

**10114**

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

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

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**

FIRST SEMESTER B.TECH DEGREE SPECIAL EXAMINATION, SEPTEMBER 2016

**Course Code: BE101-02****Course Name: INTRODUCTION TO MECHANICAL ENGINEERING SCIENCES**

Max. Marks: 100

Duration: 3 Hours

**PART A***Answer ALL questions. Each question carries 3 marks*

1. Carnot engine cannot find practical significance. Why?
2. Why are piston heads of two stroke engines made crown shaped?
3. Define Humidity ratio and Relative humidity.
4. Explain function of clutch in an automobile
5. What is Kutzbach criteria?
6. Give the significance of factor of safety in designing.
7. Differentiate between alloys and composites.
8. Briefly explain agile manufacturing.

**PART B***Answer any 2 complete questions from each module***MODULE 1**

9. Explain the working of Carnot engine with P-V and T-S diagrams (6)
10. a) Explain the concept of thermodynamic equilibrium (3)  
b) State the first law of thermodynamics for a closed system undergoing a cycle. In a cyclic process, heat transfers are +14.7 kJ, -25.2 kJ, -3.56kJ and +31.5 kJ. What is the net work for this cyclic process? (3)
11. An inventor claims to have created an engine which produces useful work from the internal energy of the atmosphere. Discuss the validity of his claim by stating the relevant laws of thermodynamics. (6)

**MODULE 2**

12. What are hydraulic turbines? Differentiate between hydraulic turbines, gas turbines and steam turbines. (6)
13. Differentiate between two stroke and four stroke engines (6)

14. Explain the working principle of chemical rockets. How are chemical rockets classified? (6)

### MODULE 3

15. a) Differentiate between refrigeration and air conditioning (3)  
b) State briefly the impact of Freon's (CFC's) on refrigeration and air conditioning (3)
16. What are the advantages, disadvantages and applications of All air systems and All water systems. (6)
17. a) What are the conditions required for human comfort? (4)  
b) Draw comfort chart (2)

### MODULE 4

18. Name 6 major automobile manufacturers in India and list 3 of their popular models. (6)
19. Explain any 6 ways of classifying automobiles (6)
20. Explain the aerodynamic forces acting on a body in flight (6)

### MODULE 5

21. Explain the different types of lower kinematic pairs with neat sketches. (7)
22. a) Explain any 4 types of engineering design? (4)  
b) Explain mechanical advantage. (3)
23. a) What is the relevance of codes & standards in manufacturing systems? (4)  
b) What is meant by reliability? (3)

### MODULE 6

24. What is meant by heat treatment? List any two heat treatment process and their purpose. (7)
25. Explain any four methods of manufacturing. (7)
26. a) If you have to test a specimen without breaking it, what method will you suggest for the testing? Why? (3)  
b) Mention any two metal joining processes and name any one product made by these methods. (4)