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# B.Tech.(AE) (2012 to 2017) (Sem.-4) INTERNAL COMBUSTION ENGINES Subject Code : BTAE-401 M.Code : 54122

Time : 3 Hrs.

Max. Marks : 60

#### **INSTRUCTION TO CANDIDATES :**

- 1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
- 2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
- 3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

## **SECTION-A**

#### 1. Answer briefly :

- a) Define Air standard efficiency and relative efficiency.
- b) Define Octane number.
- c) Draw the p-v diagram for Otto cycle.
- d) Explain the factors affecting the delay period in C.I. engines and summarize those.
- e) Enumerate the limitations to supercharging.
- f) What is spark retardation?
- g) Define viscosity. Explain viscosity rating.
- h) What are turbochargers?
- i) Name the various parts of a water pump with the help of a sketch.
- j) How do additives help to obtain desired properties of lubricants?

#### **SECTION-B**

- 2. A diesel engine works on diesel cycle with a compression ratio of 15 and cut off ration of 1.75. Calculate the air-standard efficiency. Take  $\gamma = 1.4$
- 3. Briefly explain the classification of two stroke engines based on scavenging processes giving neat sketches for each engine.
- 4. Draw a line diagram of Electronic Fuel Injection system, discuss it briefly and state its merits over carburetor System.
- 5. Explain the working of any fuel injection pump used in diesel engine.
- 6. Differentiate between supercharging and turbocharging.

## **SECTION-C**

- 7. A diesel engine working on diesel cycle uses compression ratio of 18. The cut off is 6% of stroke at a particular load. The specific heat at constant volume increases by 1.2%. Find the percentage change in the air-standard efficiency of the cycle. Take Cv = 0.72 KJ/kg K and R = 287 J/kg K as an average value.
- 8. a) How are injection systems classified? Write short note on common rail injection system.
  - b) Explain the use of study of the heat balance of an engine.
- 9. What do you understand by term turbocharging? How is turbo-charging different from supercharging? Explain with a neat sketch the principle of exhaust turbocharging of a single cylinder engine.

# NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.

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