

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.

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

- (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:
- Brake Power
 - Indicated Power
 - Mechanical Efficiency
 - Indicated thermal efficiency

- Q.5 (a) Discuss the term: **03**
- Condenser
 - Baffle tray
 - Evaporator
- (b) Explain with neat sketch the working of Internal Expanding Shoe Brake. **04**
- (c) Discuss the following with application and Properties: **07**
- Glass
 - Ceramic
 - 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**
- Centrifugal clutch
 - Fast and Loose pulley drive
