

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

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

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**  
**FIRST SEMESTER B.TECH DEGREE EXAMINATION(S), DECEMBER 2019**

**Course Code: ME100**

**Course Name: BASICS OF MECHANICAL ENGINEERING**

Max. Marks: 100

Duration: 3 Hours

**PART A**

*Answer any two questions, each carries 15 marks.*

Marks

- |   |    |   |      |
|---|----|---|------|
| 1 | a) | State and explain second law of thermodynamics.   | (5)  |
|   | b) | Derive the expression for the efficiency of a Carnot cycle.   | (10) |
| 2 | a) | Compare intensive and extensive properties with examples.   | (5)  |
|   | b) | With the help of a neat diagram explain the working of an impulse steam turbine clearly showing the variation of steam pressure and velocity. | (10) |
| 3 | a) | With a neat diagram explain the working of a Cochran boiler.  | (10) |
|   | b) | Compare an open cycle and closed cycle gas turbine.   | (5)  |

**PART B**

*Answer any two questions, each carries 15 marks.*

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|---|----|---|------|
| 4 | a) | Define the following terms: (i) absolute humidity (ii) relative humidity (iii) DBT (iv) WBT and (v) Sensible heat.                  | (5)  |
|   | b) | With neat sketches explain the working of vapour compression refrigeration system.  | (10) |
| 5 | a) | With a neat sketch explain the working of a domestic refrigerator.  | (10) |
|   | b) | With a neat sketch explain an epicyclic gear train.   | (5)  |
| 6 | a) | With a neat sketch explain the working of a single plate clutch.  | (10) |
|   | b) | Two mating spur gears have 60 and 40 teeth. Their common module is 5 mm. Determine centre to centre distance between the gear axes. | (5)  |

**PART C**

*Answer any two questions, each carries 20 marks.*

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|---|----|--|-----|
| 7 | a) | With the help of a neat diagram explain the arc welding process.                     | (8) |
|   | b) | Explain the extrusion process. Compare direct and indirect extrusion process.        | (6) |
|   | c) | Explain important mechanical properties of materials.                                | (6) |
| 8 | a) | Explain forging process. With suitable diagrams discuss any four forging operations. | (8) |
|   | b) | With the help of a flow diagram explain the principle of numerical control machine.  | (8) |
|   | c) | Explain any four operations performed on a lathe.                                    | (4) |
| 9 | a) | Explain various casting defects.   | (8) |
|   | b) | Explain the steps involved in powder metallurgy process.                             | (6) |
|   | c) | Compare up milling and down milling process.   | (6) |

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