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Roll No. | | | | | | | | | | | | | Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(AE) (2011 & 2012) (Sem.–4)

INTERNAL COMBUSTION ENGINES

Subject Code : BTAE-401

Paper ID : [A1161]

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) What do you mean by scavenging?

b) Define octane number.

c) Draw the T-S diagram for Otto cycle.

d) What do you mean by ignition lag?

e) What is knocking?

f) What is delay period? Name few variables that affects the delay period.

g) What is lubrication? List few requirements of a good lubricant.

h) What do you mean by calibration of fuel injection pump?

i) Briefly explain the function of injector in a diesel engine.

j) What is an engine analyzer?

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SECTION-B

2. a) With the aid of a schematic diagram, explain the combustion process In a CI engine.

   b) Explain the factors affecting the delay period in C.I. engines and summarize those.

3. 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 γ=l .4

4. Under what situation, two stroke cycle engines are preferred to four stroke engines.

5. A 42.5 kW engine has a mechanical efficiency of 85%. Find the indicated power and frictional power. If the frictional power is assumed to be constant with load, what will be the mechanical efficiency at 60% of the load?

6. Differentiate between wet and dry sump method of lubrication.

SECTION-C

7. A spark-ignition engine working on ideal Otto cycle has the compression ratio 6. The initial pressure and temperature of air are 1 bar and 37°C. The maximum pressure in the cycle is 30 bar. For unit mass flow, calculate

   a) p,V, and T at various salient points of the cycle and

   b) the ratio of heat supplied to the heat rejected. Assume γ=1.4 and R=8.314 kJ/kmol K.

8. Compare the performance characteristic of petrol and diesel engine with regard to specific fuel consumption, thermal efficiency and fuel-air rate. Which engine is best suited for part load operation and why?

9. 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.

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