(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 2106 Roll No. | | | | | | | | | | |

B.Tech

(SEMESTER-V) THEORY EXAMINATION, 2012-13

I.C. ENGINES & COMPRESSORS

Time : 2 Hours] *[Total Marks : 50*

Note : (1) Use illustrations, wherever needed.

(2) In case of missing data assume missing data, suitably and state the assumption made.

Section – A

1. Attempt **all** questions in this section : **5 × 2 = 10**

(i) Which are the alternative fuels that can be used in I.C. engines ?

(ii) What is meant by valve timing diagram ?

(iii) Obtain the expression of air standard efficiency of a diesel cycle.

(iv) What are the objectives of supercharging ?

(v) What is meant by surging in compressors ?

Section – B

2. Attempt any **three** parts : **5 × 3 = 15**

(a) (i) Describe classification of I.C. engines. **5**

(ii) Discuss the desirable properties of IC engine fuels.

(b) Describe the phenomenon of knocking in SI engines and the effects of knocking on engine performance. **5**

(c) Describe different phases of CI engine combustion and also abnormal combustion. **5**

(d) Describe the operation of water cooling system used in IC engines with schematic arrangement. **5**

(e) Describe the conservation and operation of a two stage reciprocating air compressor with intercooling and also show processes on P-V diagram. **5**

Section – C

Attempt **all** questions in this section : $5 \times 5 = 25$

3. Attempt any **two** parts :

(a) During a test of a single cylinder four-stroke oil engine a rope brake dynamometer is used to measure the output of the engine. The details of the test are

Cylinder diameter	=	250 mm
Stroke length	=	400 mm
Gross mep	=	7 bar
Pumping mep	=	0.5 bar
Engine speed	=	250 rpm
Net load on the brake	=	1080 N
Effective diameter of the brake	=	1.5 m
Fuel used per hour	=	10 kg
Calorific value of fuel	=	44300 kJ/kg

Calculate :

(i) Indicated power

(ii) Brake power

(iii) Mechanical efficiency

(iv) Indicated thermal efficiency

(b) Explain the effect of engine variables on flame propagation in SI engines.

(c) Describe the two basic methods of generating air swirl in CI engine combustion chambers.

4. Attempt any **one** part :

(a) An IC engine working on diesel cycle has a bore of 150 mm and stroke of 250 mm respectively. If the clearance volume is 0.0004 m^3 and fuel injection takes place at constant pressure for 5 percent of the stroke, determine the thermal efficiency of the engine.

(b) Define Octane number and describe the motor method and the research method of determining octane number of a fuel.

5. Attempt any **one** part :

(a) Describe the different constituents which are exhausted from SI engine and the different factors which affect the amount of these constituents.

(b) Describe any two methods of ignition systems used in IC engine with their Schematic arrangement.

6. Describe the operation of any two types of modern fuel injection systems with sketch. Also explain working of Pintle nozzle & Pintaux nozzle.

7. Attempt any **one** parts :

(a) Describe the features of an IC engine working on sterling cycle.

(b) Describe any one type of combustion chamber for SI engine and its merits.

(c) Describe any one type of supercharging arrangements for IC engine and its application.
