

**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**PDDC - SEMESTER-V • EXAMINATION – SUMMER • 2015**

**Subject Code: X51904****Date: 15/05/2015****Subject Name: Internal Combustion Engines****Time: 02:30 pm - 05:00 pm****Total Marks: 70****Instructions:**

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

- Q.1 (a)** Draw actual valve timing diagram for petrol engine. Give reasons for early opening of exhaust valve and late closing of inlet valve. What is meant by valve overlap? Give reasons for its use and mention any possible disadvantages. **07**
- (b)** Explain working of wankle engine with neat sketch. **07**
- Q.2 (a)** Explain the phenomenon of dissociation. Generally 10 to 20 % rich mixture is used to prevent dissociation. Why? Explain. **07**
- (b)** Prove that the adiabatic process is represented by  $p^b v^a (e)^{KT} = \text{constant}$  when the specific heats of the gases follow the law  $C_p = a + KT$  and  $C_v = b + KT$ . **07**
- OR**
- (b)** Discuss the effects of compression ratio and F:A ratio on the pressures and temperatures at salient points of Otto cycle used for fuel-air cycle. **07**
- Q.3 (a)** Define CNG, LNG and LPG. State and explain advantages and disadvantages of CNG over petrol. **07**
- (b)** What is carburetion? Discuss simple carburetor with neat sketch. **07**
- OR**
- Q.3 (a)** Discuss the important quality of an SI and CI engine fuels. **07**
- (b)** Derive an expression for air-fuel ratio of carburetor. **07**
- Q.4 (a)** Explain CI engine Bosch fuel pump with neat sketch. **07**
- (b)** Explain working of battery ignition system with neat sketch. **07**
- OR**
- Q.4 (a)** What is scavenging? State different types of scavenging system. Explain any two of scavenging system. **07**
- (b)** State objectives of supercharging. Explain different methods of supercharging. **07**
- Q.5 (a)** Describe the phenomenon of knocking and discuss factors affecting the knocking phenomenon. **07**
- (b)** Explain pre combustion chambers with neat sketch. State its merits and demerits. **07**
- OR**
- Q.5 (a)** Describe how the indicated power of multi cylinder engine is measured? Mention assumption made. **07**
- (b)** Discuss the effect of CO, HC, NO<sub>x</sub> and smoke emission of human and biological life. **07**

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