THE OPEN UNIVERSITY OF SRI LANKA
FACULTY OF ENGINEERING TECHNOLOGY
DEPARTMENT OF MECHANICAL ENGINEERING
DIPLOMA IN TECHNOLOGY – LEVEL 4
FINAL EXAMINATION 2006
MEX4232/ MED2203– AUTOMOBILE TECHNOLOGY

DATE : 21ST MARCH 2007
TIME : 0930 HRS - 1230 HRS
DURATION : THREE HOURS

INSTRUCTIONS FOR PART "B"

1. Part B consists of seven (07) questions. Answer **any four** (04) questions.

2. All questions carry equal marks.

3. Time allotted for **Part B** is **Two hours and Fifteen minutes.**

PART – B

QUESTION 01

A four cylinder, four stroke, spark ignition engine with a cylinder bore of 75mm and a stroke of 90 mm was tested on a rope brake dynamometer and the following results were obtained.

Engine speed	-	2,400 rev/min
Load applied	-	340 N
Spring balance reading	-	20 N
Effective diameter of the brake	-	600 mm
Volume flow rate of fuel	-	0.13 litres/min
Volume flow rate of air	-	1.53 m^3/min
Specific gravity of fuel	-	0.8
Calorific value of fuel	-	44 MJ/kg

Determine the following parameters of the engine.
(i) Brake power
(ii) Brake mean effective pressure
(iii) Brake thermal efficiency
(iv) Volumetric efficiency

If the engine has a compression ratio of 9.0 and its indicated thermal efficiency is 60% of that of the corresponding air standard Otto cycle, determine the mechanical efficiency of the engine. Take $\gamma = 1.4$ for air.

QUESTION 02

"Morse test is a method adopted to determine the indicated power of a multi cylinder engine" Briefly explain how this test is carried out.

A four cylinder gasolene engine has an output of 60 kW at 2500 rev/min. A Morse test was carried out and the corresponding brake torque readings were observed to be 158, 162, 155, and 164 Nm. Calculate the indicated power and the mechanical efficiency of the engine.

QUESTION 03

(a) Draw a typical valve timing diagram for a spark ignition engine and indicate the sequence of valve opening and closing. Explain how more complete filling of intake air and more complete removal of exhaust gases have been ensured.

(b) What are the most important functions of a lubricating system? Explain.

QUESTION 04

(a) There are many types of air flow sensors used in modern automobiles. Describe the construction and operation of one such type with appropriate sketches.

(b) Explain the process of turbo charging adopted in automobiles with the aid of sketches.

QUESTION 05

(a) What is meant by cooling load as applicable to air conditioning of automobiles? Explain.

(b) Explain with the aid of sketches how the oxides of nitrogen in the vehicle emissions are reduced.

QUESTION 06

(a) Describe the working principle of a fluid flywheel with sketches where necessary.

(b) Explain the difference between fully floating and semi floating types of wheel bearings.

QUESTION 07

(a) What are the advantages and disadvantages of disc brakes over drum brakes? Explain.

(b) Write short notes on any **two** of the following.

(i) Main suspension components of a passenger car
(ii) Hydro elastic suspension
(iii) Independent suspension

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