Total Number of Pages: 1

1st Semester Regular/Back Examination – 2014
INTERNAL COMBUSTION ENGINES
BRANCH(S): HEAT POWER & THERMAL ENGINEERING, HEAT POWER ENGINEERING, THERMAL ENGINEERING, THERMAL POWER ENGINEERING

Time: 3 Hours
Max Marks: 70

Answer Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.

Q1		Answer the following questions:	(2x10)
	a)	What do you mean by HUCR? Explain in brief.	
	b)	What is vapor lock?	
	c)	Sketch the idling system in carburetor.	
	d)	Write down different types of nozzles used.	
	e)	What do you understand by the energy requirements of the ignition system?	
	f)	What do you mean by multi-fuel engines?	
	g)	Why is over-cooling in an engine harmful?	
	h)	How lubricating oils are classified?	
	i)	Sketch the heat balance curves for CI engines.	
	j)	Why a rich mixture is required for maximum power?	

Q2 a) Show by suitable graphs the effect of dissociation on maximum temperature and horse power. Explain the effect of presence of CO on dissociation. (6)

b) Compare the actual and fuel-air cycles in diesel engines. (4)

Q3 a) A spark ignition engine having 4-cylinders each of 8.5 cm diameter and 10 cm stroke develops 8.6kW brake power at 800 RPM. The mixture supplied to the engine is 10% rich. The fuel used is C_7H_{16}. If the volumetric efficiency of the engine is 80% at 27°C and 1 bar pressure, determine BMEP of the engine. Take mechanical efficiency of the engine is 0.85 and C.V. of fuel is used in 45000kJ/kg. (8)

b) Compare the Otto cycle with Diesel cycle on the same compression ratio. (2)

Q4 a) Explain the phenomenon of pre-ignition? How pre-ignition leads to detonation and vice-versa? (5)

b) Explain the fuel spray behavior and structure of diesel fuel. (5)

Q5 a) Which of the two engines, SI and CI, is inherently more suitable for supercharging? Why? Give examples of supercharging of SI and CI engines? (5)

b) .Discuss various methods of control for emissions from petrol engines. (5)

Q6 The 4-stroke Maruti engine has a capacity of 1500c.c., it develops maximum power at 4200 rpm. The volumetric efficiency at this speed is 70% and the air/fuel ratio is 13:1. At peak power the theoretical air speed at choke is 90 m/s. The coefficient of discharge for the venture is 0.85 and that of the main petrol jet is 0.66. An allowance should be made for the emulsion tube, the diameter of which can be taken as 1/2.5 of the choke diameter. The petrol surface is 6 mm below the choke at this engine condition. Calculate the sizes of a suitable choke and main jet. The specific gravity of the petrol is 0.74. Atmospheric pressure and temperature are 1 bar and 20C respectively. (10)

Q7 a) Discuss Fault diagnosis of S.I. Engines. (5)

b) Describe the methods of charge stratification by carburetor alone. (5)

Q8 Write short notes (any two) (5+5)

a) Three way catalytic converter

b) Engine cooling

c) Wankel rotary combustion engine