

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

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

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**  
FIRST SEMESTER B.TECH DEGREE EXAMINATION, APRIL 2018

**Course Code: BE101-02**

**Course Name: INTRODUCTION TO MECHANICAL ENGINEERING SCIENCES**

Max. Marks: 100

Duration: 3 Hours

**PART A**

*Answer any two questions, each carries 15 marks.*

- |  | Marks |
|--|-------|
| 1 a) Give the two statements of second law of thermodynamics and show their equivalence. | (6)   |
| b) Explain the working of a reaction steam turbine with a neat sketch.                   | (5)   |
| c) Write a short note about the qualitative ideas on entropy.                            | (4)   |
| 2 a) State the zeroth law of thermodynamics. What is its physical significance?          | (4)   |
| b) Distinguish between the terms heat engine, heat pump and refrigerator.                | (5)   |
| c) Explain the working of a four stroke CI engine with suitable sketches.                | (6)   |
| 3 a) Mention any four milestones in Indian space program.                                | (4)   |
| b) Explain the working of gas turbines.  | (5)   |
| (c) Explain the following:   | (6)   |
| i) Principle of increase of entropy    ii) Irreversibility    iii) Available energy      |       |

**PART B**

*Answer any two questions, each carries 15 marks.*

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|---|-----|
| 4 a) List any six applications of refrigeration.  | (6) |
| b) Explain the working of a split air conditioning system with a suitable sketch.           | (5) |
| (c) Mention the names any four vehicle manufactures in India along with their popular makes | (4) |
| 5 a) Explain the following terms with respect to psychrometry                               | (6) |
| i) WBT    ii) Relative humidity    iii) Dew point temperature                               |     |
| b) List the major components of an automobile. Also explain their individual functions.     | (9) |
| 6 a) How do we use refrigeration for the purpose of food preservation?                      | (4) |
| b) Explain any three different types of jet engines mentioning their applications.          | (6) |
| c) Write a short note about aerodynamics.   | (5) |

**PART C**

*Answer any two questions, each carries 20 marks.*

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|--|-----|
| 7 a) Explain about the mechanical properties of common engineering materials.      | (7) |
| b) What are CNC machines? What are their applications?                             | (7) |
| c) Differentiate between following manufacturing methods:                          | (6) |
| i) Casting    ii) Forging    iii) Rolling  |     |
| 8 a) What are alloys? List any five alloys with their composition.                 | (6) |
| b) Distinguish between BCC, FCC and HCP crystal structures.                        | (6) |
| c) How do soldering process differ from brazing?                                   | (4) |
| d) What is grinding process in machining?  | (4) |
| 9 a) Explain any four methods for testing engineering materials.                   | (8) |
| b) What is a welding process? Explain any three welding techniques.                | (7) |
| c) Give few examples for the typical products produced by the following processes: | (5) |
| i) Forging    ii) Extrusion    iii) Turning    iv) Milling    v) Drilling          |     |

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