Kadi Sarva Vishwavidytalaya

M.E. Sem I (Thermal Engineering)

Subject: Advanced Internal Combustion Engine

Date: 21th January, 2013 Max. Marks: 70

Time: 3 Hrs

Instruction: (1) Answer each section in separate Answer sheet.
(2) Use of Scientific calculator is permitted.
(3) Draw neat diagram whenever required.
(4) Assume suitable additional data if required.

Section – I

Q.1 **Each carries equal marks** **[15]**

[A] Discuss causes of deviation of actual cycles from Fuel-Air cycles.

[B] Represent the effect of time losses on P-V diagram.

[C] Determine the effect of percentage change in the efficiency of Otto cycle having compression ratio 8, if the specific heat at constant volume increases by 1.1 percent

OR

[C] Define combustion and state necessary conditions for same.

Q.2 **[10]**

[A] State effect of engine variables on flame propagation.

[B] Explain "Detonation"

OR

Q.2

[A] With neat sketch explain various types of combustion chambers.

[B] How tetraethyl lead (TEL) improves the quality of fuel for S.I. engine?

Q.3 **[10]**

[A] Explain with help of P-θ diagram stages of combustion in C.I. engine.

[B] Discuss factors affecting delay period.

OR

Q.3

[A] Discuss primary considerations in the Design of combustion chambers for compression ignition engines.

[B] Define "Volumetric Efficiency"

Section – II

Q.4 **Each carries equal marks** **[15]**

[A] Effect of various factors on Volumetric Efficiency.

[B] A four stroke, eight cylinder engine is tested while running at 3600 r.p.m. The inlet air temperature is 15 ^{0}C and the pressure is 760 mm of Hg. The total piston displacement volume is 4066 cm^3. The air-fuel ratio of the engine is 14:1 and b.s.f.c. is 0.38 kg/kWh. Dynometer reading shows a power output of 86 kW. Find the volumetric efficiency of engine.

[C] With the help of neat sketch discuss various Scavenging systems used in two stroke engines.

OR

[C] Discuss advantages and limitations of various alternate fuels for I.C. engines.

Q.5 **[10]**

[A] Explain "MPFI" system and discuss advantages and limitations of this injection system.

[B] Discuss control of air pollution from S.I. engines.

OR

Q.5

[A] Explain briefly "Catalytic converters".

[B] Explain Dissociation and its effect.

Q.6 **[10]**

[A] Briefly explain various methods to decide friction power on an engine.

[B] "Best Gasoline fuel is most poor Diesel fuel" justify the statement.

OR

Q.6

[A] Discuss future of I.C. engine as prime mover.

[B] Discuss effect of varying spark advance angle on performance of an engine.

*****END OF PAPER*****