

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

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

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**  
FIRST SEMESTER B.TECH DEGREE EXAMINATION, DECEMBER 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) Define entropy. What happens to entropy of an isolated system during irreversible process and reversible process?  | (5) |
|   | b) An inventor claims to have developed an engine that works between 500 degree Celsius and 30 degree Celsius with an efficiency of 68%. Is this claim true? Justify your answer. | (6) |
|   | c) Differentiate between enthalpy and internal energy.  | (4) |
| 2 | a) Explain the working of reciprocating air compressor with neat sketch.  | (8) |
|   | b) Describe the working of reaction type steam turbine.   | (7) |
| 3 | a) Discuss the recent space programs of ISRO.   | (5) |
|   | b) Differentiate between solid propellant rockets and liquid propellant rockets.  | (5) |
|   | c) Compare SI and CI engines.   | (5) |

**PART B**

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

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|---|---|------|
| 4 | a) Describe the working of vapour compression refrigeration system with line diagram. Also show the processes on P-h and T-S coordinates. | (10) |
|   | b) Draw and explain the fuel system of a diesel engine.   | (5)  |
| 5 | a) With a neat sketch explain the working of window air conditioning system.  | (10) |
|   | b) Draw a single plate clutch and mark different parts on it.   | (5)  |
| 6 | a) Explain the working of turboprop engine with line diagram.   | (9)  |
|   | b) Differentiate between comfort air-conditioning with industrial air-conditioning.   | (6)  |

**PART C**

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

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|---|--|------|
| 7 | a) Define the following terms associated with crystallography<br>i. Space lattice    ii. Unit cell    iii. Coordination number    iv. Atomic packing factor. | (10) |
|   | b) Discuss the following mechanical properties of the material<br>i. Ductility    ii. Brittleness    iii. Hardness    iv. Malleability    v. Creep           | (10) |
| 8 | a) With a neat sketch explain the working of a shaper machine.   | (10) |
|   | b) Explain arc welding process with schematic diagram.   | (10) |
| 9 | a) Illustrate the properties of composites and ceramics with reference to the relevant fields of application.  | (10) |
|   | b) Draw a neat diagram of a lathe and label its parts.   | (10) |

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