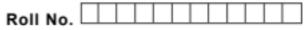


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Total No. of Pages : 02

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B.Tech.(AE) (2011 & 2012) (Sem.-4) INTERNAL COMBUSTION ENGINES Subject Code : BTAE-401 M.Code : 54122

Time : 3 Hrs.

Max. Marks : 60

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INSTRUCTION TO CANDIDATES :

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

SECTION-A

1. Answer briefly :

- a) What is scavenging process?
- b) What are the differences between 2-stroke and 4-stroke engine?
- c) What is the function of thermostat in cooling system of automobile?
- d) What do you understand by octane number and cetane number?
- e) What are the main functions of piston rings?
- f) What are the difference between ignition lag and delay period?
- g) Write the advantages of water-cooling system.
- h) What is the physical significance of mean effective pressure?
- i) Write-down the objectives of supercharging.
- j) Write down the full form of following terms :
 - i) CRDI
 - ii) ABS

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SECTION-B

- Sketch Otto, diesel and dual cycle on p-v and T-s diagrams. Prove that Otto cycle is more efficient than diesel cycle for the same compression ratio and same heat input.
- What do you understand by stoichiometric A:F ratio. Find stoichiometric A:F ratio for fuel C₈H₁₈.
- 4. What are the functions of nozzles? Explain various types of nozzles with neat sketches.
- 5. How the lubricating oils are graded as per SAE?
- Discuss the limitation of turbocharging.

SECTION-C

- 7. Write short notes :
 - a) Limitations of simple carburetor.
 - b) Explain the types of injection system in CI engine.
- 8. The following observations are made during a trial on an oil engine
 - a) Motor power to start the engine =10 KW.
 - b) RPM = 1750.
 - c) Brake torque = 327.5 Nm.
 - d) Fuel used =15kg/hr.
 - e) CV of fuel used = 42 MJ/kg.
 - f) Air supplied = 4.75kg/min.
 - g) Quantity of cooling water = 16kg/min
 - h) Outlet temperature of cooling water = 65.8 °C.
 - Room temperature = 20.8 °C.
 - j) Exhaust gas temperature = 400 °C, Take : C_{pw} = 4.2KJ/kg.K and C_{pg} = 1.25KJ/kg.K Determine :
 - a) Brake power
 - b) Mechanical Efficiency
 - c) bsfc
 - d) Draw a heat balance sheet on KW basis and percentage basis.
- The compression ratio of an engine working on Otto cycle is 8. The initial condition of air is 1 bar and 373 K. The max pressure of a cycle is limited to 50 bar. Determine volume, pressure and temperature at all salient points of the cycle. Also find the ratio of (Q_S/Q_R) on the basis of one kilogram of air.

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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