

**PARUL UNIVERSITY**  
**FACULTY OF ENGINEERING & TECHNOLOGY**  
**B.Tech., Summer 2017 - 18 Examination**

**Semester: 1, 2**  
**Subject Code: 03109102**  
**Subject Name: Elements of Mechanical Engineering**

**Date: 29/05/2018**  
**Time: 02:00 pm to 04: 30 pm**  
**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 (Each of one mark) (15)**

1. Zeroth law of thermodynamics forms the basis of measurement of \_\_\_\_\_.
2. CNG is excellent for \_\_\_\_\_ engine.
3. Constant volume process is also known as \_\_\_\_\_ process.
4. Founder of Otto cycle \_\_\_\_\_
5. Priming is required for which type of pump?
6. Dryness fraction of a steam(x)=
7. Write the Relation between the specific heats  $C_p$  and  $C_v$
8. For the same compression ratio, the thermal efficiency of Otto cycle is greater than Diesel cycle statement is True or False
9. For the Vapour absorption refrigeration (VAR) cycle which refrigerant is used?
10. Co-efficient of performance for refrigeration system is always less than one. statement is True or False
11. A type of boiler in which the hot gases are inside the tubes and water is surrounding the tubes is called.....  
 (a) fired tube boiler (b) Water tube boiler  
 (c) Natural circulation boiler (d) Forced circulation boiler
12. Carnot cycle efficiency depends upon  
 (a) Only maximum and minimum temperature (b) maximum temperature and maximum pressure  
 (c) Temperature and compression ratio (d) Temperature and volume
13. In which engine spark plug is used  
 (a) Diesel engine (b) Petrol engine (c) Gas engine (d) none of above
14. Compressor in which compression of air from suction pressure to delivery pressure takes place in more than one cylinder is called \_\_\_\_\_ compressor.  
 (a) Single acting (b) Double acting (c) Single stage (d) multi stage
15. Which one of the following is a positive drive?  
 (a) Flat belt drive (b) V-belt drive (c) wire rope drive (d) chain drive

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

- A) What is prime mover? Give types of prime movers.
- B) Explain about non-conventional energy
- C) Explain about isothermal process and derive the equation work done for isothermal process.
- D) Find the enthalpy of 1kg of steam at 12 bar when (1) steam is dry saturated, (2) steam is 22% wet and (3) superheated to 250° C. Use the steam table. Assume the specific heat of the superheated steam as 2.1 kJ/kg K.

**Q.3 A) Write about Carnot cycle, assumption and derive the equation for efficiency of Carnot cycle. (07)**

- B) Draw a neat sketch of Babcock and Wilcox boiler and explain it in detail. (08)

**OR**

- B) Explain four stroke Diesel engine with neat sketch. (08)

**Q.4 A) Write about single and double acting reciprocating pump with neat sketch. (07)****OR**

- A) Explain about Chain drive and classify them. (07)

- B) Explain with flow diagram, the working of VCR write function of each component. (08)