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**013621**

**May 2023**

**B.Tech. (ME) Re-appear VI SEMESTER  
Internal Combustion Engines (PEC-ME-304)**

Time : 3 Hours]

[Max. Marks : 75

**Instructions :**

1. *It is compulsory to answer all the questions (1.5 marks each) of Part-A in short.*
2. *Answer any four questions from Part-B in detail.*
3. *Different sub-parts of a question are to be attempted adjacent to each other.*

**PART-A**

1. (a) Write the assumptions commonly made for fuel-air cycle analysis. (1.5)
- (b) The efficiency of an Otto cycle is 50%. What is the compression ratio if  $\gamma = 1.5$ ? (1.5)
- (c) What is meant by 'ignition limits'? (1.5)
- (d) What is meant by 'delay period' in CI engines? It is usually divided into two parts. Name them. (1.5)

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- (e) Why the air injection system is not used now days? (1.5)
- (f) What is firing order in four cylinder engine? (1.5)
- (g) Why cooling of an internal combustion engine is necessary? (1.5)
- (h) What is evaporative cooling? (1.5)
- (i) What are the various methods of measuring indicated power? (1.5)
- (j) What is meant by turbocharging? (1.5)

#### PART-B

2. Explain dual combustion cycle. Why this cycle is also called limited pressure cycle? Derive an expression for the air standard efficiency of dual cycle in terms of compression ratio ( $r$ ), adiabatic constant( $\gamma$ ), cut off ratio ( $\rho$ ), pressure ratio ( $\alpha$ ). (15)
  
3. (a) Describe with suitable sketches the combustion phenomenon in SI engines, and explain the two phases of combustion. (10)
- (b) Explain the phenomenon of diesel knock. Compare it with the phenomenon of detonation in SI engines. (5)
  
4. (a) What is the function of carburettor in S.I. engine? Briefly explain with a neat sketch the operation of a simple float type carburettor? (10)

- (b) Discuss the requirements of an ideal diesel injection system. (5)

5. (a) Explain a battery ignition system with the help of a neat sketch. (10)
- (b) What do you understand by ignition timing? Discuss the various factors which affect ignition timing requirements. (5)
  
6. (a) Explain Wet sump lubrication system with a neat sketch. (10)
- (b) Compare the merits and demerits of air and water cooling systems. (5)
  
7. Write short notes on :
  - (a) Engine emissions and control. (8)
  - (b) Supercharging. (7)