Question Bank for Alternative Fuel and Emission Control **(**Prof.S.V.Raut)

Unit-III: Emission Control (SI Engine):

Multiple Choice Question

1. For which of the following the Chemiluminescence analyzer is used to measure?

   a) NO_x

   b) CO

   c) HC

   d) CO_2

Explanation: The Chemiluminescence analyzer is used to measure NO_x in the exhaust gases from the engine. The principle of measurement is based on Chemiluminescence reaction between ozone and NO. It results in the formation of excited NO_2.

2. Which of the following is the best method to measure the speed?

Mechanical tachometer

b) Electrical tachometer

c) Magnetic pickup

d) Mechanical counters

Explanation: Magnetic pickup is the best device to measure the speed. Mechanical and electrical tachometers are affected by temperature variation and those are not accurate.

3. Which of the following is the most accurate method of determining friction power?

   a) Morse test

   b) Willian's line

   c) Motoring test

   d) Measurement of brake and indicated power

Explanation: The friction power can be obtained by measurement of the brake and indicated power. The indicated power can be obtained by indicated diagram and brake power obtained by a dynamometer

4. For which of the following the flame ionization detector (FID) is used to measure?
   a) CO
   b) HC
   c) CO_2
   d) NO_x

Explanation: Flame ionization detector (FID) is used to measure the hydrocarbon concentration. Ionization is the characteristic of HC compound.

5. What is the requirement of the air box in the airbox method of measuring airflow?
   a) To dump out the pulsation
   b) To provide the constant velocity of flow
   c) To have a constant flow
   d) To have a constant temperature

Explanation: The airbox is used to dump out the pulsation while measuring the airflow. In IC engines, the satisfactory measurement of the air consumption is difficult because the flow is pulsating due to the cyclic nature of the engine and because the air is a compressible fluid.

6. Which of the following is the most accurate dynamometer?
   a) Eddy current dynamometer
   b) Prony brake dynamometer
   c) Hydraulic type dynamometer
   d) Swinging field type dynamometer

Explanation: Swinging field type dynamometer is the most accurate dynamometer. It consists of an electrical machine which may be run either by motor or generator.

7. What can be obtained from the engine indicator diagram?
   a) Indicated mean effective pressure
   b) Brake mean effective pressure
   c) Relative efficiency
   d) Mechanical efficiency

Explanation: The engine indicator diagram is used to obtain the indicated mean effective pressure. Pressure-volume, P-V, and pressure-crank angle, P-θ is the two types of indicator diagram that can be obtained from an engine. Both these indicator diagrams are mutually convertible.

8. Which of the following is one of the major exhaust emissions from CI engines compared to SI engines?
   a) Oxides of nitrogen
   b) Particulates
   c) CO and CO_2
   d) Unburnt hydrocarbon

Explanation: Unburnt hydrocarbons are one of the major exhaust emissions from CI engines. The components in diesel fuel have higher molecular weight.

9. Which of the following causes the photochemical smog?
   a) Excess O_2
   b) CO and CO_2
   c) Soot and particulate matter
   d) NO_x and HC

Explanation: NO_x is one of the primary causes of photochemical smog. This smog is formed by the photochemical reaction of automobile exhaust and atmospheric air in the presence of sunlight.

10. During which condition of the vehicle does NO_x emission in SI engine will be lowest?

a) Cruising

b) Idling

c) Accelerating

d) Decelerating

Explanation: NO_x emissions are lowest in SI engine during idling. NO_x is created from nitrogen in the air. Nitrogen can also be found in fuel blends.

11. For what purpose is the Rhodium used?

a) To reduce CO and HC

b) To reduce NO_x

c) To reduce CO

d) To reduce HC

Explanation: Rhodium is used to reduce NO_x. It is used to clean vehicle emission. It is mixed with the other two metals – platinum and palladium.

Short Question Answers

1 What is hydrocarbons in S.I. Engine?

Hydrocarbons, or more appropriately organic emissions, are the consequence of incomplete combustion of the hydrocarbon fuel. The level of unburned hydrocarbons (HC) in the exhaust gases of gasoline fueled spark-ignition engines is typically 1 to 2% of the fuel: in diesels it is much less.

2 What is hydrocarbon in an engine?

A small fraction of the fuel oil, which consists of hydrocarbons, will pass through the engine unburned and other hydrocarbons are formed during the combustion process. The hydrocarbons are thus mainly particles of unburned and partly burned original fuel.

3 What is Polycyclic Aromatic hydrocarbons?

Polycyclic aromatic hydrocarbons are a group of chemicals that occur naturally in coal, crude oil, and gasoline. PAHs are also present in products made from fossil fuels, such as coal-tar pitch, creosote, and asphalt. When coal is converted to natural gas, PAHs can be released.

4 What are the factors that can affect the emissions and durability of SI engines?

- **Combustion duration**: Increasing combustion duration can reduce NO and HC emissions, but it can also increase CO emissions.
- **Fuel type**: Different fuels can have different emission levels. For example, methanol can have high THC emissions, but it can also decrease NOx emissions.
- **Engine load**: At full engine load, fuel burning is improved, which can lead to lower HC emissions.
- **Humidified air induction**: Humidified air induction can reduce CO emissions.
- **Variable valve actuation (VVA)**: VVA can improve fuel economy, emissions, and low speed torque.
- **Engine durability**: Engine durability is the probability that an engine can withstand the effects of time-dependent or non-time-dependent mechanisms such as fracture, fatigue, wear, corrosion, creep, deformation, fouling, and plugging.

5 Short note on charcoal canister control for evaporative emission control.

A canister containing activated charcoal is used to store the fuel vapours. The vapours produced in the fuel tank normally collect in the fuel tank itself and are vented to the charcoal canister when fuel vapour pressure becomes excessive.

6 What is Positive Crankcase Ventilation (PCV) system?

A Positive Crankcase Ventilation (PCV) system reduces unburned hydrocarbon (UBHC) emissions from an engine by recycling harmful gases back into the combustion chamber:

- **How it works**

  The PCV system uses hoses and valves to redirect gases from the crankcase back into the intake manifold. When the engine is running, the PCV valve opens to allow the gases to mix with the air-fuel mixture and be burned.

- **Benefits**

  The PCV system reduces emissions, improves fuel economy, and increases engine efficiency. It also prevents oil dilution and sludge formation in the crankcase.

- **How to check it**

  You can check the PCV system by looking for a white plastic sticker under the hood of your car. The sticker will list the engine size, emission systems, and other information. You can also check for swelling or cracking in the hoses and connections.

- **How to repair it**
  Replacing a hose, grommet, or PCV valve usually costs less than $20. If you're unsure, you can consult a professional.

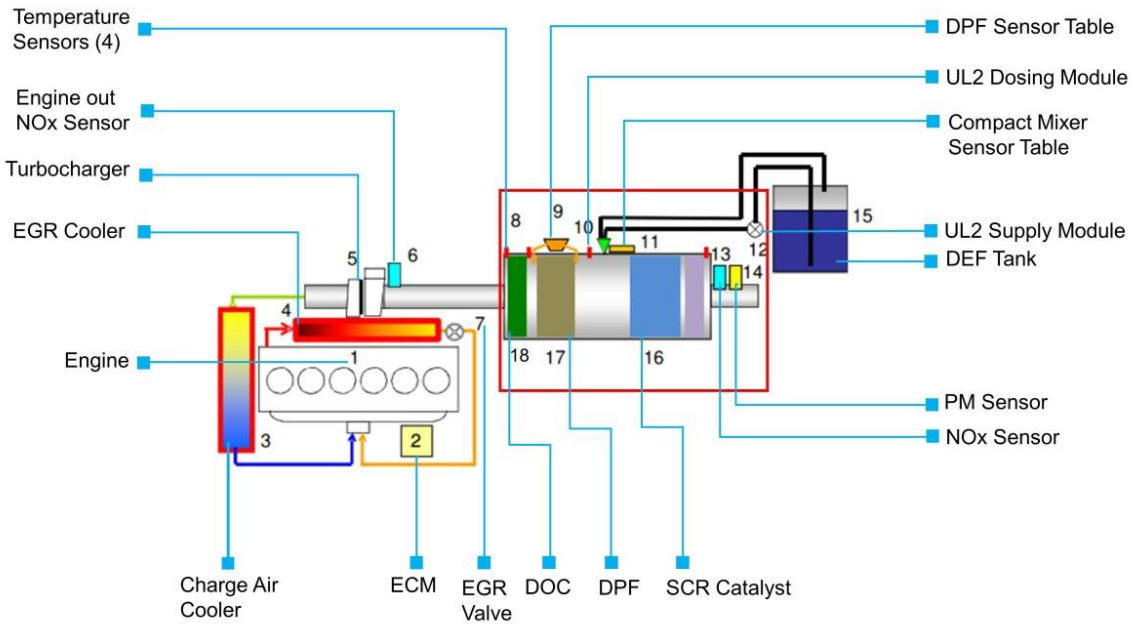
7 What are the effects of design and operating variables on emission formation in spark ignition engines?

The design and operating variables that affect emission formation in spark ignition (SI) engines include:

- **Air-fuel ratio**: Affects hydrocarbon and carbon monoxide concentrations
- **Spark timing**: Affects hydrocarbon concentrations
- **Compression ratio**: A design variable that affects engine emissions
- **Combustion chamber surface to volume ratio**: A design variable that affects engine emissions
- **Ignition timing**: A design variable that affects engine emissions

- **Valve timings and valve overlap**: A design variable that affects engine emissions
- **Air motion, swirl tumble, etc.** A design variable that affects engine emissions
- **Charge stratification**: A design variable that affects engine emissions
- **Burned gas temperature-time history and oxygen concentration**: Affects NO formation and emission
- **Flame quenching, quench layer thickness, and post flame oxidation**: Control engine out HC emissions

8 How to control pollutant formation in engines exhaust after treatment?



The emission aftertreatment system (ATS) in a stoichiometric spark ignition (SI) engine uses a three-way catalyst (TWC) to reduce pollutants in the exhaust gas. The ATS is typically installed under the vehicle's floor-pan.

Other ways to control pollutant formation in engines include:

- **Engine design and operating conditions**

  Controlling engine design and operating conditions can reduce particulate generation.

- **Combustion chamber design and timing control**

  Extending combustion time can reduce particulate amounts in the exhaust. However, this can also increase cylinder temperature and NOx generation.

- **Engine management systems**
  Engine management systems can minimize emissions by controlling ignition timing, injection pressure, injection timing, and/or valve timing.

9 Short Note on EVAP.

The Evaporative Emission Control (EVAP) system in a vehicle uses a purge control solenoid valve (PCSV) to control the release of fuel vapors into the engine:

- **When the engine is idling**: The PCSV is closed to prevent evaporated fuel from entering the engine.
- **When the engine is running**: The PCSV opens to allow the fuel vapors to enter the engine. The Engine Control Module (ECM) controls the PCSV.

The EVAP system also includes:

- **Activated carbon canister**: A plastic case containing activated carbon that traps fuel vapors from the fuel tank.
- **Liquid vapor separator**: Prevents liquid fuel from reaching the crank case or canister.
- **Fuel-tank caps**: Sealed to reduce gasoline fumes from evaporating into the atmosphere.

Question Bank for Alternative Fuel and Emission Control **(**Prof.S.V.Raut)

Unit-IV: Emission Measurement and Control (CI Engine)

Multiple Choice Question

1	Advantage of gaseous fuel is that	
	A.	it can be stored easily
	B.	it can mix easily with air
	C.	it can displace more air from the engine
	D.	all of the above
2	For CI engine fuels most preferred are	
	A.	napthenes
	B.	paraffins
	C.	olefins
	D.	aromatics
3	Ignition quality of diesel fuel is indicated by its-	
	A.	octane number
	B.	cetane number
	C.	flash point
	D.	fire point
4	Flash point of fuel oil is-	
	A.	minimum temperature to which1 oil is heated in order to give off inflammable vapo a flame
	B.	temperature at which it solidifies or congeals
	C.	temperature at which it catches fire without external aid
	D.	indicated by 90% distillation temperature, i.e. when 90% of sample oil has distilled
	Answer» A. minimum temperature to which1 oil is heated in order to give off inflammable vapours in Sufficient quantity to ignite momentarily when brought in contact with a flame	
5	The choke is closed when the engine is	
	A.	accelerating
	B.	hot
	C.	cold
	D.	idling

6	Advantage of air injection system is	
	A.	cheaper fuels can be used
	B.	mep is high
	C.	fine atomization and distribution of the fuel
	D.	all of the above
7	Commonly used injection system in automobiles is	
	A.	air injection
	B.	solid injection
	C.	combination of (a) and (b)
	D.	none of the above
8	Fuel is injected in a four-stroke CI engine	
	A.	at the end of suction stroke
	B.	at the end of expansion stroke
	C.	at the end of compression stroke
	D.	at the end of exhaust stroke
9	Injection system in which the pump and the injector nozzle is combined in one housing is known as	
	A.	common rail system
	B.	distributor system
	C.	unit injector system
	D.	individual pump and nozzle system
10	'MPFI' stands for	
	A.	Multi point fuel injection
	B.	Multi port fuel injection
	C.	Manifold point fuel injection
	D.	Manifold port fuel injection
11	Fuel injector is used for	
	A.	gas engines
	B.	CI engines
	C.	SI engines
	D.	none of the above

12	Continuous injection system usually has	
	A.	plunger pump
	B.	rotary pump
	C.	gear pump
	D.	vane pump
13	The cold start injector-	
	A.	maintain stoichiometric air-fuel ratio
	B.	provides lean air-fuel ratio
	C.	gives rich air-fuel ratio
	D.	is not used for any of the above functions
14	With EFI (ELECTRONIC FUEL INJECTION) of diesel engines	
	A.	sharp start and stop is not possible
	B.	very high injection pressure can be obtained
	C.	sudden cylinder cut-off is impossible
	D.	diagnostic properties are poor
15	The first vehicle in India equipped with MPFI system in Indian automobile industry	
	A.	Tata Indica
	B.	Daewoo Matiz
	C.	Maruti Alto
	D.	Chevrolet spark

Short Question Answers

1 What is Chemical delay?

Chemical delay in a compression ignition (CI) engine is the period when chemical reactions start slowly and gradually accelerate until inflammation occurs:

- **Explanation**
  The ignition delay period is the time between when the first fuel droplet hits the hot air in the combustion chamber and when the actual burning phase begins. This period is made up of physical and chemical delays, which occur simultaneously.
- **Chemical delay**

This delay is caused by precombustion reactions and affects the thermodynamic efficiency, NOx emissions, in-cylinder pressure, and the combustion phase.

- **Factors that affect chemical delay**
  Chemical delay is generally larger than physical delay, but it depends on the temperature of the surroundings. At higher temperatures, chemical reactions are faster, and the physical delay can become longer than the chemical delay.
- **Reducing ignition delay**
  Modern engines reduce the ignition delay to reduce NOx.

2 What is formation of intermediate compounds?

According to intermediate compound formation theory, the catalyst forms an unstable intermediate compound with the reactants and this unstable intermediate is then decomposed to form our desired products.

3 What are the 4 stages of combustion in CI engine?

Different significant phases of combustion are explained as under. 1) Ignition Delay Period • Physical delay • Chemical Delay 2) Uncontrolled Combustion 3) Controlled Combustion 4) After Burning

4 What pollutants forms due to incomplete combustion in CI Engine?

Incomplete combustion in a CI engine can produce a number of pollutants, including:

- **Carbon monoxide (CO)**: A colorless, odorless, and poisonous gas that is produced when carbon-containing fuels like diesel and petrol are not completely burned. It can block oxygen from reaching organs and tissues, and reduce the oxygen-carrying capacity of blood.
- **Carbon (C)**: Released in the form of soot.
- **Hydrocarbons (HCs)**: A product of incomplete combustion.
- **Nitric oxide (NO)**: A product of incomplete combustion.
- **Nitrogen dioxide (NO2)**: A product of incomplete combustion.
- **Dioxins**: A product of incomplete combustion.
- **Furan**: A product of incomplete combustion.

5 **What are the effect of design and operating variables on pollutant formation?**

The design and operating variables of a compression ignition (CI) engine can affect the formation of pollutants in several ways, including:

- **Engine speed**: The speed at which an engine is designed to operate affects the amount of nitrogen oxides (NOx) it emits. Engines designed for lower speeds provide more time for NO to form than those designed for higher speeds.
- **Fuel-air ratio**: An inadequate fuel-air ratio can lead to large amounts of carbon monoxide being produced. Carbon monoxide is toxic because it binds to hemoglobin in the blood, which inhibits oxygen transport.
- **Ammonia-diesel dual-fuel combustion**: This mode can help achieve low carbon emissions. However, as the ammonia energy ratio increases, unburned ammonia emissions rise.
- **Fuel injection parameters**: These include injection pressure, injection timing, and injection duration.
- **Air swirl**: This can affect the performance and emissions of a CI engine.
- **Piston design**: This can affect the performance and emissions of a CI engine.
- **Bowl geometry**: A bowl geometry with less surface area is suitable at low engine speeds, while one that produces strong squish is favorable at high engine speeds.

Other factors that can affect pollutant formation include: flame quenching, quench layer thickness, post flame oxidation, burned gas temperature-time history, and oxygen concentration.

6 **How to control emissions and drivability in ci engine?**

Here are some ways to control emissions and maintain drivability in a CI engine:

- **Catalytic converters**: These devices use a catalyst to convert harmful pollutants into less harmful substances.
- **Selective Catalytic Reduction (SCR)**: This technology can reduce nitrogen oxide emissions by up to 90%.
- **Lean De-NOx catalysts**: These catalysts use hydrocarbon like ethanol or diesel to reduce NOx.
- **Particulate filters**: These remove particulate matter from exhaust.
- **ECM controlled EVAP system**: This system uses an Engine Control Module (ECM) to adjust fuel injection duration based on sensor signals.

- **Introducing water**: Infiltrating water droplets into the engine cylinder can reduce nitrogen oxide emissions by decreasing the temperature of the flame gases.
- **Multiple injection**: Using multiple injection strategies can reduce NOx emissions, but it can also increase fuel consumption.

Emission control systems limit the discharge of harmful gases from the engine, crankcase, fuel tank, and carburetor. The choice of emission control technology depends on the engine technology, application, operating conditions, and available materials.

7 **Write short note on Exhaust gas recirculation (EGR).**

Exhaust gas recirculation (EGR) is an emission control technology that reduces nitrogen oxide (NOx) emissions in internal combustion engines, including diesel engines:

- **How it works**
  EGR works by routing a portion of the exhaust gases back into the engine's intake air system. This dilutes the air and fuel mixture, which lowers the combustion temperature and reduces the amount of NOx formed.
- **Benefits**
  EGR is an efficient process that can improve fluid consumption and reduce air pollution.
- **Drawbacks**
  A lower combustion temperature can also mean a less efficient and complete burn.
- **How it's measured**
  The EGR ratio is measured by comparing the CO2 concentrations between the exhaust and intake of the engine.
- **EGR strategies**
  Manufacturers use hybrid EGR strategies that use a short route during transient conditions and a long route during steady-state operating conditions.
- **EGR types**
  Cold EGR is more effective than hot EGR in reducing NOx emissions because it results in a lower intake air temperature.

8 **What is NDIR?**

Non-dispersive infrared (NDIR) analyzers are used to measure the concentration of carbon monoxide (CO) and carbon dioxide (CO2) in the exhaust of internal combustion engines. NDIR analyzers are the industry standard for measuring these gases.

NDIR analyzers work by shining an infrared beam through a sample cell containing the gas and measuring how much infrared light is absorbed by the gas. The concentration of the gas is calculated by analyzing the difference between the amount of light generated by the lamp and the amount that reaches the detector.

NDIR analyzers are used in a variety of applications, including:

- **Exhaust gas monitoring**
  NDIR analyzers are used to measure the concentration of CO, CO2, and HC (hydrocarbons) in the exhaust of internal combustion engines.
- **Air quality monitoring**
  NDIR analyzers can detect low levels of gas concentrations, which can be important for air quality monitoring and control.
- **Process gas monitoring**
  NDIR analyzers can be used to monitor the concentration of gases in processes such as semiconductor manufacturing.

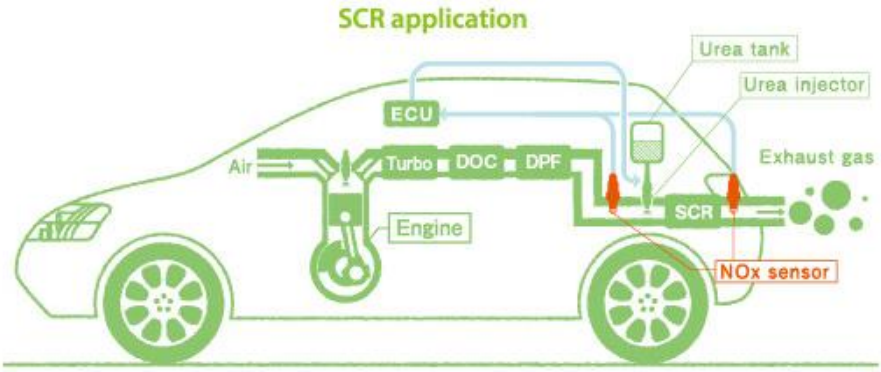
NDIR analyzers are durable, easy to maintain, and can be used for continuous measurement

9 **What is chemiluminescence detector for NOx?**

Chemiluminescence sensors can be used alongside Gfx, Infrared, Paramagnetic and Flame Ionization Detector technology to deliver a comprehensive continuous emissions monitoring (CEM) solution. If the sample gas pressure varies, the amount of light emitted will be affected even if the NOx concentration remains stable.

10 **What is the principle of NOx sensor**?

The NOx sensor is part of the NOx reduction aftertreatment system used in diesel vehicles with urea based SCR systems. The sensor located upstream of the SCR catalyst directly measures the engine-out NOx gas concentration, which helps determine the optimum amount of urea injection



11 **What is Oxygen Analyser Do?**

An oxygen analyzer is a tool that analyzes data, such as gases, to find patterns and relationships. Some signs of a failing oxygen sensor include:

- The sensor light on the dash is on
- Increased fuel consumption
- Increased tailpipe emissions
- Rough idling
- Stalling
- Hesitation when accelerating

12 **What is smoke analyser?**

The smoke intensity of a compression ignition (CI) engine's exhaust is measured using a smoke meter or opacimeter. The smoke meter measures the smoke density, which is the amount of light blocked by the particles in the exhaust. The smoke density is displayed on the meter's readout and indicates the combustion efficiency.

Here are some ways to measure smoke in a CI engine:

- **Light extinction type smokemeter**: Measures the amount of light absorbed in a specific length of exhaust gas column. Examples of this type of smokemeter include the Hartridge and AVL smokemeters.
- **Bosch smokemeter**: Filters a fixed volume of exhaust gases through filter paper and evaluates the smoke stain on a grayness scale.
- **AVL Opacimeter**: Measures smoke opacity.
- **AVL Smoke Meter**: Measures filtered smoke number (FSN).

13 **What is Particulate matter (PM) emissions?**

Particulate matter (PM) emissions from compression-ignition (CI) engines can be measured using a variety of methods, including:

- **Gravimetric measurement**
  The mass of PM is measured by weighing the increase in mass of a sampling filter after it's preconditioned at a controlled temperature and humidity.
- **Condensation particle counters**
  These counters measure solid particle numbers after the sample has been diluted and evaporated to prevent volatile material from nucleating.
- **Dilution and conditioning**
  A dilution system reduces the concentration of particles and brings the sample conditions to a level that can be measured by the instrument.

Other parameters of engine particulates, such as particle sizes, volatile particle numbers, and size distributions, can be measured using non-standardized methods and instruments.

Here are some other things to consider when measuring particulate emissions:

- **Accuracy**
  The accuracy of PM mass measurements can be around 0.1 mg/kWh. However, volatile artifacts on the filters can increase the uncertainty to around 1 mg/kWh.
- **Uncertainty**
  The uncertainty in SPN systems can be around 34% for systems sampling at >23 nm and 42% for systems sampling at >10 nm.
- **Engine braking**
  High particle number emissions can occur during engine braking, even when the engine isn't fueled.

	Akhil Bharatiya Maratha Shikshan Parishad's **Anantrao Pawar College of Engineering & Research**	
	Record No.: ADM/D/036B **Revision: 00**	**DoI: 21/01/2019**

Internal Correspondence For Department

Question Bank for Alternative Fuel and Emission Control **(**Prof.S.V.Raut)

Unit-V: Health effects of Emissions from Automobiles:

Multiple Choice Question

1	What is the primary cause of greenhouse gas emissions contributing to global warming? A) Deforestation B) Water pollution C) Air pollution D) Carbon dioxide (CO2) emissions Answer: D
2	Which of the following is an example of a non-renewable energy source with significant environmental impact? A) Wind energy B) Solar energy C) Natural gas D) Geothermal energy Answer: C
3	Which environmental issue is associated with the thinning of the ozone layer? A) Acid rain B) Ocean acidification C) Greenhouse effect D) Ozone depletion Answer: D
4	Which of the following pollutants is responsible for the phenomenon known as “acid rain”? A) Carbon dioxide (CO2) B) Sulfur dioxide (SO2) C) Methane (CH4)

	D) Nitrogen oxides (NOx) Answer: B
5	What is the primary greenhouse gas emitted from agricultural activities? A) Methane (CH4) B) Carbon dioxide (CO2) C) Nitrous oxide (N2O) D) Ozone (O3) Answer: A
6	Which of the following is a major contributor to air pollution in urban areas? A) Forest fires B) Volcanic eruptions C) Automobile emissions D) Desert dust storms Answer: C
7	What is the major environmental concern associated with hydraulic fracturing (fracking)? A) Air pollution B) Soil erosion C) Water conservation D) Noise pollution Answer: A
8	What is the term for the release of greenhouse gases from thawing permafrost? A) Permafrost melt B) Cryosphere disruption C) Methane burp D) Glacial retreat Answer: C

9	Which of the following pollutants is primarily responsible for the formation of smog in urban areas? A) Particulate matter B) Carbon monoxide (CO) C) Sulfur dioxide (SO2) D) Nitrogen dioxide (NO2) Answer: D
10	Possible health effects of noise pollution includes A. Hearing loss B. Hypertension C. Cardiovascular effects D. All of the above

Short Question Answers

1	**What are the effect of pollution on human health?**
	Emissions from the burning of fossil fuels and other activities can have significant negative effects on human health and the environment, including: • **Air pollution** Air pollution from fossil fuels and other sources can cause: • Respiratory and cardiovascular diseases • Lung cancer • Diabetes • Neurological disorders • Adverse pregnancy outcomes • Premature deaths • Eye, throat, and nose irritation

	• Impaired sense of smell
2	**Air pollution effect on Climate Change.**
	Climate change Greenhouse gas emissions from fossil fuels trap the sun's heat, leading to global warming and climate change. This can cause: • Changing weather patterns • Disruption of the balance of nature • Risks to human beings and other forms of life • **Acid rain** Nitrogen oxides and sulfur oxides released into the atmosphere from burning fossil fuels can create acid rain. Acid rain can: • Damage trees • Acidify soils and water bodies • Speed the decay of buildings, statues, and sculptures
3	**Noise Pollution Effect on Human Health.**
	Noise pollution from highways, airports, and streets can lead to: • Hearing loss • Tinnitus • Sleep loss • Cardiovascular and metabolic diseases
4	**What is Emission Inventory?**
	An emission inventory is a record of the amount of pollutants released into the atmosphere over a specific time period and in a specific geographical area. It typically includes the total emissions of one or more air pollutants or greenhouse gases
5	**Importance of Emission Inventory.**

	Emission inventories are important because they help: • Assess the potential effects of different prevention and control measures • Identify the most cost-effective ways to reduce emissions • Understand atmospheric chemistry and air quality • Estimate the impact of pollution sources on human health • Formulate effective emission control strategies and air quality management plans
6	Emission inventories can include emissions from?
	• Natural processes, such as trees releasing organic gases • Deliberate processes, such as the combustion of fossil fuels • Human-made emissions from major sectors, such as transportation, electricity generation, agriculture, landfills, and residential and commercial buildings
7	**What is** Ambient air quality monitoring?
	Ambient air quality monitoring is the process of collecting and measuring air pollution samples to assess the quality of the air: • **Purpose** Ambient air quality monitoring helps to: ◦ Assess the extent of pollution ◦ Identify polluted areas ◦ Evaluate the effectiveness of emissions control strategies ◦ Support research on the health effects of air pollution
8	**What is Emission Noms?**
	Emission norms are legal requirements that limit the amount of air pollutants that can be released into the atmosphere from specific sources and over specific timeframes. In India, the Central Pollution Control Board (CPCB) sets the Bharat Stage (BS) emission norms for vehicles. All vehicle manufacturers must sell vehicles that comply with these norms. Here are some of the BS emission norms:

- **BS-IV**
  Introduced in 2017, this norm allowed 50 parts per million (ppm) of sulfur.
- **BS-VI**

  Applicable from 2020, this norm allows only 10 ppm of sulfur. BS6 emission norms have reduced the limit of pollution by reducing the amount of NOx, HC+NOx, and PM:

  - **NOx**: Reduced from 250mg/km in BS4 to 80mg/km in BS6
  - **HC+NOx**: Reduced from 300mg/km in BS4 to 170mg/km
  - **PM**: Reduced from 25mg/km in BS4 to 4.5mg/km