



17523

14115

3 Hours/100 Marks

Seat No.

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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) **Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.**
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MARKS

1. A) Attempt **any three** :

12

- a) Compare SI and CI engines on the basis of :
 - i) Thermal efficiency
 - ii) Compression ratio
 - iii) Power output per unit weight
 - iv) Applications.
- b) State four drawbacks of carbureted SI engine.
- c) State four features of CRDI system.
- d) List four properties of hydrogen used as Fuel in I.C. engines.

B) Attempt **any one** :

6

- a) List the methods of fuel injection in SI engine and describe any one with neat sketch.
- b) Draw the block diagram of CRDI systems and describe its working. State its two advantages.

P.T.O.



2. Attempt **any four** : **16**
- a) Draw a neat labelled P- θ diagram showing the stages of combustion in SI engine.
 - b) Compare knocking in SI and CI engines.
 - c) List four sensors used in MPFI engine and state their functions.
 - d) Describe the working of electronically controlled diesel injection pump.
 - e) State two advantages and two disadvantages of electric cars.
 - f) What is diesel smoke ? State two methods to control diesel smoke.
3. Attempt **any four** : **16**
- a) What are the effects of detonation ? Explain in brief.
 - b) State the effect of following factors on ignition lag and flame propagation of SI engine.
 - i) Compression ratio
 - ii) Turbulence.
 - c) Compare Throttle Body Injection (TBI) with Port Fuel Injection (PFI) systems.
 - d) Draw a schematic diagram of a closed loop EFI feedback control system. What is its purpose ?
 - e) State four environmental benefits of biodiesel in comparison to petroleum based fuels.
 - f) Describe the concept of Gasoline Direct Injection (GDI).



4. A) Attempt **any three** : **12**
- a) What are the advantages and disadvantages of the IDI swirl chamber over the open chamber design of combustion chamber.
 - b) What does VTEC stands for ? State its two advantages.
 - c) State the methods of controlling gasoline engine emissions. Describe one method.
 - d) Draw a labelled sketch of EGR valve and describe its working.
- B) Attempt **any one** : **6**
- a) Draw a labelled sketch of TOP feed electric fuel injector and describe its working.
 - b) Draw a neat labelled block diagram of CNG conversion kit. Describe its working.
5. Attempt **any two** : **16**
- a) How the following factors will affect the delay period in CI engine ?
 - i) Ignition quality of fuel
 - ii) Injection timing
 - iii) Compression ratio
 - iv) Engine speed
 - v) Air fuel ratio
 - vi) Load
 - vii) Engine size
 - viii) Type of combustion chamber.
 - b) Describe the idle speed control as a output control function of a electronic control module with neat sketch.
 - c)
 - i) What is glow plug ? Why and where it is used ?
 - ii) Draw a labelled circuit diagram of glow plug and describe its operation.



6. Attempt **any four** :

16

- a) i) Identify the diagram given in figure 1.
ii) Label it and state its two advantages.

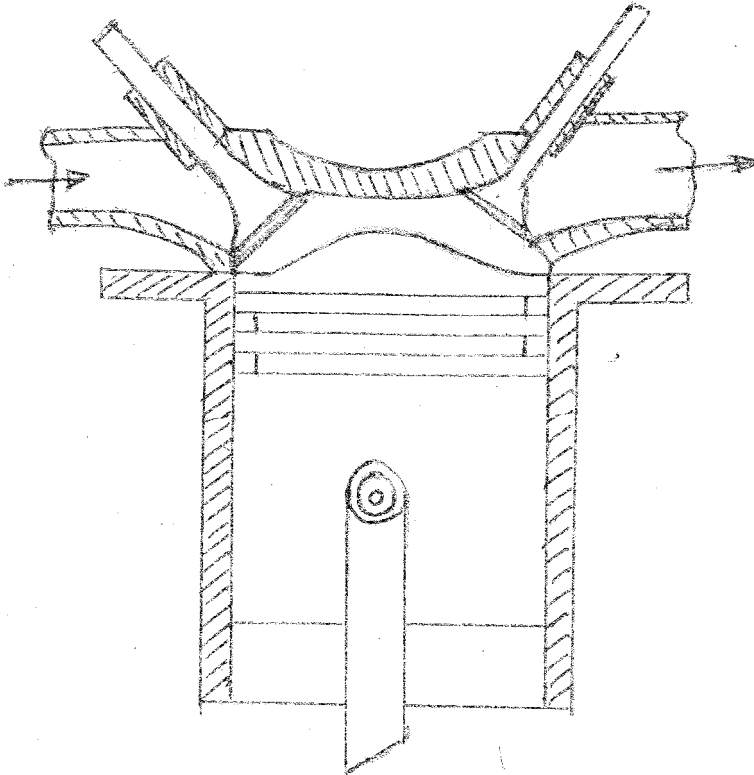


figure 1

- b) Compare variable geometric turbocharger with conventional turbocharger.
c) What are the major pollutants from the exhaust of gasoline engines ? What are the environmental effects of these pollutants ?
d) State the Euro norms and Bharat stage norms for diesel cars.
e) How is the NO_x formed in the exhaust of I.C. engines ? What are the important engine variables that affect NO_x emissions ?
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