-s diagram explain the working of a precooled Linde-Hampson system. Derive an expression for the liquid yield.	(10)

PART B

Answer any three full questions, each carries 10 marks.

5		With a neat sketch and T-s diagram explain the working of Collins helium liquefaction system.	(10)
6		Draw the schematic and T-s diagram and explain the working of the Simon helium liquefaction system.	(10)
7	a)	Explain the significance of regenerators in a Philips refrigerator.	(4)
	b)	With a neat sketch and T-s diagram, explain the working of a Linde-Hampson refrigerator.	(6)
8		Describe adiabatic demagnetization process. With the help of a schematic and T-s diagram explain the working of a magnetic refrigerator.	(10)

PART C

Answer any four full questions, each carries 10 marks.

9		With a neat diagram explain the suspension system, safety devices and fill and drain system of a typical cryogenic storage vessel.	(10)
10		Compare the advantages and disadvantages of different insulations used in cryogenic equipments.	(10)
11		Explain in detail the features of cryogenic fluid transfer systems.	(10)
12	a)	Write notes on the cryogenic fluid transportation systems.	(5)
	b)	Explain the features of a good storage vessel used for cryogenic fluid transportation.	(5)
13		With the help of a diagram explain the working of a platinum resistance thermometer.	(10)
14	a)	Explain the working of a turbine type flow meter.	(5)
	b)	Explain the working of any one pressure measurement system used in cryogenic applications.	(5)

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