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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S1 (S, FE) S2 (S, FE) Examination December 2023 (2015 Scheme)

Course Code: BE 10102

Course Name: INTRODUCTION TO MECHANICAL ENGINEERING SCIENCES

Max. Marks: 100 Duration: 3 Hours

PART A

Answer any two questions. Each question carries 15 marks Marks

1	a)	Define 'internal energy'. Also prove that it is a property of the system.	(5)
	b)	State the two classical statements of second law of thermodynamics.	(5)
	c)	Derive an expression for the work done in an isothermal process.	(5)
2	a)	Distinguish between renewable and non – renewable energy. what are their advantages and disadvantages?	(6)
	b)	Explain the principle of working of impulse and reaction turbines.	(5)
	c)	Why diesel engines have a higher value of compression ratio? Explain.	(4)
3	a)	Explain with a neat sketch, name all the parts, the working of a single cylinder four stroke petrol engine.	(6)
	b)	Explain the function of an intercooler in a multistage compressor with the help of a P-V diagram.	(5)
	c)	Differentiate between single stage and multistage compressor.	(4)

PART B

Answer any two questions. Each question carries 15 marks

4	a)	Explain the principle of refrigeration.	(5)
	b)	Describe with a neat sketch the working of a vapour absorption refrigerator.	(6)
	c)	Name the refrigerants that are commonly used.	(4)
5	a)	What is psychrometry? Explain Psychrometric chart.	(5)
	b)	Discuss the need of transmission system in an automobile?	(6)
	c)	What is calorific value? How it is expressed?	(4)
6	a)	What are gears? Explain different types of gears with neat sketches?	(5)
	b)	What is a differential and why it is used in automobiles?	(5)
	c)	Write a short note on fuels used in jet engines.	(5)

PART C

Answer any two questions. Each question carries 20 marks

7	a)	What are alloys how it differs from pure metals? Explain the need of alloying in engineering applications.	(7)
	b)	Define crystallography. List out and explain the common crystal structurers in metals.	(7)
	c)	What are ceramic materials? List any two and state its properties and applications.	(6)
8	a)	Discuss any two non-destructive testing methods used in testing of engineering materials. Write its advantages.	(7)
	b)	Differentiate a pattern and a core in casting.	(5)
	c)	What is rolling? What are the different types of rolling? Explain with neat sketches?	(8)
9	a)	What is the difference between drawing and extrusion?	(6)
	b)	What is welding? Explain the types and basic principle involved in welding.	(7)
	c)	Write a short note on CNC machines. Explain how it differ from NC machines.	(7)

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