

**Scheme – I**  
**Sample Question Paper**

**Program Name** : Diploma in Automobile Engineering  
**Program Code** : AE  
**Semester** : Third  
**Course Title** : Automobile Engines  
**Marks** : 70

**22308**

**Time: 3 Hrs.**

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**Instructions:**

- (1) All questions are compulsory.
- (2) Illustrate your answers with sketches wherever necessary.
- (3) Figures to the right indicate full marks.
- (4) Assume suitable data if necessary.
- (5) Preferably, write the answers in sequential order.

**Q.1) Attempt any FIVE of the following.**

**10 Marks**

- a) Define the terms: Swept volume and compression ratio
- b) List four systems used in I.C. engine
- c) Locate the position of following components in an I.C. engine: Crank shaft, Camshaft, Piston, and Circlip.
- d) State four type of injector nozzles.
- e) List four functions of exhaust system.
- f) State any four rotating components of I.C. engine to be lubricated.
- g) Define Brake power and Indicated Power.

**Q.2) Attempt any THREE of the following.**

**12 Marks**

- a) Compare S.I. and C.I. engines on the basis of: compression ratio, thermal efficiency, mechanical efficiency and application.
- b) Compare overhead valve and overhead cam arrangement on the basis of: emission, number of parts, Power output and efficiency.
- c) Elaborate the working of S.U. electrical fuel feed pump with help of sketch.
- d) Describe the working of pressurized water cooling system with help of schematic diagram.

**Q.3) Attempt any THREE of the following.**

**12 Marks**

- a) Describe the working principle of Four-stroke petrol engine with help of sketches.
- b) Describe the construction of piston of a four-stroke engine with sketch.
- c) Explain the working of magneto ignition system with sketch.
- d) Sketch high voltage connections between distributor and spark plugs of multi-cylinder engine with direction of rotation of distributor shaft/ rotor assembly. Label the sketch.

**Q.4) Attempt any THREE of the following.**

**12 Marks**

- a) Select I.C. engine for transport application with justification.
- b) Draw valve operating mechanism of Overhead valve arrangement and explain the same.
- c) Select muffler for a motorcycle engine with justification.
- d) Describe the construction and working of water expansion tank with help of sketch.
- e) In a test on a 2- stroke single cylinder diesel engine, following observations were made: Bore -75mm, Stroke -90mm, Engine speed =1200rpm, Mean effective pressure = 12 bar, Mean brake Diameter = 0.5 m, Net Brake load= 200 N, Fuel consumption = 2.04kg/hr, Calorific value of diesel =42000 kJ/kg.  
Calculate –
  - i) Mechanical efficiency
  - ii) Brake thermal efficiency

**Q.5) Attempt any TWO of the following.**

**12 Marks**

- a) Choose valve operating system for-(i) Front Engine Front Wheel Drive arrangement of a vehicle and (ii) Front Engine rear wheel drive arrangement of a vehicle – with justification.
- b) Elaborate the working of Two-wheeler carburetor with help of a sketch.
- c) Statement: Racing car engines have Dry sump lubrication system. Justify the statement by giving reasons for use of dry sump lubrication system in racing car. Sketch the lubrication system.

**Q.6) Attempt any TWO of the following.**

**12 Marks**

- a) Describe the Morse test procedure for multi-cylinder I.C. engine.
- b) Select lubricant with justification for – i) Four-stroke S.I. engine , ii) Four stroke C.I. engine, from given list of lubricants.

Sr. No.	Lubricant category/ Grade
1	SAE 20 W40
2	SN
3	CJ-4
4	CF-4

- c) In a trial on a four cylinder engine 100 mm bore, 150 mm stroke and working on a four stroke cycle. The following observations were made:  
Speed = 2500 rpm  
Net Dynamometer load at 50mm radius = 200N  
Power required to rotate with Ignition off= 45KW  
Petrol consumption = 752 g/minute  
Cooling water circulated = 200 g/minute  
Temperature size of cooling water=50° C  
Calorific valve of petrol =46,000 KJ/Kg
  - i) Calculate mechanical efficiency and indicated mean effective pressure.
  - ii) Draw heat balance sheet for the test in KJ/Kg.

**Scheme – I**  
**Sample Test Paper - I**

**Program Name** : Automobile Engineering Program  
**Program Code** : AE  
**Semester** : Third  
**Course Title** : Automobile Engines  
**Marks** : 20

**22308**

**Time: 1 Hour**

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**Instructions:**

- (1) All questions are compulsory.
- (2) Illustrate your answers with neat sketches wherever necessary.
- (3) Figures to the right indicate full marks.
- (4) Assume suitable data if necessary.
- (5) Preferably, write the answers in sequential order.

**Q.1) Attempt any FOUR of the following.**

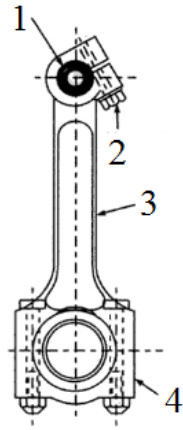
**08 Marks**

- a) Classify I. C. engines on the basis of cylinder arrangement and method of charging.
- b) Draw a labeled sketch of the piston of four stroke engine.
- c) Explain the reason for driving camshaft at half of engine crank shaft speed.
- d) Describe function of induction system of Diesel engine.
- e) State the air: fuel ratio for following conditions of S.I. engine operation: Cold Start, Idling, part throttle and acceleration.
- f) Define the terms: Clearance volume and Bottom dead center.

**Q.2) Attempt any THREE of the following.**

**12 Marks**

- a) Describe construction of Cylinder head with help of sketch.
- b) Describe valve timing diagram for four stroke C.I. engine with sketch.
- c) Elaborate the working of Starting circuit of Two-wheeler carburetor with help of a sketch.
- d) Describe function of any four components of Fuel Injection pump.
- e) State the specifications of I.C. engine used in a Two- wheeled vehicle.
- f) Identify the given I.C. engine component, redraw and write four labels as per numbers in the figure.



**Scheme – I**  
**Sample Test Paper - II**

**Program Name** : Automobile Engineering Program  
**Program Code** : AE  
**Semester** : Third  
**Course Title** : Automobile Engines  
**Marks** : 20

22308

**Time: 1 Hour**

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**Instructions:**

- (1) All questions are compulsory.
- (2) Illustrate your answers with sketches wherever necessary.
- (3) Figures to the right indicate full marks.
- (4) Assume suitable data if necessary.
- (5) Preferably, write the answers in sequential order.

**Q.1) Attempt any FOUR of the following.**

**08 Marks**

- a) State the firing orders of 3 and 4 cylinder engine.
- b) State the function of Ignition coil and condenser.
- c) List four additives of Engine oil.
- d) State the necessity of I.C. engine cooling system.
- e) Define Indicated thermal efficiency and Brake thermal efficiency.
- f) List four functions of I.C. engine exhaust system.

**Q.2) Attempt any THREE of the following.**

**12 Marks**

- a) Differentiate between battery ignition and magneto ignition system on the basis of – Intensity of spark at low speed, space occupied, application and maintenance.
- b) State four types exhaust system muffler and explain one type with sketch.
- c) Describe the working of air cooling system with sketch.
- d) Describe the working of electrically operated fan with help of circuit diagram.
- e) Describe Willian’s Line method for finding Frictional power of an I.C. Engine.
- f) An I.C. engine uses 6 kg fuel having calorific value 44000 KJ/kg in one hour. The brake power developed is 18kW. The temperature of 11.5 kg of cooling water found to rise through 50° C per minute.  
Calculate- Heat input, heat converted to BP and heat lost in cooling system.