

- (i) Work required to compress and deliver 1 kg of air
 - (ii) Actual power required to run the compressor if mechanical efficiency is 80%.
 - (iii) Heat lost through the cylinder walls per minute.
 - (iv) Isothermal efficiency.
- (b) Describe the function of impeller and diffuser in a centrifugal compressor. Draw the velocity diagrams for the inlet and outlet of the impeller.
- (c) Describe an axial flow compressor. Discuss the merits and demerits of Centrifugal Compressor over axial flow Compressor.

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

PAPER ID : 4094 Roll No.

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B.Tech.

(SEM VI) EVEN SEMESTER THEORY EXAMINATION,
2009-2010

I.C. ENGINES

Time : 3 Hours

Total Marks : 100

- Note :** (i) Attempt **ALL** the questions.
(ii) All questions carry **equal** marks.
(iii) If any data missing assume suitably.

1. Attempt any two part of the following : (2x10=20)

(a) Define mean effective pressure.

An air standard Otto cycle has a compression ratio of 8. The initial temperature and pressure are 293°K and 1 bar. The heat added during constant volume heating is 1.8MJ/kg. Find the air standard efficiency and mean effective pressure of the cycle.

(b) Describe with neat sketch the working of four stroke petrol engine. Draw the indicator and valve timing diagram for this engine.

(c) Write notes on :

- (i) Qualities of S.I. engine fuels
- (ii) Dopes and additives.

2. Attempt any two parts of the following : (2x10=20)

- (a) Explain why rich mixtures are required for starting and during idling of an engine ?
A four cylinder four stroke engine running at 2000 rpm is provided with a carburettor whose venturi throat is 3 cm. Find the suction head at the throat assuming the volumetric efficiency of the engine is 0.7. Take $C_a = 1.2 \text{ kg/m}^3$ and $C_d = 0.8$ and atmospheric pressure is 1.013 bar. Stroke and diameter of the engine cylinder are 12 cm and 10 cm respectively.
- (b) Describe the stages of combustion in SI engine with help of a pressure crank angle diagram. Discuss the abnormal combustion and its control.
- (c) Describe the following :
 - (i) Ignition delay and effect of engine variables on ignition delay.
 - (ii) Electronic ignition

3. Attempt any four parts of the following : (4x5=20)

- (a) What are the different types of injection system ? Describe a common Rail system.
- (b) Make a neat sketch of fuel injector and explain its working.
- (c) What are the causes of knock in C.I engine ? How it is controlled ?

(d) What are the requirements of C.I. combustion chamber ? Describe a open combustion chamber.

(e) Draw part-timing diagram for two stroke diesel engine.

(f) Describe EGR method to control NO Pollution in diesel engine.

4. Attempt any four parts of the following : (4x5=20)

- (a) Mention the different types of cooling systems. Mention their field of application.
- (b) Explain the function of radiator and fan in a cooling system.
- (c) Supercharging is more preferred in C.I. engine than S.I. engine. Discuss.
- (d) Differentiate between Splash and Pressure lubrication systems with the help of neat sketches.
- (e) What are the desirable properties of a good lubricating oil ? How the lubricating oil are graded as per SAE ?
- (f) Describe the morse test for measuring the frictional power of a engine.

5. Attempt any two parts of the following : (2x10=20)

- (a) A single cylinder single acting air compressor delivers 10 kg of air per minute from 1 bar and 27°C to 6 bar. The compression follows the law $p v^{1.25} = C$. Determine.