

Dec-22-0154

ME-403 (I.C. Engines)

(ME, AE)

B.Tech-4th (CBCS)

Time : 3 Hours

Max. Marks : 60

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

- Note:** (i) This question paper carries five sections. Attempt five questions in all, select one question from each sections A, B, C & D. Section E is compulsory.
(ii) Draw neat and comprehensive sketches wherever necessary to clearly illustrate your answer.

SECTION-A

1. (a) Distinguish between internal combustion and external combustion engines. What are the relative merits and demerits of internal combustion engines over the external combustion engines? (5)
(b) Discuss the important qualities of an SI engine fuel. (5)
2. (a) Explain the various types of combustion chambers used in CI engines. (5)
(b) Discuss the factors affecting combustion in spark-ignition engines. (5)

SECTION-B

3. (a) With a neat sketch, explain the working principle of a simple carburettor. (5)

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- (b) Describe the principle and working of a continuous injection system with the help of a diagram. (5)
4. (a) Explain the following in brief: (5)
 - (i) Unit pump
 - (ii) Inline pump
- (b) What are the different types of nozzles? What is the difference between pintle type and pintaux type nozzles? (5)

SECTION-C

5. (a) Discuss different types of lubricants. (5)
(b) What are the advantages and disadvantages of a liquid-cooling system? (5)
6. A four-stroke, four-cylinder gasoline engine has a bore of 60 mm and a stroke of 100 mm, On test it develops a torque of 66.5 Nm when running at 3000 rpm. If the clearance volume in each cylinder is 60 cc, the relative efficiency with respect to brake thermal efficiency is 0.5 and the calorific value of the fuel is 42 MJ/kg, determine the fuel consumption in kg/h and the brake mean effective pressure. (10)

SECTION-D

7. (a) Discuss the types of catalytic convertor. (5)
(b) Discuss the following on-board diagnostic systems: (5)
 - (i) OBD-I
 - (ii) OBD-II

[P.T.O.]

8. (a) What are the advantages and disadvantages of using LPG in SI engines? (5)
- (b) What is natural gas? What are the advantages and disadvantages of using natural gas as alternate fuels? (5)

SECTION-E

9. (i) Mention the various assumptions made in air-standard cycle analysis.
- (ii) What do you understand by the term auto-ignition?
- (iii) What is delay period?
- (iv) What are the main drawbacks of the carburettor which prompted the use of the fuel-injection system in SI engines?
- (v) What are the requirements of a good spark plug?
- (vi) What is the purpose of using a governor in CI engines?
- (vii) Why is it necessary to cool internal combustion engines?
- (viii) The bore and stroke of a four-cylinder four-stroke engine are 90 mm and 100 mm respectively and the torque measured is 120 Nm. Calculate the brake mean effective pressure.
- (ix) What do you mean by homologation?
- (x) What are the disadvantages of using hydrogen in SI engine?

(10×2=20)