

QUESTION 2015 [JUNE]

Group – A (Multiple Choice Type Questions)

1. Choose the correct alternatives for any ten of the following:

i) Blue baby syndrome is related to

- a) NO_2^- b) PO_4^{3-} ✓c) NO_3^- d) SO_4^{2-}

ii) Which of the following can be used for disinfection of water?

- ✓a) Chlorine ✓b) Hydrogen Peroxide ✓c) Ozone d) none of these

iii) Greenhouse effect is due to

- a) over cultivation of land b) testing nuclear weapons
✓c) some atmospheric gases like CO_2 , N_2O and some man made gases
d) none of these

iv) Kyoto protocol is related with

- a) Ozone layer depletion ✓b) Green house gas
c) SPM d) Water pollution

v) Which one of the following statements is true for Threshold Limit Value (TLV)

- ✓a) less the TLV, more toxic the pollutant is
b) more the TLV, more toxic the pollutant is
c) TLV is not at all related with toxicity of a pollutant
d) a substance is said to be pollutant if its concentration falls below its TLV

vi) Floods are caused by

- ✓a) afforestation ✓b) constructing mega dams
✓c) cutting the forests ✓d) filling the land

vii) Ozone acts as a pollutant when resides in

- ✓a) Troposphere b) Stratosphere c) Mesosphere d) Ionosphere

viii) The important mineral for generation of atomic energy is

- ✓a) Uranium b) Thorium c) Hafnium d) Lawrencium

ix) Synecology can also be termed as

- a) population ecology b) landscape ecology
✓c) community ecology d) none of these

x) In nephrotoxicity the affected body part is

- a) Liver ✓b) Kidney c) Lungs d) Stomach

POPULAR PUBLICATIONS

- xi) The most useful method of disposal of non-hazardous solid waste is
a) open dumping b) composting ✓c) land filling d) incineration
- xii) The major constituent of soil waste is
✓a) Silicon b) Iron c) Potassium d) Oxygen

Group – B

(Short Answer Type Questions)

2. a) What do you mean by Environment Impact Assessment?
b) How is it related to the setting up of a new process industry?
See Topic: ENVIRONMENTAL MANAGEMENT, Long Answer Type Question No. 1.
3. Discuss the working principle of trickling filters used in the secondary treatment of waste water.
See Topic: WATER POLLUTION & CONTROL, Short Answer Type Question No. 15.
4. a) What is black body?
b) It took the world about 300 years to increase in population from 0.5 billion to 4.0 billion. If we assume exponential growth at a constant rate over that period of time, what would that growth rate be?
a) **See Topic: AIR POLLUTION & CONTROL, Short Answer Type Question No. 13.**
b) **See Topic: FUNDAMENTALS OF ENVIRONMENT, Short Answer Type Question No. 5.**
5. a) What is Maximum Sustainable Yield?
b) Prove that maximum sustainable yield $= \frac{R_0 K^2}{4(K - N_0)}$.
See Topic: FUNDAMENTALS OF ENVIRONMENT, Short Answer Type Question No. 6
6. What are the biochemical effects of Arsenic pollution?
See Topic: WATER POLLUTION & CONTROL, Short Answer Type Question No. 7.

Group – C

(Long Answer Type Questions)

7. a) Explain the term Green House Effect.
b) Name the green house gases in the atmosphere.
c) Mention the impact of Green House Effect on global climate, agriculture and marine ecosystem and sea-water level.
d) Why is existence of life not possible in Venus?
a) & b) **See Topic: AIR POLLUTION AND CONTROL, Short Answer Type Question No.6.**
c) **See Topic: AIR POLLUTION AND CONTROL, Long Answer Type Question No. 3.**
d) **See Topic: AIR POLLUTION AND CONTROL, Short Answer Type Question No. 14.**
8. a) Explain what you understand by eco-system.
b) Classify the components of eco-system.
c) State the characteristics of food chain.
d) Define parasitic food chain with example.
e) What is trophic level?

- a) See Topic: ECOLOGY, Short Answer Type Question No. 1.
- b) See Topic: ECOLOGY, Short Answer Type Question No. 2.
- c) See Topic: ECOLOGY, Short Answer Type Question No. 9
- d) See Topic: ECOLOGY, Short Answer Type Question No. 13.
- e) See Topic: ECOLOGY, Short Answer Type Question No. 3.

9. In a BOD₅ test

- a) Why it is necessary to cover the bottle with a stopper?
 - b) Why the dilution of waste water sample is necessary?
 - c) In dark test run is conducted explain why?
 - d) What is the necessity of seeding the sample?
 - e) Why ultimate BOD is not measured?
 - f) Giving a sketch and discuss the typical treatment plant for surface water to make potable water.
- See Topic: WATER POLLUTION AND CONTROL, Long Answer Type Question No. 6.

10. a) Explain the harmful effects of noise pollution on human health and migratory birds.
b) How much is a sound of 100dB louder than a sound of 90dB? (Reference intensity = $1 \times 10^{-12} \text{ w/m}^2$)
c) What is weathering process? Describe different weathering process briefly.
- a) See Topic: NOISE POLLUTION AND CONTROL, Long Answer Type Question No. 3.
 - b) See Topic: NOISE POLLUTION AND CONTROL, Short Answer Type Question No. 1.
 - c) See Topic: LAND POLLUTION AND CONTROL, Long Answer Type Question No. 3.

11. a) Define coning, looping, fumigation, lofting fanning plume.
b) What is the CFC number for CCl₂FCClF₂?
c) Write short notes on
- i) Eutrophication
 - ii) Cyclone separator
- a) & b) See Topic: AIR POLLUTION AND CONTROL, Long Answer Type Question No. 8 (a) & (b).
 - c) i) See Topic: WATER POLLUTION AND CONTROL, Short Answer Type Question No. 8.
 - ii) See Topic: AIR POLLUTION & CONTROL; Long Answer Type Question No. 19(c).

QUESTION 2015 [DECEMBER]

Group – A (Multiple Choice Type Questions)

1. Choose the correct alternatives for any ten of the following:

- i) The cause of eutrophication is
 - a) increase of pathogens
 - b) increase of BOD
 - ✓c) increase in algae's productivity
 - d) increase in DO
- ii) Which one of the following shows highest Green-house effect?
 - a) CH₄
 - ✓b) CO₂
 - c) NO₂
 - d) O₃

POPULAR PUBLICATIONS

- iii) Oxygen demanding waste is the
a) inorganic pollutant
 c) organic pollutant
b) radioactive material
d) none of these
- iv) The law of minimum was proposed by
 a) Liebig b) Woodbury c) Odum d) Krebs
- v) In which year wildlife (Protection) Act, India, enacted
a) 1986 b) 1972 c) 1984 d) 1981
- vi) Biogas is _____ type and nuclear energy is _____ type of energy resource.
a) conventional, non conventional
c) both conventional
 b) non conventional, conventional
d) both non conventional
- vii) Which is the normal hearing frequency range?
a) 60 dB
c) 80 dB
 b) 20 Hz-20,000 Hz
d) 60 Hz-60,000 Hz
- viii) The mathematical formulation of environmental resistance is
a) $N = K/2$ b) $1 - (N/K)$ c) $70/r\%$ d) $rK/4$
- ix) Energy flow in an ecosystem is
a) cyclic
 c) unidirectional
b) both cyclic and unidirectional
d) none of these
- x) Material cycles go through
a) biosphere and lithosphere
c) biosphere and hydrosphere
b) atmosphere and hydrosphere
 d) all of the four spheres

Group – B

(Short Answer Type Questions)

2. What are endemic species? Differentiate between *in situ* and *ex situ* conservations principles.
See Topic: **ECOLOGY**, Short Answer Type Question No. 14.
3. What is L_{epn} ? Explain different types of noise.
See Topic: **NOISE POLLUTION & CONTROL**, Short Answer Type Question No. 2.
4. What is Chemical Oxygen Demand (COD)? How is it related to Biological Oxygen Demand (BOD)?
See Topic: **WATER POLLUTION & CONTROL**, Short Answer Type Question No. 16.
5. a) What do you understand by the term 'Maximum Sustainable yield'?
b) Define population growth? Prove that population growth is exponential?
See Topic: **FUNDAMENTALS OF ENVIRONMENT**, Short Answer Type Question No.7.

6. What do you mean by 'environmental resistance' in determining population growth? Describe step function response in a box system with a suitable diagram.

See Topic: FUNDAMENTALS OF ENVIRONMENT, Short Answer Type Question No. 8.

Group – C

(Long Answer Type Questions)

7. a) What is dissolve oxygen? Why is it considered as an important water quality parameter to know the health of a water body?

b) Establish the relation $BOD_t = L_0 (1 - e^{-kt})$,

where, BOD_t = amount of oxygen consumed by the waste in first t days.

L_0 = the ultimate carbonaceous oxygen behind

And k = the BOD reaction rate constant (time^{-1})

c) The dilution factor P for an unseeded mixture of wastes and water is 0.030. The DO of the mixture was initially 9.0 mg/l and after 5 days it has dropped to 3.0 mg/l. The reaction rate constant is 0.22 day^{-1} calculate

(i) the 5 day BOD of the wastes

(ii) L_0

(iii) The remaining oxygen demand after 5 days.

d) What is biodegradation rate constant?

a) See Topic: WATER POLLUTION & CONTROL, Long Answer Type Question No. 10 (a).

b) See Topic: WATER POLLUTION & CONTROL, Long Answer Type Question No. 1 (a).

c) See Topic: WATER POLLUTION & CONTROL, Long Answer Type Question No. 1(b).

d) See Topic: WATER POLLUTION & CONTROL, Long Answer Type Question No. 10(b).

8. a) A sample of ground water has 140 mg/L of Ca^{2+} ion. Express its hardness in units of mg/L of CaCO_3 .

b) Discuss the role of ClONO_2 in formation of Antarctic ozone Hole.

c) Enlist the different criteria pollutants as far as Air pollution is concerned. What is NAAQS?

d) Define sustainable development. Discuss how depletion of major renewable resources is caused by rapid growth of population and technology.

a) See Topic: WATER POLLUTION & CONTROL, Long Answer Type Question No. 10(c).

b) See Topic: AIR POLLUTION & CONTROL, Long Answer Type Question No. 8(a).

c) See Topic: AIR POLLUTION & CONTROL, Long Answer Type Question No. 8(b).

d) See Topic: FUNDAMENTALS OF ENVIRONMENT, Long Answer Type Question No. 3.

9. a) Show that the temperature of the atmosphere falls by a rate $r = -g/C_p$ where r = rate of change of temperature with altitude, g = gravitational constant and C_p = specific heat at constant pressure.

b) Explain with diagram

(i) Sub Adiabatic Lapse rate,

(ii) Super Adiabatic Lapse rate

(iii) Neutrally stable Lapse rate.

c) What is maximum mixing depth and ventilation coefficient?

a) See Topic: AIR POLLUTION & CONTROL, Long Answer Type Question No. 1.

b) & c) See Topic: AIR POLLUTION & CONTROL, Long Answer Type Question No. 9 (a) & (b).

POPULAR PUBLICATIONS

10. a) What is the working unit for measurement of sound intensity level (SIL)? Express it mathematically.
b) What is the intensity of 100 dB sound?
c) What is threshold limit value? Discuss various mechanisms to control noise.
d) What is heavy metals? How heavy metals interact with enzymes.
e) Discuss biomagnifications.
a), b) & c) See Topic: **NOISE POLLUTION & CONTROL**, Long Answer Type Question No. 4.
d) & e) See Topic: **WATER POLLUTION & CONTROL**, Long Answer Type Question No. 11.
11. Write short notes any *three* of the following:
a) Cyclone separator
b) Hydraulic gradient and Darcy's law
c) Arsenic pollution
d) Biological hotspot
e) Environmental Impact Assessment.
a) See Topic: **AIR POLLUTION & CONTROL**, Long Answer Type Question No. 19(c).
b) See Topic: **WATER POLLUTION & CONTROL**, Long Answer Type Question No. 22(d).
c) See Topic: **WATER POLLUTION & CONTROL**, Long Answer Type Question No. 7.
d) See Topic: **ECOLOGY** Long Answer Type Question No. 5(b).
e) See Topic: **ENVIRONMENT MANAGEMENT** Long Answer Type Question No. 1.

QUESTION 2016 [JUNE]

Group – A (Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following:
- i) The growth rate of population at the population saturation value is
✓ a) zero b) negative c) greater than zero d) none of these
- ii) Anaerobic digestion of carbon containing material produces mainly
a) CH₄ and CO₂ ✓ b) CH₄ only c) CO₂ only d) H₂S
- iii) The unit of BOD reaction rate constant is
✓ a) Time⁻¹ b) ML⁻¹ c) ML⁻¹S⁻¹ d) M⁻¹LS⁻¹
- iv) The dry adiabatic lapse rate in the troposphere is about
✓ a) -9.8°C/km b) -4.5°C/km c) -8.9°C/km d) -5.4°C/km
- v) The atmosphere is unstable under the condition of
a) ELR = ALR ✓ b) ELR > ALR c) ELR < ALR d) none of these

- vi) Ozone acts as a protective shield when it resides in
 a) Mesosphere ✓b) Stratosphere c) Thermosphere d) Troposphere
- vii) The average annual solar intensity of solar radiation (solar constant, S) is
 ✓a) 1370 W/m^2 b) $1730 \text{ m}^2/\text{W}$ c) 0.31 W/m d) $0.69 \text{ W}^2/\text{m}$
- viii) In the industrial area noise is measured by
 a) L_{10} (18 hrs) index ✓b) L_{eq} c) $L_c P_n$ d) none of these
- ix) For a sample of waste water containing both biodegradable and non-biodegradable waste is
 a) $\text{BOD} > \text{COD}$ ✓b) $\text{BOD} < \text{COD}$ c) $\text{BOD} = \text{COD}$ d) $\text{BOD} \propto \text{COD}$
- x) The maximum sustainable yield is obtained when the population is
 ✓a) half of the carrying capacity b) one-fourth of the carrying capacity
 c) double of the carrying capacity d) two-third of the carrying capacity
- xi) The temperature of magnetosphere is about
 ✓a) 1200°C b) -100°C c) 0°C d) 34°C
- xii) Thickness of earth crust varies from
 a) 0 - 10 km b) 20 - 50 km ✓c) 64 - 96 km d) 100 - 200 km

Group – B

(Short Answer Type Questions)

2. a) What does the term 'Three-way Catalytic Converter' mean? Explain the principle of a three-way catalytic converter.
 b) Write about nitrogen cycle in nature with the help of a suitable block diagram.
 a) See Topic: AIR POLLUTION & CONTROL, Short Answer Type Question No. 15.
 b) See Topic: ECOLOGY, Short Answer Type Question No. 6.
3. a) What is the difference between Resource and Reserve?
 b) What are volatile organic chemicals (VOC's)? Briefly discuss their characteristic features with example.
 a) See Topic: FUNDAMENTALS OF ENVIRONMENT, Short Answer Type Question No. 9
 b) See Topic: WATER POLLUTION & CONTROL, Short Answer Type Question No. 17.
4. Describe aquifer. Name different types of aquifers. What is hydraulic gradient? State Darcy's law.
 See Topic: WATER POLLUTION & CONTROL, Short Answer Type Question No. 5.
5. In a work area the noise levels are recorded as follows: 110 dB(A) for 10 min/day, 100 dB(A) for 30 min/day, 90 dB(A) for 45 min/day, 80 dB(A) for 2 hr/day. Determine whether the combined noise level is within limit.
 given: Noise Threshold limit values of 110 dB(A) is 15 min, 100 dB(A) is 1 hr, 90 dB(A) is 4 hr, 80 dB(A) is 16 hr.

POPULAR PUBLICATIONS

See Topic: NOISE POLLUTION & CONTROL, Short Answer Type Question No. 3.

6. Discuss logistic population growth model. Why is logistic population growth more acceptable?

See Topic: FUNDAMENTALS OF ENVIRONMENT, Short Answer Type Question No. 3.

Group – C

(Long Answer Type Questions)

7. a) What is hardness of water? What ions are responsible for hardness of water? Discuss the principle of lime-soda process for removal of hardness of water.

See Topic: WATER POLLUTION & CONTROL, Short Answer Type Question No. 6.

b) A waste water sample has a BOD at 20°C equal to 200 mg/L and ultimate BOD of 400 mg/L. Find the BOD₅ at 35°C.

Data is insufficient.

c) What is meant by hazardous wastes? Mention special care to be taken for their handling and disposal purpose.

See Topic: LAND POLLUTION & CONTROL, Short Answer Type Question No. 1.

8. a) Consider the sun as a perfect sphere of radius 6.8×10^8 m. Calculate the energy radiated by the sun in 12 hours. Surface temperature of the sun is 6200K and Stefan's constant $\sigma = 5.67 \times 10^{-8} \text{ Jm}^{-2}\text{s}^{-1}\text{K}^{-4}$.

b) Define food chain. Discuss the grazing food chain with an example.

c) Discuss the energy flow in the ecosystem.

d) Discuss *in-situ* conservation of biodiversity.

a) See Topic: AIR POLLUTION & CONTROL, Short Answer Type Question No. 16.

b) See Topic: ECOLOGY, Short Answer Type Question No. 5.

c) See Topic: ECOLOGY, Short Answer Type Question No. 4.

d) See Topic: ECOLOGY, Short Answer Type Question No. 14.

9. a) What is acid rain? How is it formed? Discuss its effect on environment.

b) The physical stack (chimney) height 500 metre with an inside diameter of 10 metre. The stack gas velocity is 20 m/sec. The stack gas temperature is 200°C and ambient air temperature is 10°C. The atmospheric pressure is 1000 millibar and average wind speed is 5m/sec. Then calculate the effective stack height.

c) Mention the biochemical effect of toxicity due to As & Cd.

a) See Topic: FUNDAMENTALS OF ENVIRONMENT, Short Answer Type Question No. 1.

b) See Topic: AIR POLLUTION & CONTROL, Short Answer Type Question No. 17.

c) See Topic: WATER POLLUTION & CONTROL, Short Answer type Question No. 9.

10. a) What is solid waste? Write a note on land filling as a method of disposal of solid waste.

See Topic: LAND POLLUTION & CONTROL, Short Answer Type Question No. 4.

See Topic: LAND POLLUTION & CONTROL, Long Answer Type Question No. 5(b).

b) Name four Ozone Depleting Substances (ODS). How do these substances cause ozone depletion in the stratosphere?

See Topic: AIR POLLUTION & CONTROL, Long Answer Type Question No. 10(a).

c) Deduce the chemical formula for CFC-115.

See Topic: AIR POLLUTION & CONTROL, Long Answer Type Question No. 10(b).

d) Mention the uses of CFC.

See Topic: AIR POLLUTION & CONTROL, Long Answer Type Question No. 10(c).

11. Write short notes on any *three* of the following:

a) Conference of parties (COP)-21 Paris

b) Eutrophication

c) Energy pyramid

d) Use of Baghouse filter and ESP for removal of particulate matter

e) Oil pollution and its effect in marine life and coastal infrastructure.

a) See Topic: ENVIRONMENTAL MANAGEMENT, Long Answer Type Question No. 3(c).

b) See Topic: WATER POLLUTION & CONTROL, Long Answer Type Question No. 8.

c) See Topic: ECOLOGY, Long Answer Type Question No. 5(c).

d) See Topic: AIR POLLUTION & CONTROL, Long Answer Type Question No. 19(b) & (f).

e) See Topic: WATER POLLUTION & CONTROL, Long Answer Type Question No. 22.e).

QUESTION 2016 [DECEMBER]

Group – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for the following:

i) While carrying out BOD test, BOD bottle is stoppered

a) to avoid evaporation of water

b) to avoid photosynthesis

✓ c) to avoid diffusion of atmospheric oxygen

d) to avoid diffusion of atmospheric carbon dioxide

ii) The IR active gas is

a) O₂

✓ b) CO₂

c) N₂

d) He

iii) The simple global temperature model predicts earth temperature to

a) 0°C

b) 34°C

✓ c) –19°C

d) –273°C

iv) For a sample of waste water containing both biodegradable and non-biodegradable waste

a) BOD > COD

✓ b) BOD < COD

c) BOD = COD

d) BOD ∝ 1/COD

v) Species with very restricted distribution over relatively small ranges is called

✓ a) endangered species

b) extinct species

c) endemic species

d) none of these

POPULAR PUBLICATIONS

- vi) Water will be considered saline if the TDS value is
✓a) < 1500 mg/L b) > 5000 mg/L c) < 500 mg/L d) None of these
- vii) For air stability, we must have
a) Dry Adiabatic Lapse Rate – Ambient Lapse rate
✓b) Dry Adiabatic Lapse Rate > Ambient Lapse Rate
c) Dry Adiabatic Lapse rate < Ambient Lapse Rate
d) None of these
- viii) Aircraft noise is measured through
a) L_{10} (18 hour) index b) decibel ✓c) $L_e P_n$ d) Leq.
- ix) In the measurement of SPL, the reference pressure is taken
✓a) $2 \times 10^{-5} \text{ N/m}^2$ b) $1 \times 10^{-5} \text{ N/m}^2$
c) $8 \times 10^{-5} \text{ N/m}^2$ d) $6 \times 10^{-5} \text{ N/m}^2$
- x) The temperature range of troposphere is
a) -2°C to 92°C b) -56°C to -2°C ✓c) 15°C to -56°C d) -92°C to 12000°C

Group – B

(Short Answer Type Questions)

2. Define the term EIA.

See Topic: ENVIRONMENTAL MANAGEMENT, Long Answer Type Question No. 1.

The following data are given in a dam construction project:

Parameter	Original value	Present value
SPM	120 $\mu\text{g}/\text{c.c}$	100000 $\mu\text{g}/\text{c.c}$
TDS	100 mg/L	20000 mg/L
Do	8 mg/L	3 mg/L
Noise level	40dB	120dB

Find out the total EIU value considering the parameter importance unit as 4, 3, 2 and 4 respectively for the parameters mentioned above.

Out of Syllabus

3. Which of the Hg(I) , Hg^{2+} and $\text{CH}_3\text{Hg}^{2+}$ is most toxic?

Mention the biochemical effects of toxicity due to a) Mercury and b) Cadmium.

See Topic: WATER POLLUTION & CONTROL, Long Answer Type Question No. 3.

See Topic: WATER POLLUTION & CONTROL, Short Answer Type Question No. 9.

4. What is trickling filter? Explain its use with a diagram.

See Topic: WATER POLLUTION & CONTROL, Short Answer Type Question No. 13.

5. World population in 1850 has been estimated to have been about 1 billion. It reaches 4 billion in 1975. Use the exponential growth rate $2^{\frac{1}{2}}$ equation to find the growth rate constant and also calculate the doubling time value.

See Topic: FUNDAMENTALS OF ENVIRONMENT, Short Answer Type Question No.10.

6. Discuss the winkler method of analysis of DO in the laboratory.

See Topic: WATER POLLUTION & CONTROL, Short Answer Type Question No. 18.

Group – C

(Long Answer Type Questions)

7. a) What is global warming?

b) Describe clearly how the greenhouse gases cause global warming.

c) Explain the 'Wien's Law' and its application for explaining greenhouse effect.

d) Consider earth to be a black body having average temperature of 15°C and surface area = $5.1 \times 10^{14} \text{m}^2$. Find the rate at which energy is radiated by the earth and the wavelength at which the maximum energy is radiated.

Given that Stefan-Boltzmann constant, $\sigma = 5.67 \times 10^{-8} \text{Wm}^{-2}\text{K}^{-4}$

a), b) & c) See Topic: AIR POLLUTION & CONTROL, Long Answer Type Question No. 2.

d) See Topic: AIR POLLUTION & CONTROL, Long Answer Type Question No. 11.

8. a) Explain Stack and Plumes.

b) How many types of plumes can be observed?

c) Explain maximum mixing depth and ventilation coefficient.

d) 'ELR>ALR is the ideal situation for the dispersion of the pollutants in the atmosphere.' –justify it.

a) & b) See Topic: AIR POLLUTION & CONTROL, Short Answer Type Question No. 9.

c) See Topic: AIR POLLUTION & CONTROL, Long Answer Type Question No. 9(c).

d) See Topic: AIR POLLUTION & CONTROL, Long Answer Type Question No. 12.

9. a) What types of solid wastes are separated from domestic, trade and industries.

b) What are solid hazardous wastes? How can those wastes be disposed?

c) What is noise pollution? State the various sources of noise pollution.

d) How much is a sound of 100 dB louder than a sound of 90 dB?

a) See Topic: LAND POLLUTION & CONTROL, Long Answer Type Question No. 1.

b) See Topic: LAND POLLUTION & CONTROL, Short Answer Type Question No. 1.

c) See Topic: NOISE POLLUTION & CONTROL, Long Answer Type Question No. 1.

d) See Topic: NOISE POLLUTION & CONTROL, Short Answer Type Question No. 4.

10. a) What do you mean by eutrophic lake? How does thermal stratification influence an eutrophic lake?

See Topic: WATER POLLUTION & CONTROL, Short Answer Type Question No. 19.

Write a short note on ozone layer depletion in stratospheric zone.

See Topic: AIR POLLUTION & CONTROL, Short Answer Type Question No. 4.

POPULAR PUBLICATIONS

b) Give a concise account of the chemical speciation of (a) Mercury, (b) Lead.

See Topic: WATER POLLUTION & CONTROL, Short Answer Type Question No. 11.

c) How is a catalytic converter used for creating automobile emissions? What is the role of tetramethyl lead in the internal combustion of engines?

See Topic: AIR POLLUTION & CONTROL, Short Answer Type Question No. 5.

11. Write the short notes any *three* of the following:

a) EIA

c) Oxygen Sag Curve

e) Temperature inversion

g) Environmental Management System

b) Montreal protocol

d) Electrostatic Precipitator

f) Demography

h) Activated Sludge Process.

a) See Topic: ENVIRONMENTAL MANAGEMENT, Long Answer Type Question No. 1.

b) See Topic: AIR POLLUTION & CONTROL, Long Answer Type Question No. 19(i).

c) See Topic: WATER POLLUTION & CONTROL, Long Answer Type Question No. 22(f).

d) See Topic: AIR POLLUTION & CONTROL, Long Answer Type Question No. 19(b).

e) See Topic: AIR POLLUTION & CONTROL, Long Answer Type Question No. 19(j).

f) *Presently Out of Syllabus*

g) See Topic: ENVIRONMENTAL MANAGEMENT, Long Answer Type Question No. 3(d).

h) See Topic: WATER POLLUTION & CONTROL, Long Answer Type Question No. 22(g).

QUESTION 2017 [JUNE]

Group – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following:

i) In nephrotoxicity the affected body part is

a) Liver

✓ b) Kidney

c) Lungs

d) Stomach

ii) The most useful method of disposal of non-hazardous solid waste is

a) open dumping

b) composting

✓ c) land filing

d) incineration

iii) An example of biotic factor in a forest ecosystem is

a) water fall

b) cliff

✓ c) a tree

d) a rock

iv) In five days BOD test, BOD_5^{20} is

✓ a) CBOD

b) NBOD

c) Both CBOD & NBOD

d) DO

v) GWP is maximum for

a) CO_2

b) CH_4

✓ c) CFC

d) N_2O

- vi) Poor air quality when ventilation coefficient is
 a) greater than $6000 \text{ m}^2\text{s}^{-1}$ ✓b) less than $6000 \text{ m}^2\text{s}^{-1}$
 c) greater than $8000 \text{ m}^2\text{s}^{-1}$ d) less than $8000 \text{ m}^2\text{s}^{-1}$
- vii) Stratospheric ozone layer concentration approximately is
 a) 300 DU ✓b) 200 DU c) 100 DU d) 500 DU
- viii) DO_{\min} for aquatic life is
 a) 3 ppm ✓b) 5 ppm c) 1 ppm d) 7 ppm
- ix) Trickling filter is classified under
 a) Primary treatment ✓b) Secondary treatment
 c) Tertiary treatment d) none of these
- x) The most important elements causing algal bloom are
 ✓a) C, N, P b) Ca, Pb, Cu
 c) Co, Ni, Nn d) Na, K, Mg
- xi) In Genotoxicity the target area is
 a) Blood b) Liver c) Kidney ✓d) Gene
- xii) Sound pressure level (SPL) can be defined as
 a) $\text{SPL} = 20 \log_{10} \left(\frac{I}{I_0} \right)$ b) $\text{SPL} = 20 \log_{10} \left(\frac{P}{P_0} \right)$
 ✓c) $\text{SPL} = 10 \log_{10} \left(\frac{I}{I_0} \right)$ d) $\text{SPL} = 10 \log_{10} \left(\frac{P}{P_0} \right)$

Group – B

(Short Answer Type Questions)

2. What is black body? How does the earth manage its radiation balance to maintain an average surface temperature of 15°C ?
1st part: See Topic: AIR POLLUTION & CONTROL, Short Answer Type Question No. 18.
2nd part: See Topic: AIR POLLUTION & CONTROL, Long Answer Type Question No. 5.
3. What is photochemical smog? Briefly describe the formation mechanism of PAN.
See Topic: AIR POLLUTION & CONTROL, Short Answer Type Question No. 2.
4. How much is a sound of 100 dB louder than a sound of 80 dB? (reference intensity = $1 \times 10^{-12} \text{ w/m}^2$). Explain different types of noise.
1st part: See Topic: NOISE POLLUTION & CONTROL, Short Answer Type Question No. 5.
2nd part: See Topic: NOISE POLLUTION & CONTROL, Short Answer Type Question No. 2.
5. Name two hazardous chemicals present in waste water. Write down their source(s) and biochemical effects.
See Topic: WATER POLLUTION & CONTROL, Short Answer Type Question No. 9.

POPULAR PUBLICATIONS

6. Write down the Sulphur cycle in nature with the help of a suitable block diagram.
See Topic: **ECOLOGY, Short Answer Type Question No. 11.**

Group – C (Long Answer Type Questions)

7. a) What is Maximum Sustainable Yield?

See Topic: **FUNDAMENTALS OF ENVIRONMENT, Short Answer Type Question No. 2.**

b) Prove that maximum sustainable yield $= \frac{R_0 K^2}{4(K - N_0)}$

See Topic: **FUNDAMENTALS OF ENVIRONMENT, Short Answer Type Question No. 6 (b).**

c) Prove that adiabatic lapse rate is equal to $-\frac{g}{C_p}$

See Topic: **AIR POLLUTION & CONTROL, Long Answer Type Question No. 1.**

d) What is hardness of water? How do you like to remove the hardness of water?

See Topic: **WATER POLLUTION & CONTROL, Short Answer Type Question No. 6.**

8. a) What do you understand by PSI/AQI in air pollution? What are criteria pollutants?

See Topic: **AIR POLLUTION & CONTROL, Long Answer Type Question No. 13.**

b) What are the differences between photochemical smog and sulphurous smog?

See Topic: **AIR POLLUTION & CONTROL, Short Answer Type Question No. 11.**

c) What are the important steps of solid waste disposal management? Write in details.

See Topic: **LAND POLLUTION & CONTROL, Short Answer Type Question No. 2.**

d) How does 60 dB_A of sound level differ from 90 dB_A on the basis of sound intensity? What do you understand by TLV of noise level?

See Topic: **NOISE POLLUTION & CONTROL, Long Answer Type Question No. 5.**

9. a) How does Antarctica ozone hole formation take place? What is its impact?

1st part: See Topic: **AIR POLLUTION & CONTROL, Short Answer Type Question No. 4.**

2nd part: See Topic: **AIR POLLUTION & CONTROL, Short Answer Type Question No. 19.**

b) What is oxygen sag curve? Explain it by a diagram.

See Topic: **WATER POLLUTION & CONTROL, Long Answer Type Question No. 12(a).**

c) Describe effluent treatment in details by block diagram.

See Topic: **WATER POLLUTION & CONTROL, Long Answer Type Question No. 12(b).**

d) What do you understand by earth albedo and atmospheric window?

Earth albedo: See Topic: **AIR POLLUTION & CONTROL, Short Answer Type Question No. 7.**

Atmospheric window: See Topic: **AIR POLLUTION & CONTROL, Short Answer Type Question No. 8.**

10. a) Name the green house gases.

See Topic: AIR POLLUTION & CONTROL, Short Answer Type Question No. 9(b).

b) Prove that for exponential growth $N_t = N_0 e^{Rt}$.

See Topic: FUNDAMENTALS OF ENVIRONMENT, Long Answer Type Question No. 4(a).

c) Show that for doubling time of population for exponential growth $t_b = 70/R(\%)$ where R is the growth rate.

See Topic: FUNDAMENTALS OF ENVIRONMENT, Long Answer Type Question No. 4(b).

d) Calculate the earth temperature from radiating heat balance considering albedo.

See Topic: AIR POLLUTION & CONTROL, Long Answer Type Question No. 14(a).

e) Hence justify the difference between equivalent earth temperature and observed earth temperature.

See Topic: AIR POLLUTION & CONTROL, Long Answer Type Question No. 14(b).

11. Write the short notes any *three* of the following:

a) Hot spots

See Topic: ECOLOGY, Long Answer Type Question No. 5(b).

b) ESP

See Topic: AIR POLLUTION & CONTROL, Long Answer Type Question No. 19(b).

c) Catalytic converter

See Topic: AIR POLLUTION & CONTROL, Long Answer Type Question No. 19(a).

d) RBC

See Topic: WATER POLLUTION & CONTROL, Long Answer Type Question No. 22(h).

e) EIA

See Topic: ENVIRONMENTAL MANAGEMENT, Long Answer Type Question No. 3(e).

f) Eutrophication.

See Topic: WATER POLLUTION & CONTROL, Long Answer Type Question No. 22(i).

QUESTION 2017 [DECEMBER]

Group – A
(Multiple Choice Type Questions)

1. Choose the correct alternatives for the following:

i) Choose the correct alternative of MMD value (m^2/s) for a greater possibility of pollutant concentration in atmosphere

a) < 6000

✓ b) > 6000

c) < 5000

d) > 5000

4. What do you mean by 'environmental resistance' in determining population growth? Describe step function response in a box system with a suitable diagram.

See Topic: FUNDAMENTALS OF ENVIRONMENT, Short Answer Type Question No. 8.

5. Consider the earth is flat and an isothermal body. Albedo for the earth is 0.2. Estimate the temperature of the flat earth. Given:

$$S = 1372 \text{ W/m}^2$$

$$\sigma = 5.67 \times 10^{-8} \text{ W/m}^2 (\text{°K})^4$$

See Topic: AIR POLLUTION & CONTROL, Short Answer Type Question No. 20.

6. Suppose the human population follows a logistic curve until it stabilizes at 15.0 billion. In 1986, world's population was 5.0 billion and its growth rate was 1.7%. When would the population reach 7.5 billion?

See Topic: FUNDAMENTALS OF ENVIRONMENT, Short Answer Type Question No. 11.

Group – C

(Long Answer Type Questions)

7. a) Draw the schematic diagrams of (i) Fanning plume model and (ii) Looping plume model along with their lapse rate diagram.

b) State two advantages and two disadvantages of filter bag house unit.

c) Define Eutrophication of a pond. How can it be controlled?

d) Define doubling time (T_d) in an exponential population growth. Show that $T_d = \frac{69.3}{r}$ where, r

is the percent population growth rate constant and $\ln 2 = 0.693$.

a) See Topic: AIR POLLUTION & CONTROL, Long Answer Type Question No. 15(a).

b) See Topic: AIR POLLUTION & CONTROL, Long Answer Type Question No. 15(b).

c) See Topic: WATER POLLUTION & CONTROL, Long Answer Type Question No. 13.

d) See Topic: FUNDAMENTALS OF ENVIRONMENT, Long Answer Type Question No. 5.

8. a) Establish the relation $BOD_t = L_0(1 - e^{-kt})$, where BOD_t = amount of oxygen consumed by the waste in first t days, L_0 = ultimate carbonaceous oxygen demand and k = the BOD reaction rate constant.

b) The dilution factor P for an unseeded mixture of wastes and water is 0.030. The DO of the mixture was initially 9.0mg/L and after 5 days it has dropped to 3.0 mg/L. The reaction rate constant is 0.22/day.

Calculate:

(i) The 5-day BOD of the wastes

(ii) L_0

(iii) The remaining oxygen demand after 5 days.

c) What is acid rain? How is it formed? Discuss its effect on environment.

a) See Topic: WATER POLLUTION & CONTROL, Long Answer Type Question No. 1(a).

b) See Topic: WATER POLLUTION & CONTROL, Long Answer Type Question No. 1(b).

c) See Topic: FUNDAMENTALS OF ENVIRONMENT, Short Answer Type Question No. 1.

POPULAR PUBLICATIONS

9. a) What is meant by hardness of water? What ions are responsible for hardness in natural hard water? Mention the disadvantages of using hard water in boilers and laundries.
b) What is aquifer? Mention the different types of aquifer. State Darcy's law.
c) Name the three sources of thermal pollution.
d) Mention water polluting substances produced by chemical industries, two each from organic and inorganic origin.
- a) See Topic: WATER POLLUTION & CONTROL, Short Answer Type Question No. 6.
b) 1st Part: See Topic: WATER POLLUTION & CONTROL, Short Answer Type Question No. 3.
2nd Part: See Topic: WATER POLLUTION & CONTROL, Long Answer Type Question No. 5.
c) See Topic: WATER POLLUTION & CONTROL, Long Answer Type Question No. 14(a).
d) See Topic: WATER POLLUTION & CONTROL, Long Answer Type Question No. 14(b).
10. a) What are the effects of noise pollution?
b) In a work area the noise levels are read as 95 dBA for 2hrs a day, 90 dBA for 4 hrs a day, 80 dBA for remaining 2hrs a day and permissible duration of each noise level is 95 dBA for 2 hrs, 90 dBA for 4 hrs and 80 dBA for 16 hrs. Find out the noise threshold limit value and predict whether the noise level is within Permissible limit or not?
c) Write the controlling measures of Noise pollution.
d) What is solid waste management? Discuss the effect of noise pollution on public health.
- a) See Topic: NOISE POLLUTION & CONTROL, Long Answer Type Question No. 3.
b) See Topic: NOISE POLLUTION & CONTROL, Long Answer Type Question No. 6(a).
c) See Topic: NOISE POLLUTION & CONTROL, Long Answer Type Question No. 6(b).
d) 1st Part: See Topic: LAND POLLUTION & CONTROL, Short Answer Type Question No. 2.
2nd Part: See Topic: NOISE POLLUTION & CONTROL, Long Answer Type Question No. 7.
11. Write short notes on any *three* of the following:
a) Electrostatic Precipitator
b) Composting
c) Logistic growth of population
d) Environmental Impact Assessment (EIA)
Atmospheric radiation e) window.
- a) See Topic: AIR POLLUTION & CONTROL, Long Answer Type Question No. 19(b).
b) See Topic: LAND POLLUTION & CONTROL, Long Answer Type Question No. 5(a).
c) See Topic: FUNDAMENTALS OF ENVIRONMENT, Long Answer Type Question No. 6(c).
d) See Topic: ENVIRONMENTAL MANAGEMENT, Long Answer Type Question No. 1.
e) See Topic: AIR POLLUTION & CONTROL, Long Answer Type Question No. 19(k).

POPULAR PUBLICATIONS

- xi) The value of Wet adiabatic lapse rate is
a) 15°C/km ✓b) 6°C/km c) 10°C/km d) 9.8°C/km
- xii) Pollutant that affects the oxygen transport in blood is
a) CO₂ b) SO₂ ✓c) CO d) Hydrocarbons

Group – B

(Short Answer Type Questions)

2. Write down the phosphorous cycle in nature with help of a suitable block diagram.
See Topic: **ECOLOGY, Short Answer Type Question No. 15.**
3. Briefly discuss the BODs test and illustrate it with mathematical equations.
See Topic: **WATER POLLUTION & CONTROL, Short Answer Type Question No. 21.**
4. a) Prove that maximum sustainable yield occurs at half of the carrying capacity.
b) How is the pH of sea water is maintained all over the world.
a) See Topic: **FUNDAMENTALS OF ENVIRONMENT, Short Answer Type Question No. 2.**
b) See Topic: **WATER POLLUTION & CONTROL, Short Answer Type Question No. 22.**
5. a) Explain the "Wien's law" and its application for explaining green house effect.
b) Consider earth to be a black body with average temperature 15°C and surface area equal to $5.1 \times 10^{14} \text{ m}^2$. Find the rate at which energy is radiated by the earth and the wavelength at which maximum power is radiated.
a) See Topic: **AIR POLLUTION & CONTROL, Long Answer Type Question No. 2.**
b) See Topic: **AIR POLLUTION & CONTROL, Long Answer Type Question No. 4.**
6. a) A sample of ground water at pH 10.0 has 32mg/L of CO₃²⁻ and 56mg/L of HCO₃⁻. Find the alkalinity as CaCO₃.
b) Name six important criteria pollutants. Why are they called so?
a) See Topic: **WATER POLLUTION & CONTROL, Short Answer Type Question No. 23.**
b) See Topic: **AIR POLLUTION & CONTROL, Long Answer Type Question No. 8 b).**

Group – C

(Long Answer Type Questions)

7. a) What is the difference between photochemical smog and sulphurous smog?
b) What is positive lapse rate? Why stratosphere shows positive lapse rate?
c) Mercury is $58 \times 10^9 \text{ m}$ away from the sun and has albedo equal to 0.06. Find out the average surface temperature of Mercury. (Distance from Sun to Earth is $15 \times 10^{10} \text{ m}$).
d) What is atmospheric radiative window? Write down the name of four green house gases.
a) See Topic: **AIR POLLUTION & CONTROL, Short Answer Type Question No. 11.**
b) See Topic: **AIR POLLUTION & CONTROL, Long Answer Type Question No. 16 a).**
c) See Topic: **AIR POLLUTION & CONTROL, Long Answer Type Question No. 16 b).**
d) See Topic: **AIR POLLUTION & CONTROL, Long Answer Type Question No. 16 c).**
8. a) What is eutrophication?
Discuss the adverse effect of eutrophication in the lake.

- b) Discuss the effect of oil pollution on marine environment.
- c) Describe the principle of reverse osmosis for removal of dissolved solids from water. What are the advantages and disadvantages of reverse osmosis process?
- d) Give an example of detritus food chain.
- a) 1st part See Topic: WATER POLLUTION & CONTROL, Short Answer Type Question No. 8.
- 2nd part See Topic: WATER POLLUTION & CONTROL, Long Answer Type Question No. 15 (a).
- b) See Topic: WATER POLLUTION & CONTROL, Long Answer Type Question No. 15 (b).
- c) See Topic: WATER POLLUTION & CONTROL, Long Answer Type Question No. 15 (c).
- d) See Topic: ECOLOGY, Short Answer Type Question No. 16.

9. a) What are hazardous solid wastes? How can those hazardous wastes be disposed of?
b) What do you mean by noise pollution?
What are the effects of noise pollution on living organisms?
How can you control noise pollution?
c) What is Environmental Impact Assessment (EIA)? Describe the methodology for Environmental Impact Assessment.
d) If two machines produce 50 dB sounds simultaneously, what will be the total sound level?
- a) See Topic: LAND POLLUTION & CONTROL, Short Answer Type Question No. 1.
 - b) See Topic: NOISE POLLUTION & CONTROL, Long Answer Type Question No. 8(a).
 - c) See Topic: ENVIRONMENTAL MANAGEMENT, Long Answer Type Question No. 1.
 - d) See Topic: NOISE POLLUTION & CONTROL, Long Answer type Question No. 8(b).

10. a) Why seeded BOD test is necessary over ordinary BOD test?
b) Describe the seeded BOD test and derive the formula

$$BOD_w = \frac{[(DO_i - DO_t) - (B_i - B_t)(1 - P)]}{P}$$

where the terms DO = Dissolved Oxygen and P =

Dilution factor.

- c) In 5 days DO level drops by 2.0 mg/l of seeded dilution water. A 300ml BOD bottle filled with 35ml waste water and the rest seeded dilution water, shows a drop of 6mg/l in the same period (5 days). What would be the BOD₅ of the waste?
- d) Why BOD experiment is always performed in a dark place?
- e) What will be the ratio of BOD₅ at 20°C, to that of BOD_{2.5} at 35°C?
- f) Describe the Municipal waste water treatment by using flow chart.
- a) See Topic: WATER POLLUTION & CONTROL, Long Answer Type Question No. 16 a).
- b) See Topic: WATER POLLUTION & CONTROL, Long Answer Type Question No. 16 b).
- c) See Topic: WATER POLLUTION & CONTROL, Long Answer Type Question No. 16 c).
- d) See Topic: WATER POLLUTION & CONTROL, Short Answer Type Question No. 24.
- e) See Topic: WATER POLLUTION & CONTROL, Long Answer Type Question No. 16 d).
- f) See Topic: WATER POLLUTION & CONTROL, Long Answer Type Question No. 6.

11. Write brief notes on any *three* of the following:

- a) Global warming
- b) Trickle filter
- c) Hardness of water
- d) Electroaratic precipitator
- e) Hydrological cycle

POPULAR PUBLICATIONS

f) Sound Intensity Level (SIL)

a) See Topic: AIR POLLUTION & CONTROL, Long Answer Type Question No. 19(i).

b) See Topic: WATER POLLUTION & CONTROL, Long Answer Type Question No. 22.b).

c) See Topic: WATER POLLUTION & CONTROL, Short Answer Type Question No. 6.

d) See Topic: AIR POLLUTION & CONTROL, Short Answer Type Question No. 3.

e) See Topic: WATER POLLUTION & CONTROL, Short Answer Type Question No. 2.

f) See Topic: NOISE POLLUTION & CONTROL, Long Answer type Question No. 12.

QUESTION 2018 [DECEMBER]

Group – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for the following:

i) There are two samples of waste water sample; sample-I has BOD 200mg/L and sample-II has BOD 50mg/L

a) sample-II is more polluted than sample-I

✓ b) sample-I is more polluted than sample-II

c) the degree of pollution is same in both the sample

d) no interference can be drawn on the degree of pollution

ii) In carbonate hardness Ca^{2+} and Mg^{2+} are associated with

a) SO_4^{2-}

b) NO_3^-

c) NO_2^-

✓ d) none of these

iii) Which of the following can be used for disinfection of water

a) ozone

b) hydrogen peroxide

✓ c) chlorine

d) none of these

iv) Colloid particles remain suspended in solution because they have

✓ a) net negative surface charge

✓ b) net positive surface charge

c) no charge on surface

d) none of these

v) Water will be considered saline if the TDS value is

a) < 1500 mg/L

b) > 5000 mg/L

c) < 500 mg/L

✓ d) none of these

vi) The coldest region of atmosphere is

a) troposphere

b) stratosphere

✓ c) mesosphere

d) thermosphere

vii) Atmospheric radiative window is

a) 12 to 18 μm

b) 13 to 18 μm

✓ c) 7 to 12 μm

d) 1 to 15 μm

ENSC-200

viii) Minamata disease is due to following species:

- a) Hg^+ ✓b) CH_3Hg^+ c) Hg^{2+} d) Cd^{2+}

ix) The atmosphere is neutrally stable under the condition of

- a) $\text{ELR} > \text{ALR}$ b) $\text{ELR} < \text{ALR}$
✓c) $\text{ELR} = \text{ALR}$ d) none of these

x) In the industrial area noise is measured by

- ✓a) L_{10} (18 hrs) index b) L_{eq}
c) $L_e P_n$ d) none of these

Group – B

(Short Answer Type Questions)

2. What is trickling filter? Explain its use with a diagram.

See Topic: Water Pollution and Control, Long Answer Type Question No. 17(b).

3. a) What is noise dose and explain the same as recommended by Noise Control Board.

See Topic: NOISE POLLUTION AND CONTROL, Short Answer Type Question No. 6.

b) What does the term "Three ways Catalytic Converter" mean? What catalyst is used in such converter bed?

See Topic: AIR POLLUTION AND CONTROL, Short Answer Type Question No.5.

4. What do you understand by the term 'maximum sustainable yield? Prove that $N = K/2$ for maximum sustainable.

See Topic: FUNDAMENTALS OF ENVIRONMENT, Short Answer Type Question No. 2.

5. Prove that on the basis of global temperature model, the earth's surface temperature is -19°C .

See Topic: AIR POLLUTION & CONTROL, Short Answer Type Question No. 21.

6. a) Define DALR and SALR.

b) Derive $-dT/dZ = g/C_p$ with usual notation.

a) See Topic: AIR POLLUTION & CONTROL, Short Answer Type Question No. 22.

b) See Topic: AIR POLLUTION & CONTROL, Long Answer Type Question No. 1.

Group – C

(Long Answer Type Questions)

7. a) Instead of spherical shape if the earth had been flat, then what would have been the surface temperature of earth? Calculate on the basis of zero-dimensional energy balance model. [$S = 1370 \text{ Wm}^{-2}$, $\sigma = 5.67 \times 10^{-8} \text{ Wm}^{-2}\text{K}^{-4}\text{s}^{-1}$, $\alpha = 0.31$].

See Topic: WATER POLLUTION AND CONTROL, Long Answer Type Question No. 8(b).

b) What is the global temperature model?

See Topic: AIR POLLUTION AND CONTROL, Short Answer Type Question No.10.

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c) What are biochemical effects of arsenic and cadmium?

See Topic: **WATER POLLUTION & CONTROL, Short Answer Type Question No. 7.**

d) What is difference between sulphurous smog and photochemical smog?

See Topic: **AIR POLLUTION & CONTROL, Short Answer Type Question No. 11.**

8. a) What is ecosystem? Discuss a Mangrove forest as natural ecosystem with all of its components.

b) What is resource? What is the difference between resource and reserve?

c) Write a short note on EIA.

d) How the green houses gases helps to maintain the earth average temperature of 15°C.

a) See Topic: **ECOLOGY, Long Answer Type Question No. 3**

b) See Topic: **FUNDAMENTAL OF ENVIRONMENT, Short Answer Type Question No. 9**

c) See Topic: **ENVIRONMENTAL MANAGEMENT, Long Answer Type Question No. 1.**

d) See Topic: **AIR POLLUTION & CONTROL, Long Answer Type Question No. 5.**

9. a) Sometimes packaged drinking water is labeled as 'Ozonised water' : What do you mean by ozonised water?

b) Describe, in brief, about the various process involved in surface water treatment to make it of drinkable quality.

c) What is the basic difference of noise pollution from any other pollution? What is noise threshold limit values? A sample of ground water has 140 mg/Litre of Ca^{2+} ions. Express its hazardness in units of mg/Litre of CaCO_3 .

d) Which one of the species Hg^0 , Hg^{+1} , Hg^{+2} and CH_3Hg^+ is most toxic and why? If a chemical industry discharges 'Hg' marine water the fish in the bay were found to contain CH_3Hg^+ : How can you explain this missing link?

a) & b) See Topic: **WATER POLLUTION AND CONTROL, Long Answer Type Question No. 17.**

c) 1st & 2nd part: See Topic: **NOISE POLLUTION & CONTROL, Long Answer type Question No. 9.**

3rd part: See Topic: **WATER POLLUTION & CONTROL, Long Answer Type Question No. 10(c).**

d) See Topic: **WATER POLLUTION & CONTROL, Long Answer Type Question No. 3**

10. a) Define 'decibel' and 'sound pressure level'.

b) What is 'Noise Threshold Limit value'? Noise in an area is measured as and permissible noise exposure duration is given below. Find out whether working environment is good for the worker or not?

Noise level dBa	100	95	90	75
Measured hours	½	1	3	3
Permissible hours	1	2	4	∞

a) & b) See Topic: **NOISE POLLUTION & CONTROL, Long Answer type Question No. 10.**

c) What is adiabatic lapse rate and environmental lapse rate? Considering the two lapse rates explain the term "Mixing height" and "Ventilation Coefficient".

d) What are the differences between photochemical smog and sulphurous smog?

e) What is 'Montreal Protocol'?

c), d) & e) See Topic: **AIR POLLUTION & CONTROL, Long Answer Type Question No. 17.**

11. Write short notes on *any three* of the following:

a) Hydrologic cycle

See Topic: WATER POLLUTION & CONTROL, Short Answer Type Question No. 2.

b) Rotating Biological Contractor (RBC)

See Topic: WATER POLLUTION & CONTROL, Long Answer Type Question No. 4(b).

c) Oxidation Ponds

See Topic: WATER POLLUTION & CONTROL, Long Answer Type Question No. 22(c).

d) Biodiversity Hot-spot

See Topic: ECOLOGY, Long Answer Type Question No. 2

e) Eutrophication.

See Topic: WATER POLLUTION & CONTROL, Short Answer Type Question No. 8.

QUESTION 2019 [JUNE]

Group – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following:

i) The value of EIU is

a) $EQI \times PIU$

b) $EQI + PIU$

✓c) $EQI - PIU$

d) EQI / PIU

ii) Which of the following is likely to be present in photochemical smog?

a) Alcohol

✓b) Aldehyde

c) Acetone

d) Ether

iii) Niche refers to

a) Habitat of a number of aquatic species

b) Habitat of a number of land species

c) Habitat of a single species

✓d) None of these

iv) The best method for disposal of non-hazardous solid waste is

a) open dumping

b) sanitary land filling

c) incineration

✓d) composting

v) Tree hugging movement is

a) silent valley movement

b) green movement

✓c) Chipko andolan

d) none of these

for the health of a worker or not. Given the permissible duration for each noise level is 90 (dB) for 4 hours, 80 (dBA) for 16 hours any 75 (dBA) for any period of time.

See Topic: **NOISE POLLUTION & CONTROL**, Short Answer Type Question No. 7.

6. Using global temperature model how can we find the average temperature of earth surface?

See Topic: **AIR POLLUTION & CONTROL**, Short Answer Type Question No. 23.

Group – C

(Long Answer Type Questions)

7. a) Explain Stack and Plumes.

b) How many types of plumes can be observed?

c) How does Antarctica ozone hole formation take place? What is its impact?

d) What do you understand by earth albedo?

a) & b) See Topic: **AIR POLLUTION & CONTROL**, Short Answer Type Question No. 9.

c) See Topic: **AIR POLLUTION & CONTROL**, Short Answer Type Question No. 2.

d) See Topic: **AIR POLLUTION & CONTROL**, Short Answer Type Question No. 7.

8. a) Describe activated sludge process for treatment of waste water.

b) What do you mean by biotreatability?

c) Discuss the advantages of Biological Towers over conventional Trickling filters.

d) If the 5-day, 20°C BOD of waste water is 210 mg/ L, what will be the ultimate BOD and 10-day BOD?

Had the sample been incubated at 30°C, what would the 5-day BOD have been? (Given: $k_1 = 0.23/\text{day}$, $\theta = 1.407$)

See Topic: **WATER POLLUTION & CONTROL**, Long Answer Type Question No. 18.

9. a) Discuss the hydrological cycle showing the water balance of the Earth. What role is played by man in the hydrological cycle?

b) Distinguish between an aquifer and an aquitard.

c) State Darcy's law for groundwater flow and also define hydraulic conductivity.

d) A confined aquifer 30 m thick has two monitoring wells placed 600 m apart along the direction of groundwater flow. The difference in piezometric head in the wells is 2.0 m. The hydraulic conductivity is 50 m/day. Calculate the flow rate per meter of distance perpendicular to the flow.

a) & b) See Topic: **ECOLOGY**, Long Answer Type Question No. 4.

c) See Topic: **WATER POLLUTION & CONTROL**, Long Answer Type Question No. 19.

d) *Out of syllabus*

10. a) What is BOD?

b) Define Eutrophication.

c) What is the difference between BOD and COD method?

d) A BOD test is run using 50 ml of wastewater mixed with 100 ml of pure water. The initial DO of the mixture is 8.0 mg/L, and after 5 days it becomes 3.0 mg/ L. After a long time, the DO remains fixed at 1.0 mg/ L.

i) What is BOD_5 of waste water?

ii) What is the ultimate BOD?

iii) What is the remaining BOD after 5 days?

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iv) What is the reaction rate constant measured at 20°C?

See Topic: WATER POLLUTION & CONTROL, Long Answer Type Question No. 20.

11. Write the short notes any *three* of the following:

a) Arsenic pollution

b) Catalytic converter

c) Montreal Protocol

d) Biodiversity

e) Weathering

a) See Topic: WATER POLLUTION & CONTROL, Long Answer Type Question No. 22.j).

b) See Topic: AIR POLLUTION & CONTROL, Long Answer Type Question No. 19.a).

c) See Topic: AIR POLLUTION & CONTROL, Long Answer Type Question No. 19.m).

d) See Topic: ECOLOGY, Long Answer Type Question No. 5.e).

e) See Topic: LAND POLLUTION & CONTROL, Long Answer Type Question No. 5.e).

QUESTION 2019 [DECEMBER]

Group – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for *any ten* of the following:

i) A river with high value of BOD is

a) Highly productive

b) Highly clean

✓c) Highly polluted

d) none of these

ii) Saturated value of dissolved oxygen in water at 20°C is

✓a) 9.1 mg/l

b) 6.1 mg/ml

c) 9.1 mg/ml

d) 6.1 mg/l

iii) Lakes rich in nutrient is known as

a) Eutrophic lake

b) Mesotrophic lake

c) Atrophic lake

✓d) Oligotrophic lake

iv) Sound intensity level in decibel can be defined as

✓a) $L_i = 10 \log_{10} (I/I_0)$

b) $L_i = 20 \log_{10} (I_0/I)$

c) $L_i = 20 \log_{10} (I/I_0)$

d) $L_i = 10 \log_{10} (I_0/I)$

v) Incineration of solid waste are generally performed at temperature range of

✓a) 900-1200°C

b) 200-300°C

c) 0-50°C

d) 350-500°C

vi) The separation zone between stratosphere and mesosphere is termed as

a) Mesopause

b) Tropopause

✓c) Stratopause

d) none of these

POPULAR PUBLICATIONS

A BOD test is run using 50ml of waste water mixed with 150ml of pure water. The initial DO of the mixture is 10mg/l and after 5 days it becomes 5mg/l. After a long time the DO remain fixed at 1mg/l.

- What is BOD5 of waste water?
- What is the ultimate BOD?
- What is the remaining BOD after 5 days?
- What is the reaction rate constant at 20°C?
- What would be the reaction rate constant if measure at 45°C?

See Topic: WATER POLLUTION & CONTROL, Long Answer Type Question No. 21.

9. Define radiation heat transfer. What is atmospheric radiative window? Explain the simple global temperature model.

Consider the sun as a perfect sphere of radius 6.8×10^8 m. Calculate the energy radiative by sun in 8 hours. Surface temperature of sun 6000K and Stefan's constant is $5.67 \times 10^{-8} \text{ Jm}^{-2}\text{s}^{-1}\text{K}^{-4}$.

See Topic: AIR POLLUTION & CONTROL, Long Answer Type Question No. 18.

10. Write a short note on hazardous waste management. What are Conrad, Moho and Gutenberg discontinuities? What is the CFC number for $\text{CCl}_2\text{FCClF}_2$? Define lofting, fumigating, trapping, looping plume with diagram.

1st & 2nd part: See Topic: LAND POLLUTION & CONTROL, Long Answer Type Question No. 4.

3rd & 4th part: See Topic: AIR POLLUTION & CONTROL, Short Answer Type Question No. 25.

11. a) What is the equivalent noise and sound intensity?

b) In a work area the noise levels are read as 95 dBA for 2 hr a day, 90 dBA for 4 hr a day, 100 dBA for 1 hr and 75 dBA for 3 hr. The permissible noise exposure duration of dBA is 1 hr, 95 dBA is 3 hr, 90 dBA is 2 hr and 75 dBA is 4 hr. Find out whether the permissible limit has exceeded or not and also state if the condition is good for the health of a worker or not.

c) With a suitable diagram explain.

a) See Topic: NOISE POLLUTION AND CONTROL, Long Answer Type Question No. 11(a).

b) See Topic: NOISE POLLUTION AND CONTROL, Long Answer Type Question No. 11(b).

c) Wrong Question

12. Write short notes on any three of the following:

a) Trickling filter

b) Nitrogen Cycle

c) Global warming

d) Electrostatic precipitator

e) Biomedical waste management

a) See Topic: WATER POLLUTION & CONTROL, Long Answer Type Question No. 22(b).

b) See Topic: ECOLOGY, Long Answer Type Question No. 5(f).

c) See Topic: AIR POLLUTION & CONTROL, Long Answer Type Question No. 19(l).

d) See Topic: AIR POLLUTION & CONTROL, Long Answer Type Question No. 19(b).

e) See Topic: LAND POLLUTION & CONTROL, Long Answer Type Question No. 5(c).

