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:

(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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