

Reg. No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
FIRST SEMESTER B.TECH DEGREE EXAMINATION, DECEMBER 2017

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

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|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| 1 | a) Differentiate between intensive and extensive properties. Categories the following properties into intensive or extensive.
i) Pressure ii) Energy iii) Volume iv) Specific entropy | (4) |
| | b) Write the two statements for second law of thermodynamics along with the applications. | (4) |
| | c) Explain the working of two stroke - petrol engine with neat diagrams. | (4) |
| | d) What are the applications of air compressors? | (3) |
| 2 | a) What is irreversibility? Explain the causes of irreversibility. | (5) |
| | b) What is entropy? Explain the principle of increase of entropy. | (4) |
| | c) If the availability of water is less and head is large. Suggest the name of turbine to be installed at that site. With neat sketch explain the components and working of that turbine. | (6) |
| 3 | a) What is a Carnot engine? Explain its significance with Carnot cycle. | (4) |
| | b) Differentiate between impulse and reaction steam turbines. | (4) |
| | c) What is the principle behind rocket propulsion? Mention any two significant events in Indian space programme. | (3) |
| | d) Differentiate between SI and CI engines. | (4) |

PART B

Answer any two questions, each carries 15 marks.

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| 4 | a) What are the applications of refrigeration in process and chemical industries? | (4) |
| | b) Define the following: i) Humidity ratio ii) Relative humidity iii) Dew point temperature. | (3) |
| | c) Write any 4 types of classification of automobiles with examples for each type. | (4) |
| | d) Explain the aerodynamic forces with their significance in flight of a body. | (4) |
| 5 | a) Differentiate between refrigeration and air conditioning. | (3) |
| | b) Explain summer air conditioning and winter air conditioning with diagrams. | (5) |
| | c) Mention any four important automobile manufacturers in India and their products. | (4) |
| | d) What are COP of refrigeration and unit of refrigeration? | (3) |
| 6 | a) What is psychrometry? Explain its significance with the help of psychrometric chart. | (4) |
| | b) Write the major components of automobiles with their functions. | (6) |
| | c) With schematic diagram explain any two types of aircraft engines with their applications. | (5) |

PART C

Answer any two questions, each carries 20 marks.

- 7 a) Explain the following crystallographic structures. i) BCC and ii) FCC (6)
b) Define the following: (5)
i) Hardness ii) Toughness iii) Creep iv) Fatigue v) Stiffness
c) Differentiate between Soldering and brazing. (4)
d) Name and explain any four operations on lathe. (5)
- 8 a) How engineering materials are classified. Give two examples for each. (5)
b) List any four destructive material testing methods and explain their purpose. (6)
c) What is extrusion? Explain different types of extrusion processes. (5)
d) List the advantages of CNC machining over conventional machining. (4)
- 9 a) What are ceramics and composites? Give examples for each and their uses. (6)
b) Draw the stress-strain diagram for mild steel and mark the salient points. (4)
c) With neat sketch explain any four types of forging operations. (6)
d) Differentiate between operations done in planer and shaper machines. (4)

