2005 JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY

III B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS
THERMAL ENGINEERING -II
(MECHANICAL ENGINEERING AND PRODUCTION ENGINEERING)

APRIL/MAY 2005

TIME – 3 HOUR
MARK – 80

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Discuss the important points of difference between petrol engine and diesel engine.

(b) Draw the port timing diagram of two stroke petrol engine.

(c) Derive an expression for air standard efficiency of otto-cycle in a standard form.

2. (a) Explain the two types of cooling systems and compare them.

(b) What are the essential properties of good lubricant?

(c) What are the factors that affecting the detonation in I.C Engines?

3. (a) Explain the various factors that influence the flame speed.

(b) Explain the phenomenon of knock in C.I. Engines and compare it with S.I. engine knock.

4. (a) List various methods available for finding friction power of an engine.

(b) A gasoline engine working on four stroke develops a brake power of 20.9 kW. A morse test was conducted on this engine and the brake power (kW) obtained when each cylinder was made inoperative by short circuiting the spark plug are 14.9, 14.3, 14.8, and 14.5 respectively. The test was conducted at constant speed. Find the indicated power, mechanical efficiency and brakemean effective pressure (bmep) when all the cylinders are firing. The bore of the engine is 75mm and the stroke is 90mm. The engine is running at 3000 r.p.m.

5. The following particulars were obtained in a trial on a 4-stroke gas engine:
Duration of trial = 1hour
Revolutions = 14000
Number of missed cycle = 500
Net brake load = 1470N
Mean effective pressure = 7.5bar
Gas consumption = 20000 litres
L.C.V of gas = 21kJ/litre
Cylinder diameter = 250mm
Stroke = 400mm
Effective brake circumference = 4m
Compression ratio = 6.5:1
Calculate

(a) indicated power

(b) brake power

(c) Mechanical efficiency

(d) Indicated thermal efficiency.

(e) Relative efficiency

6. (a) Discuss the means of improving the efficiency of gas turbine working on simple Brayton Cycle.

(b) The air enters the compressor of an open cycle constant pressure gas turbine at a pressure of 1 bar and temperature of 200C. The pressure of the air after compression is 4 bar. The isentropic efficiencies of compressor and turbine are80% and 85% respectively. The air fuel ratio is 90:1. If the flow rate of air is 3.0 kg/sec, find:

i. Power developed

ii. Thermal efficiency of cyle Assume calorific value of fuel = 41800 kJ/kg.

7. (a) State the fundamental differences between the Jet propulsion and Rocket propulsion.

(b) What is meant by supercharging? What are the advantages of supercharging?

8. (a) Draw a schematic diagram of a fuel feed pump and explain its working principle.

(b) Explain with the help of sketch each component of spark plug used for S.Iengine. h it .