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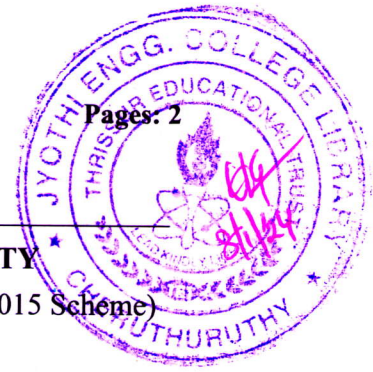
Pages: 2

Reg No.: \_\_\_\_\_

Name: \_\_\_\_\_

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S1 (S, FE) S2 (S, FE) Examination December 2023 (2015 Scheme)



Course Code: BE 10102

Course Name: INTRODUCTION TO MECHANICAL ENGINEERING SCIENCES

Max. Marks: 100

Duration: 3 Hours

**PART A**

*Answer any two questions. Each question carries 15 marks*

- |   |  | Marks |
|---|--|-------|
| 1 | a) Define 'internal energy'. Also prove that it is a property of the system.                                   | (5)   |
|   | b) State the two classical statements of second law of thermodynamics.   | (5)   |
|   | c) Derive an expression for the work done in an isothermal process.  | (5)   |
| 2 | a) Distinguish between renewable and non – renewable energy. what are their advantages and disadvantages?      | (6)   |
|   | b) Explain the principle of working of impulse and reaction turbines.  | (5)   |
|   | c) Why diesel engines have a higher value of compression ratio? Explain.                                       | (4)   |
| 3 | a) Explain with a neat sketch, name all the parts, the working of a single cylinder four stroke petrol engine. | (6)   |
|   | b) Explain the function of an intercooler in a multistage compressor with the help of a P-V diagram.           | (5)   |
|   | c) Differentiate between single stage and multistage compressor.   | (4)   |

**PART B**

*Answer any two questions. Each question carries 15 marks*

- |   |   |     |
|---|---|-----|
| 4 | a) Explain the principle of refrigeration.                                      | (5) |
|   | b) Describe with a neat sketch the working of a vapour absorption refrigerator. | (6) |
|   | c) Name the refrigerants that are commonly used.                                | (4) |
| 5 | a) What is psychrometry? Explain Psychrometric chart.                           | (5) |
|   | b) Discuss the need of transmission system in an automobile?                    | (6) |
|   | c) What is calorific value? How it is expressed?                                | (4) |
| 6 | a) What are gears? Explain different types of gears with neat sketches?         | (5) |
|   | b) What is a differential and why it is used in automobiles?                    | (5) |
|   | c) Write a short note on fuels used in jet engines.                             | (5) |

PART C

*Answer any two questions. Each question carries 20 marks*

- 7 a) What are alloys how it differs from pure metals? Explain the need of alloying in engineering applications. (7)
- b) Define crystallography. List out and explain the common crystal structures in metals. (7)
- c) What are ceramic materials? List any two and state its properties and applications. (6)
- 8 a) Discuss any two non-destructive testing methods used in testing of engineering materials. Write its advantages. (7)
- b) Differentiate a pattern and a core in casting. (5)
- c) What is rolling? What are the different types of rolling? Explain with neat sketches? (8)
- 9 a) What is the difference between drawing and extrusion? (6)
- b) What is welding? Explain the types and basic principle involved in welding. (7)
- c) Write a short note on CNC machines. Explain how it differ from NC machines. (7)

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