Seat No: _____ **Enrollment No:_____**

PARUL UNIVERSITY

FACULTY OF ENGINEERING & TECHNOLOGY

B.Tech., Winter 2017 - 18 Examination

Semester: 1 **Date: 27/12/2017**

Subject Code: 03109102 **Time: 2:00 PM to 4:30 PM**

Subject Name: Elements of Mechanical Engineering **Total Marks: 60**

Instructions:

1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

Q.1 **Objective Type Questions**. **(15)**

1. The first law of thermodynamics is the law of_____.
   (a) energy conservation (b) heat transfer
   (c) work transfer (d) all of the above
2. Function of injector in vertical boiler is_____.
   (a) to inject fuel into boiler (b) to feed water into boiler
   (c) to supply the air to boiler (d) none of the above
3. The diesel cycle consists of following processes
   (a) two adiabatic and two constant pressure
   (b) two adiabatic, constant pressure and constant volume
   (c) two isothermal, constant pressure and constant volume
   (d) two adiabatic and two isothermal
4. CNG is excellence for_____.
   (a) petrol engine (b) diesel engine
   (c) kerosene engine (d) none of the above
5. One ton of refrigeration means that
   (a) 1 ton total mass of the system
   (b) 1 ton water converted to ice
   (c) 1 ton refrigerant used
   (d) the refrigerating effect produced by melting of 1 ton of ice from and at 0°C in 24 hours
6. The ratio of brake power to indicated power is called as_____.
7. The sum of internal energy and flow work is called_____.
8. As the clearance volume increases, volumetric efficiency _____.
9. Dryness fraction of wet steam is_____
10. _____engine spark plug is not there.
11. Give any one example of water tube boiler.
12. Barometer is used to measure
13. Priming is necessary in which type of pump?
14. Which element is used to engage or disengaged of driving shaft and driven shaft?
15. In which process no heat is supplied or rejected?

Q.2 **Answer the following questions. (Attempt any three)** **(15)**

A) Explain thermodynamics systems and its types with a neat sketch.

B) Write a short note on LPG and CNG.

C) With neat sketch explain Throttling calorimeter.

D) The following observation was recorded during the trial run of single cylinder two stroke oil engines : Engine Torque = 650 N-m, Speed = 400 rpm, Cylinder diameter = 20 cm, Stroke length = 30 cm, oil Consumption = 8.5 kg/hr, mean effective pressure = 5.5 bar, Calorific value = 42500 KJ/kg .Calculate: (i) Mechanical efficiency (ii) Indicated Thermal Efficiency (iii) Brake Thermal Efficiency (iv) Specific Oil Consumption in kg/KW

Q.3 A) Explain combine gas law and derive equation PV= mRT. **(07)**

B) Describe the working of a Cochran boiler with neat sketch. **(08)**

OR

B) Explain with flow diagram the working of a Vapor Compression Refrigeration Cycle. **(08)**

Q.4 A) Classify centrifugal pump and explain volute type, vortex or diffuser type centrifugal pump. **(07)**

OR

A) What is rotary pumps and classify them. **(07)**

B) What are belt drives? List and explain various Belt drive. **(08)**