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THE OPEN UNIVERSITY OF SRI LANKA
FACULTY OF ENGINEERING TECHNOLOGY
DEPARTMENT OF MECHANICAL ENGINEERING
DIPLOMA IN TECHNOLOGY – LEVEL 4
FINAL EXAMINATION 2010/2011

MEX 4232– AUTOMOBILE TECHNOLOGY
DATE : 02ND APRIL 2011
TIME : 14:00HRS TO 17:00HRS
DURATION : THREE HOURS

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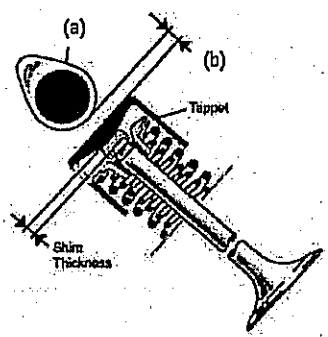
INSTRUCTIONS

1. This paper consists of eight (08) questions. Answer **any five** questions.
2. All questions carry equal marks.
3. In case of a doubt consult the supervisor or an invigilator conducting the examination.

Question 01

(a) Draw a typical ignition system for a four cylinder engine consisting of a battery, ignition coil, distributor and spark plugs and briefly explain the operating principle.

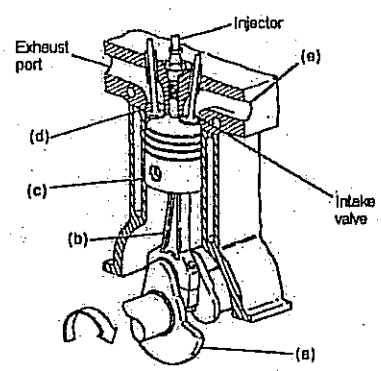
(b) A typical valve train is shown in the figure. Identify the component shown by (a) and the parameter shown by (b)



Question 02

(a) Draw a typical diesel fuel injection system consisting of a fuel tank, filter, fuel injection pump and injector for a compression ignition engine and briefly explain the operating principle.

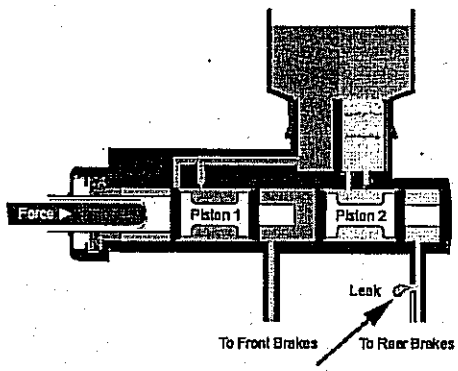
(b) A cross section of an engine is shown in the figure. Identify the components indicated by (a),(b),(c),(d) and (e)



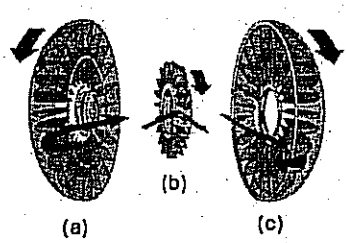
Question 03

A typical tandem master cylinder is shown in the figure.

(a) Explain the operating principle of the tandem master cylinder
(b) Explain what happens if there is a leak in the path to the rear brakes.



(c) Identify the components shown as (a), (b) and (c) of the torque converter shown in the figure



Question 04

a) Explain the necessity of a gear box for a vehicle.

b) Draw the variation of power vs road speed for 1^{st}, 2^{nd}, 3^{rd},and 4^{th} gear ratios for a typical vehicle

c) Calculate the stroke length of a single cylinder engine if the bore diameter is 110 mm, the clearance volume is 0.13×10^{-3} m^3 and the compression ratio is 19.

Question 05

a) Using rough sketches explain the construction of radial ply and cross ply tyres separately.

b) Briefly explain the advantages of radial ply tyres over cross ply tyres.

c) Briefly explain camber, caster and toe in-out with respect to wheel alignment of an automobile.

Question 06

a) A schematic diagram of a gasoline fuel injection system is shown in figureQ6. Identify the sensors and actuators numbered from 1 to 6.

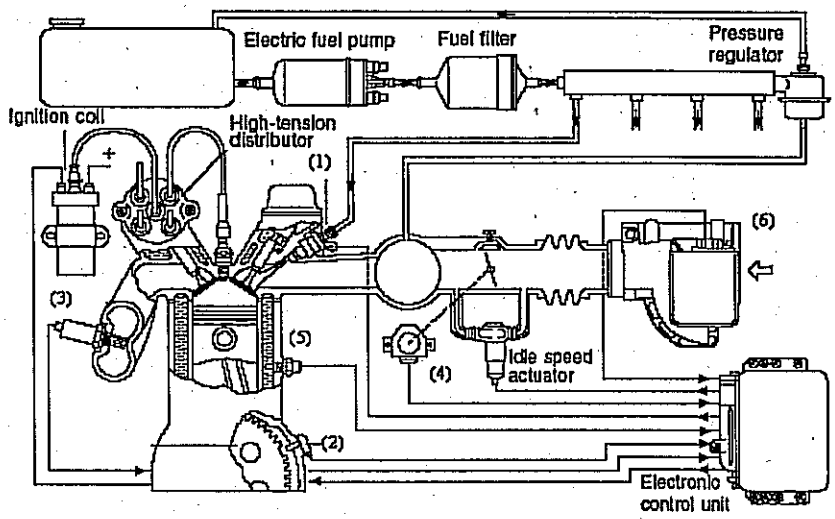


Figure Q6

b) Graphically explain the variation of HC, CO and NOx concentrations in the exhaust gas with the air/fuel ratio for a gasoline engine. (Assume that exhaust gases are not treated with catalytic converters etc).

Question 07

A three cylinder four stroke spark ignition engine with a cylinder bore diameter of 85 mm and a stroke of 90 mm was tested on an engine dynamometer and the following results were observed.

Engine speed	- 3800 rev/min
Brake torque	- 150 Nm
Volume flow rate of fuel	- 0.18 litres/min
Volume flow rate of air	- 1.88 m^3/min
Specific gravity of fuel	- 0.82
Calorific value of fuel	- 45 mJ/kg

Determine the following parameters of the engine.

I. Brake power
II. Brake mean effective pressure
III. Brake thermal efficiency
IV. Volumetric efficiency

Question 08

(a) Briefly explain function of the centrifugal governor of a conventional carburettor type gasoline engine.

(b) Identity the type of engine shown in figure Q8 and explain its operating principle

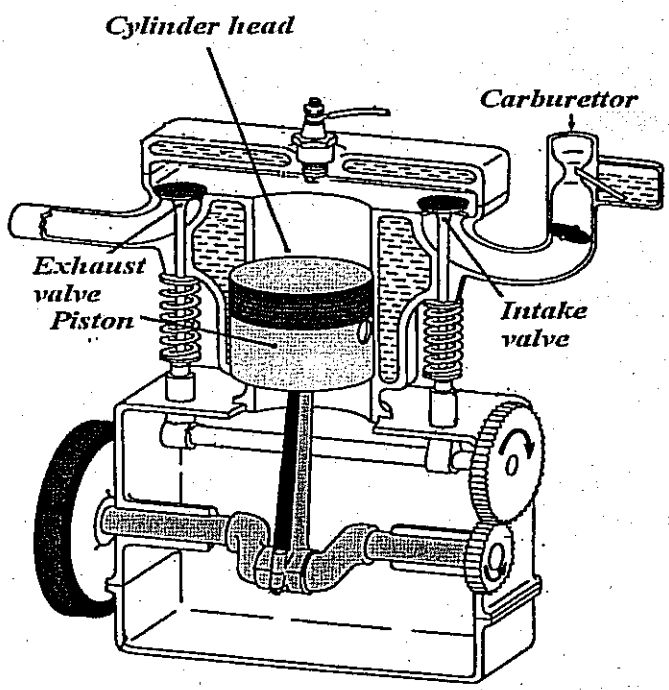


Figure Q8

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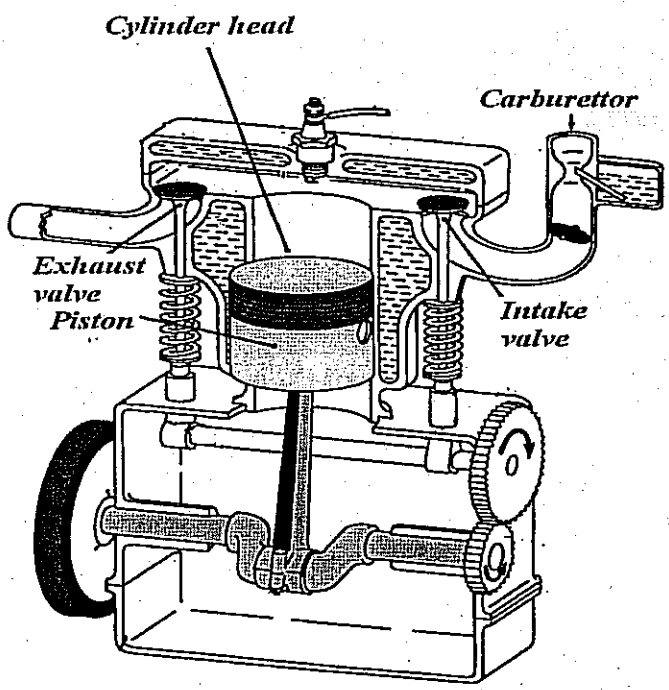


Figure Q8

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