APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Scheme for Valuation/Answer Key

Scheme of evaluation (marks in brackets) and answers of problems/key

SEVENTH SEMESTER B.TECH DEGREE EXAMINATION, DECEMBER 2018

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)	Definition of Cryogenics	(2)
	b)	Type I super conductor (1.5 Marks) Type II super conductor (1.5 Marks)	(3)
	c)	Explaining historical development(5 Marks)	(5)
2	a)	Meissner Effect theory (2 Marks) Diagram(1 Mark)	(3)
	b)	Characteristics of ortho hydrogen (1.5 Marks) Characteristics of para hydrogen (1.5 Marks)	(3)
	c)	Any two space craft applications in detail (2 Marks each)	(4)
3	a)	Any two performance parameters(1.5 Marks each)	(3)
	b)	Any two applications of superconductivity (1.5 Marks each)	(3)
	c)	Precooled LindeHampson system theory (2.5 Marks) Diagram(1.5 Marks)	(4)
4	a)	FOM definition with equation (2 Marks)	(2)
	b)	Working of Stirlingcryocoolers(2.5 Marks)Diagram(1.5 Marks)	(4)
	c)	Ortho- para conversion Theory (3 Marks) simple sketch (1 Mark)	(4)

PART B

Answer any three full questions, each carries 10 marks.

5	a)	Working of Simon Helium liquefier(5 Marks) T-s diagram (2 Marks)	(7)
	b)	Reason for not using simple Linde-Hampson system(3 Marks)	(3)
6	a)	Working of any one liquefaction system for hydrogen (4 Marks) Diagram(2 Marks)	(6)
	b)	Effect of compressor efficiency (2 Marks) Effect of expanderefficiency(2 Marks)	(4)
7	a)	Derivation for COP (4 Marks)	(4)
	b)	Working of Linde-Hampson refrigerator (3 Marks) Derivation for COP (3 Marks)	(6)
8	a)	Working of a Vuilleumier refrigerator(3 Marks) Derivation for COP (2 Marks)	(5)
	b)	Explaining thermodynamics of magnetic cooling (5 Marks)	(5)

PART C

Answer any four full questions, each carries 10 marks.

9		Explaining any 4 features of cryogenic fluid transfer systems(2.5 Marks each)	(10)

10	Explaining any 4 types of insulations used(2.5 Marks each)	(10)
11	Explaining a typical cryogenic liquid storage vessel(6 Marks) Sketch(4 Marks)	(10)
12	Working of a platinum resistance thermometer(7 Marks) Sketch (3 Marks)	(10)
13	Working of a turbine flow meter (7 Marks) Sketch (3 Marks)	(10)
14	Working of a capacitance type level gauge (7 Marks) Sketch (3 Marks)	(10)

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