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

PAPER ID : 0402 Roll No.

B. Tech.

(SEM. VII) EXAMINATION, 2007-08

AUTOMOBILE ENGINEERING

Time : 3 Hours] *[Total Marks : 100*

Note : *(1) Attempt **ALL** Questions.*

*(2) All questions carry **equal** marks.*

(3) Be precise in your answer.

(4) No second answer book will be provided.

(5) Assume missing data suitably, if any.

1 Attempt any **four** parts of the following : **5×4=20**

(a) What is Rolling Resistance? Describe the factors that affects the rolling resistance of a vehicle.

(b) How are the gear ratios of a named transmission system determined for a given vehicle?

(c) How does the aerodynamic lift and aerodynamic pitching moment affect the performance of a vehicle?

(d) Determine an optimum firing order and power overlap of a six cylinder 4-stroke in-line engine shown below :

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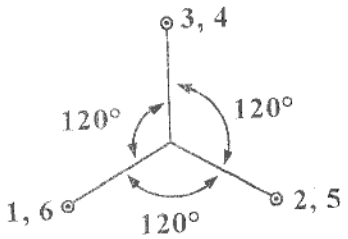

Fig. 1

(e) State and explain the essential differences in the valve timings of a highspeed and low speed 4 stroke cycle SI engines.

(f) What is Volumetric Efficiency? How does it affect the engine performance? Draw a curve between Volumetric efficiency and speed of a 4-stroke cycle SI engine and discuss it.

2 Attempt any **four** parts of the following :

(a) With the help of a neat diagram describe the construction and working of a Torque Converter.

(b) Describe the working of any one type of differential used in automobiles.

(c) What do you understand by the directional stability of a vehicle? Briefly describe the factors on which it depends.

(d) With the help of a suitable sketch describe the working of any one type of steering system used in a modern passenger car.

(e) Describe the working of an automatic transmission system (Wilson's Gear Box).

(f) What is the purpose of using an overdrive in a vehicle? – Explain.

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3 Attempt any **two** parts of the following :

(a) Discuss the advantages of using a compensated or equalized type of suspension system.

(b) What is brake effectiveness? Why is the hydraulic braking system preferred over the mechanical braking system in heavy vehicles ?

(c) With the help of a neat sketch describe the working of a hydraulic braking system used in vehicles.

4 Attempt any **two** parts of the following :

(a) What is the advantage of an Electronic ignition system? Explain the working of any one type of electronic ignition system.

(b) Discuss the differences between the Multi point fuel injection system for an SI engine and carburetted fuel supply system for an SI engine.

(c) Discuss the differences between the air-injection systems and fuel injection system used in CI engines.

5 Attempt any **four** parts of the following :

(a) What are the requirements of an Airconditioning system for an automobile?

(b) State the application, advantages and disadvantages of air-cooling system used in automobiles.

(c) What is the advantage of a pressurized cooling system in an IC engine?

(d) Enumerate lubrication system and explain wet sump lubrication system with the help of a neat sketch.

(e) Describe any one type of lubricating system used in SI engines.

(f) What do you mean by break-down maintenance? Explain briefly.