

Seat No.: \_\_\_\_\_

Enrolment No. \_\_\_\_\_

**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**BE –SEMESTER 1&2(NEW SYLLABUS)EXAMINATION- WINTER 2018**

**Subject Code: 3110006**

**Date: 05-01-2019**

**Subject Name: Basic Mechanical Engineering**

**Time: 10:30 am to 01:00 pm**

**Total Marks: 70**

**Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

		<b>Marks</b>
Q.1	(a) Discuss Closed, Open and Isolated Thermodynamic system with neat sketch.	<b>03</b>
	(b) What is solid fuel? Discuss different types of solid fuel.	<b>04</b>
	(c) Describe Isothermal process and derive expression for Workdone, Change in Internal energy, Heat transfer and Change in Enthalpy.	<b>07</b>
Q.2	(a) Dryness fraction of steam cannot have the value more than unity: Justify	<b>03</b>
	(b) Explain Steam formation T-h plot	<b>04</b>
	(c) The heat transfer from a heat reservoir is proportional to its temperature: Justify by deriving equation.	<b>07</b>
	<b>OR</b>	
	(c) 1.5kg of steam at a pressure of 10bar and temperature of 250°C is expanded until the pressure becomes 2.8bar. The dryness fraction of steam is then 0.9. Calculate change in Internal Energy	<b>07</b>
Q.3	(a) List different mountings of boiler and explain any one in brief.	<b>03</b>
	(b) Explain: Smoke tube internally fired horizontal type stationary boiler.	<b>04</b>
	(c) The efficiency of Otto cycle is a function of compression ratio: Prove it.	<b>07</b>
	<b>OR</b>	
Q.3	(a) What is throttling calorimeter? Explain its limitation.	<b>03</b>
	(b) Discuss Rankine cycle with block diagram	<b>04</b>
	(c) What is split AC? How it works? Explain with advantage and disadvantage.	<b>07</b>
Q.4	(a) Explain the term:	<b>03</b>
	(i) Swept volume	
	(ii) Clearance volume	
	(iii) Stroke length	
	(b) Discuss with neat sketch Diaphragm pump.	<b>04</b>
	(c) Distinguish between Reciprocating and Rotary Compressor.	<b>07</b>
	<b>OR</b>	
Q.4	(a) Explain with neat sketch single acting Plunger type pump.	<b>03</b>
	(b) Explain need of multi staging in reciprocating air compressor with its advantages.	<b>04</b>

- (c) The following readings were taken during the test on a single cylinder four stroke IC engine: **07**
- |                                  |              |
|----------------------------------|--------------|
| Cylinder diameter                | : 270mm      |
| Stroke Length                    | : 380mm      |
| Mean Effective Pressure          | : 6bar       |
| Engine speed                     | : 250rpm     |
| Net load on brake                | : 1000N      |
| Effective mean diameter of brake | : 1.5m       |
| Fuel used                        | : 10kg/hr    |
| Calorific value of Fuel          | : 44400kJ/kg |
- Calculate:
- (i) Brake Power
  - (ii) Indicated Power
  - (iii) Mechanical Efficiency
  - (iv) Indicated thermal efficiency

- Q.5 (a) Discuss the term: **03**
- (i) Condenser
  - (ii) Baffle tray
  - (iii) Evaporator
- (b) Explain with neat sketch the working of Internal Expanding Shoe Brake. **04**
- (c) Discuss the following with application and Properties: **07**
- (i) Glass
  - (ii) Ceramic
  - (iii) Plastics

**OR**

- Q.5 (a) How metals are classified? Show with block diagram **03**
- (b) Give brief comparison between Belt, Chain and Gear drive. **04**
- (c) Explain with sketch: **07**
- (i) Centrifugal clutch
  - (ii) Fast and Loose pulley drive

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