



Instructions:

1. Figures to right indicate full marks.
2. Draw neat figures wherever required.
3. Use of non-programmable calculator is allowed
4. Answers to both the sections should be written in two separate Answer sheets.

Section – I

1. State True or False: (20)
 - a. CNG engines can be turbocharged.
 - b. Ethanol is Hygroscopic.
 - c. Biodiesel is a good lubricant.
 - d. Biofuels are not carbon neutral.
 - e. Storage pressure of Hydrogen is 300 bar.
 - f. Three Way catalytic converter uses Palladium & Rhodium.
 - g. DME contains Oxygen.
 - h. PM is carcinogenic.
 - i. Smoke is measured by Opacimeter.
 - j. Multifunctional valve is optional for LPG vehicles.
2. Answer ANY SIX of the following: (30)
 - a. Discuss OBD regulations for LPG & CNG.
 - b. Write a short note on Flex Fuel Vehicles.
 - c. Write a short note on CNG kit testing.
 - d. Discuss about Hydrogen safety issues.
 - e. Discuss about the Ethanol blending in Gasoline along with its merits & demerits.
 - f. Explain in brief about Biogas Production Plant.
 - g. List the desirable properties of Biodiesel.

Section –II

1. Fill in the Blanks: (5)
 - a. More than 90% of ozone column is in _____.
 - b. NO_x reacts with moisture in lungs to form _____.
 - c. Chemical composition of Cordierite is _____.
 - d. The working principle for CO & CO₂ analyzers is _____.
 - e. Lower wall thickness of substrates leads to _____ OFA.
2. Expand ANY TEN the Following: (5)

a. CMVR	d. DOC	g. MOHI & PEs	j. PUC
b. ECE	e. JAMA	h. VOC	k. TIF
c. NMHC	f. PAH	i. EPA	l. MIF
3. Answer the Following: (10)
 - a. Write a short note on Smog.
 - b. Explain in brief about Blow-by gases.
4. Answer ANY TWO of the Following: (10)
 - a. Discuss about the roadmap of vehicle emission norms & sulphur reduction schedule in India.
 - b. Explain briefly the Diesel Engine technologies to meet the Emission Norms from BS I to BS V.

c. Compare DI engine with IDI engine in terms of emission, noise, thermal efficiency & fuel economy.

5. Answer ANY TWO of the Following: (10)

- a. Discuss 3 Way Catalytic Converter and explain the process with the help of reactions.
- b. Discuss about the Design Criteria of Closed Couple Catalysts with a neat sketch.
- c. Discuss DPF regeneration of a CRDI engine with a neat sketch showing temperature & pressure with respect to time.

6. Answer ANY TWO of the Following: (10)

- a. Explain the detection of Aldehydes & Ketones with the help of HPLC.
- b. Explain PE & LS type of metallic substrates with a neat sketch.
- c. Explain Lean NOx Trap operations with a neat sketch.

-----**Best of Luck**-----