

AUTOMOTIVE ENGINES

Time Allowed: 3 Hours

Full Marks: 70

Answer to Question No.1 is compulsory and to be answered first.

This answer is to be made in separate loose script(s) provided for the purpose.

Maximum time allowed is 45 minutes, after which the loose answer scripts will be collected and fresh answer scripts for answering the remaining part of the question will be provided.

On early submission of answer scripts of Question No.1, a student will get the remaining script earlier.

Answer any five questions from Group-A, B & C, taking at least one from each group.

1. A. Choose the correct answer (any ten): 1x10
- i) Fuel filter do not uses generally – a) oil, b) paper, c) cloth, d) felt.
 - ii) Fuel injector is used for – a) gas turbine, b) CI engine, c) SI engine, d) none of above.
 - iii) Lean air mixture is required for – a) starting, b) idling, c) cruising, d) acceleration.
 - iv) The throttle valve controls the supply of – a) air only, b) fuel only, c) air fuel mixture, d) none of above.
 - v) Crank case ventilation is provided – a) to cool cylinder, b) to cool crankcase, c) to cool piston, d) to remove blow.
 - vi) Connecting Rod is fitted with crank shaft and – a) Fly wheel, b) cylinder head, c) piston.
 - vii) Air cooling is – a) better, b) worse than water cooling, c) can't be compared.
 - viii) Volumetric efficiency of an automobile engine is – a) 20%-40%, b) 40%-60%, c). 60%-80%, d) 80%-90%.
 - ix) For the same out-put a two stroke engine is – a) Heavier, b) Lighter, c) more expensive than a 4-stroke engine.
 - x) Increasing the compression ratio in SI engine the knocking tendency – a) decreases, b) increases, c) not affected, d) none of above.
 - xi) If N is the rpm number of power stroke per minute in a four stroke engine is – a) 2N, b) N/2, c) N, d) 4N.
- B. Stare whether True or False (any ten): 1x10
- i) In CI engine single acting pistons are used.
 - ii) Crank shaft & Cam shaft are same.
 - iii) Engine heat controlled by coolant.
 - iv) Radiator consists of an upper tank and lower tank.
 - v) Piston rings are fitted into groove of the piston.
 - vi) Spark timing in MPFI engine is controlled by ECU.
 - vii) Inline type & distributor type fuel injection pump are same.
 - viii) Injector used in SI engine.
 - ix) Petrol engine runs on auto cycle.
 - x) Fins are used in water cooling system.
 - xi) Carburetor used in CI engine.

Group-A

2. What is IC engine & what are the important components of IC engine? Classify engines based on different parameter. 5+5
3. Comparison between SI engine & CI Engine. Draw the Piston & identify its different parts. 6+4
4. Define – (a) Piston Displacement, (b) Volumetric Efficiency, (c) Compression Ratio, (d) Thermal Efficiency. 2½x4

Group-B

5. Discuss detail of Water cooling system. Compare water & air cooling system. 5+5
6. Discuss different properties of engine lubricating oil. State working principle of dry sump lubrication system. 5+5
7. Write short notes on the followings – (a) Wet sump lubrication system, (b) Governor. 5+5

Group-C

8. Write short notes on the followings: (a) IP, (b) Fuel consumption, (c) BP, (d) Engine efficiency 2½x4
9. How Morse test is used to find IP and mechanical efficiency of an engine and under what conditions. 10
10. The following were noted for a 4-cylinder, 4-stroke engine: 10
- | | |
|----------------------------------------------------------|----------------|
| Diameter | = 101 mm |
| Stroke | = 114 mm |
| Speed | = 1600 r.p.m. |
| Fuel consumption | = 0.204 kg/min |
| Heating value of fuel | = 41800 kJ/kg |
| Difference in tension on either side of the brake pulley | = 378 N |
| Brake circumference | = 3035 m |
- Assume a mechanical efficiency = 83%
- Calculate – (a) Brake thermal Efficiency, (b) Indicated Thermal Efficiency, (c) Mean Effective Pressure of Cylinder, (d) Petrol Consumption per b.kWh.

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