

BENGAL ENGINEERING AND SCIENCE UNIVERSITY, SHIBPUR

B.E. 8th Semester (Mechanical) Examinations, 2013

Automobile Engineering Elective-II (ME-804/4)

Full Marks: 70

Time: 3 hrs

Use SINGLE Answer script

Answer any SIX questions, taking THREE from each Group

GROUP A

1. a) What are the main advantages of rear engine rear wheel drive system? Describe, with a neat sketch, the transfer of power from the engine to the wheel in case of four wheel drive system.
b) Explain in brief the following terminologies associated with wheel alignment:
i) Toe in and Toe out ii) Camber iii) King pin inclination iv) Caster
2. a) Explain with a neat sketch the working principle of Multipoint fuel injection (MPFI) engines. Also, state the major advantage of MPFI systems over Throttle Body Injection (TBI) systems.
b) What are the different subsystems of Multipoint Fuel Injection (MPFI) Engine? Explain with a neat sketch the working of fuel delivery subsystem of MPFI engine.
3. a) What are the drawbacks of conventional ignition system? Describe with a neat sketch the working principle of Capacitor Discharge Ignition (CDI) system with applications.
b) Write briefly the function of following components used in a battery ignition system:
i) Capacitor ii) Distributor iii) Ballast Resistor iv) Ignition coil.
4. a) Describe in brief the advantages of "overhead valve" combustion chamber used in SI engines over "side valve" chambers.
b) Explain the effect of the following with respect to design of combustion chamber for SI engine:
i) Flame travel distance ii) Surface to volume ratio iii) Compression ratio

GROUP B

5. a) Explain the effect of following variables on engine friction:
i) Compression ratio ii) Engine speed iii) Engine load

- b) With a neat schematic diagram, describe the operation of a pressure feed wet sump lubrication system.
6. a) What is the purpose of using antifreeze solution in cooling system? State the advantages and limitations of Forced Circulation system over Thermo-siphon system with respect to engine cooling.
- b) Describe with a neat sketch the working of cooling system of a modern day car equipped with thermostatic regulator.
7. a) Describe with a neat sketch the working of Common Rail system used in modern CI engines.
- b) A 4 stroke, single cylinder diesel engine develops 36 kW when running at a speed of 800 rpm and consumes fuel at the rate of 240 g/kWh. The pressure of air in the cylinder at the beginning of injection and at the end of injection are 40 bar and 60 bar respectively. The injection pressure at the beginning and end of injection are 200 bar and 600 bar respectively. Determine the diameter of the nozzle if the injection is carried out during 15° of crank rotation. Take the density of fuel to be 800 kg/m^3 and C_{df} to be 0.6. Consider the ambient pressure and temperature to be 1.013 bar and 27°C respectively. Assume effective pressure difference causing the fuel injection as average pressure difference during the injection period.
8. Write short notes on the following: (any three)
- a) Steering ratio ii) Disadvantages of single hole nozzle iii) Lambda sensor iv) Purpose of addition of detergents and dispersants in lubricating oil
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