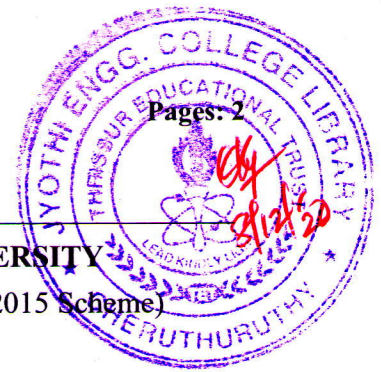


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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

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.

- 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)
