

QP Code : 4253

(OLD COURSE)

(3 Hours)

[Total Marks : 100

- 1 Question No 1 is compulsory and answer any four from the remaining
- 2 All questions carry equal marks.
- 3 Answer to each new question should be started on a fresh page.
- 4 Figure in brackets on the right hand side indicate full marks.
- 5 Assume suitable data if necessary.

Q1) Answer any four of the following:-

- a) Compare SI and CI engine with respect to:-
(i) fuel used (ii) Working cycle (iii) Method of fuel injection (iv) Method of ignition.
- b) What are A.F.ratio requirements of a spark ignition engine under varying operating conditions? Why?
- c) Compare phenomenon of knock in SI and CI engine.
- d) Explain why Four stroke I. C. engine is always economical and less pollutant than two stroke I.C.Engine?
- e) Explain why it is difficult to design high speed diesel engine. (20)

Q2) a) During a test on a single cylinder, four stroke engine having a compression ratio of 6, following data were recorded :

Bore = 10 cm; Stroke = 12.5 cm; Indicated mean effective pressure = 2.6 bar; Dead load on dynamometer, $W = 60$ N; Spring balance reading, $S = 19$ N; Effective radius of the flywheel, $R = 40$ cm; Fuel consumption = 1.0 kg/hr; Calorific value of the fuel used, $CV = 42000$ KJ/Kg; Speed, $N = 2000$ r.p.m.

Determine its indicated power, brake power, mechanical, overall, air standard and relative efficiencies. (10)

- b) Draw a valve timing diagram of four stroke CI engine and explain its working. (10)

Q3) a) Compute the bmep in bar, mean piston speed in m/s and torque in Nm for a two stroke, four cylinder C.I. engine having the following specifications:

Bore diameter, $d = 150$ mm, B.P. = 265 KW at 1200 rpm, L/d ratio = 0.9.

Also identify whether this engine is square, over square or under square engine. (10)

- b) Discuss the importance of measurement of frictional power. What are the methods used to find F.P. (10)

Q4) a) Describe with suitable sketches the combustion phenomenon in CI engine. Explain the three phases of combustion. (10)

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b) In a trial of a single cylinder oil engine working on dual cycle, the following observations were made:

Compression ratio	= 15
Oil consumption	= 10.2 Kg/h
Calorific value of fuel	= 43890 KJ/Kg
Air consumption	= 3.8 Kg/min
Speed	= 1900 r.p.m.
Torque on the brake drum	= 186 Nm
Quantity of cooling water used	= 15.5 kg/min
Temperature rise	= 36° C.
Exhaust gas temperature	= 410° C
Room Temperature	= 20° C
Cp for exhaust gases	= 1.17 KJ/Kg K

Calculate : (i) Brake power,
(ii) Brake specific fuel consumption, and
(iii) Brake thermal efficiency.

Draw heat balance sheet on minute basis.

(10)

Q5) a) The following particulars refer to a Morse test on a four cylinder, four stroke petrol engine,

Cylinder bore	= 60 mm,
Stroke	= 90 mm,
R.P.M.	= 3000
Fuel consumption	= 4.465 kg/hr,
C.V. of fuel	= 43 MJ/kg

B.P. (Torque) with all cylinder working	= 52.5Nm
B.P. with cylinder no 1 cut - out	= 37.8 Nm
B.P. with cylinder no 2 cut - out	= 36.7 Nm
B.P. with cylinder no 3 cut - out	= 36.4 Nm
B.P. with cylinder no 4 cut - out	= 37.6 Nm

Determine: (i) Brake power (ii) Indicated power (iii) B.S.F.C. (iv) I.S.F.C.
(v) Mechanical efficiency. (10)

b) How are the injection system classified? Describe them briefly. (10)

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Q6) a) What are various desired properties of fuel and explain how do additives help to achieve the desired properties. (10)

b) Give brief account of air pollution due to I C Engines and its effect on human being. (20)

Q7) Write Short Note (any four): (20)

1. Differentiate between SI and CI engine.
2. Combustion chambers of C I Engines.
3. EURO norms.
4. Rating of fuel.
5. Factors that limits the compression ratio in SI and CI engine.
6. Willians line test.