

Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Eighth Semester B.Tech Degree Regular Examination June 2023 (2019 Scheme)

Course Code: MET476**Course Name: CRYOGENIC ENGINEERING****Max. Marks: 100****Duration: 3 Hours****PART A***Answer all questions, each carries 3 marks.*

Marks

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| 1 | List the applications of Cryogenic Engineering. | (3) |
| 2 | Why thermal expansion/contraction is important in Cryogenic Engineering? | (3) |
| 3 | Difference between Refrigerator and Liquefier. | (3) |
| 4 | Explain the significance of inversion temperature for gases. | (3) |
| 5 | Explain ideal isothermal system for cryogenic refrigeration. | (3) |
| 6 | Depending on the end use application, write 3 basic requirements have to be satisfied by a Cryocooler. | (3) |
| 7 | Classify vacuum pumps. | (3) |
| 8 | What are the common techniques used for gas separation? | (3) |
| 9 | Describe the working of hydro-static liquid level gauge. | (3) |
| 10 | Briefly explain the working of a McLeod gauge. | (3) |

PART B*Answer any one full question from each module, each carries 14 marks.***Module I**

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| 11 | a) Explain super conductivity and list any two applications of super conductivity. | (8) |
| | b) Why Stainless steel is one of the best material for the cryogenic applications? | (6) |

OR

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| 12 | Explain the variation of any two mechanical, any two thermal and any one electrical properties of materials at cryogenic temperatures. | (14) |
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Module II

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| 13 | a) Explain pre-cooled Linde-Hampson system for the liquefaction of gases with a neat sketch and T-s diagram? | (14) |
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OR

- 14 a) Explain ortho-para conversion of hydrogen with suitable sketches. (5)
b) Explain Claude system for the liquefaction with T-s diagram? (9)

Module III

- 15 a) Illustrate the working of Philips refrigerator with a neat sketch. (7)
b) Illustrate the working of Gifford-McMahon refrigerator with a neat sketch. (7)

OR

- 16 a) Explain magnetic refrigerator? (6)
b) Why regenerators are used in cryogenic refrigeration systems? Substantiate your answer with suitable reasons. (8)

Module IV

- 17 a) Explain ideal gas separation system. (7)
b) Explain Gibbs phase rule with T-s diagram (7)

OR

- 18 a) Classify and explain various types of insulation used in cryogenics. (14)

Module V

- 19 a) Explain any two pressure measurement system used in cryogenics with suitable sketches? (14)

OR

- 20 a) Explain any two temperature measurement system used in cryogenics with suitable sketches? (14)
