

Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
B.Tech degree examinations (S), September 2020 (S1/S2 - 2015 Scheme)

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) Differentiate between heat and work. | (5) |
| | b) Explain the terms availability and irreversibility. | (5) |
| | c) Calculate the amount of work done on air when 7 m ³ of air at a pressure of 3 bar and at a temperature of 25°C is compressed isothermally to a pressure of 12 bar. | (5) |
| 2 | a) Explain the working of a rotary compressor. | (5) |
| | b) Explain the working of Pelton turbine in a hydraulic power plant with a neat diagram. | (10) |
| 3 | a) Explain the thermodynamic equilibrium of a system. | (6) |
| | b) Define specific speed of a turbine and explain how turbines are classified based on specific speeds. | (5) |
| | c) Illustrate the functions of draft tube. | (4) |

PART B

Answer any two questions, each carries 15 marks.

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|---|---|------|
| 4 | a) Compare vapour compression and vapour absorption refrigeration systems. | (6) |
| | b) Define COP of a refrigerator. Give the commercial specifications of a refrigerator and air conditioner. | (4) |
| | c) Draw a neat diagram of window air conditioning system and label its parts. | (5) |
| 5 | a) With a neat sketch explain the functions of power transmission elements in automobiles. | (8) |
| | b) Explain the working of turbofan engine used in an aircraft. | (7) |
| 6 | a) Define the terms WBT, Specific Humidity, Dew point temperature and Relative humidity. Also draw the psychrometric chart. | (10) |
| | b) Draw a diesel fuel pump. | (5) |

PART C

Answer any two questions, each carries 20 marks.

- 7 a) Define the following mechanical properties of engineering materials (10)
i. Toughness ii. Hardness iii. Creep iv. Fatigue v. Malleability
- b) Draw BCC, FCC and HCP unit cells. Also find the atomic packing factor of each one. (10)
- 8 a) Explain the different types of forging and rolling operations with reference to engineering applications. (10)
- b) Explain the moulding process in casting with a sketch showing all the parts. (10)
- 9 a) Explain a CNC machine with block diagram. Also give the significance of CNC machine in modern manufacturing scenario. (10)
- b) Discuss the types, properties and applications of ceramics and composites in engineering field. (10)
