RP

Indian Institute of Technology, Kharagpur

Date _____ FN/AN. Time 2 Hrs. Full Marks 30. Number of Students 98.
Spring Semester 2011 Dept: Mech E Subject: ME 30608
3rd Year BTech.(H) Subject Name: Applied Thermofluids-I

Q1. Answer any 10 of the following: [15]

(a) What are (i)the first impurities that are removed before refining of crude oil and (ii) the deleterious substances in crude oil which are removed during refining?
(b) Plants and creatures that died and were buried under layers of earth converted to fossil fuels. What were the agents for this conversion?
(c) What are the simplifications that accompany the replacement of valves by ports in IC Engines.? Why is the crankcase sealed in Two-Stroke Engines?
(d) How many power strokes occur in every rotation of the shaft in Wankel Engines?
(e) Ignition lag prevents knocking in Petrol Engines but it causes knocking in Diesel Engines. How?
(f) During idling with the throttle valve closed, how do fuel and air enter the intake manifold for combustion in the engine?
(g) How is choking prevented when the engine is already warm at start?
(h) What are the parts of the Ignition Distributor and how are they connected electrically to the primary and secondary of the Ignition Coil?
(i) What is atomization and its role in (internal) combustion? Are there any differences between the achieving of atomization in SI and CI engines?
(j) How is the minimum ignition pressure for the nozzle opening set?
(k) How do the inlet port, outlet port and helical groove work in conjunction in regulating fuel injection in Diesel Engines?
(l) How does air in the combustion chamber acquire swirl in Diesel Engines with swirl chambers?
(m) How are the pistons in Direct Injection Diesel Engines different from other regular pistons?
(n) Why are the topics of Lubrication and Cooling interlinked?

[5]

Q2. Does the use of mist lubrication in any way affect maintenance schedules of Two-Stroke versus Four Stroke Engines?

[5]

Q3. How is spark timing influenced as the mixtures get more and more reactive? What is exhaust gas dilution and how does it affect reactivity and when is it more pronounced?

[5]

Q4. Friction rises with speed. Yet IC Engines are most efficient at high speeds. Explain. Between Diesel and Petrol engines which engines deviate more from their thermodynamic cycles?