

**INDIA METEOROLOGICAL
DEPARTMENT
QUESTION BANK
OF
INTEGRATED MET. TRAINING COURSE
(IMTC)
FINAL EXAMINATION
BASED ON 1-11 BATCHES (2013-2021)
PAPER-II: PHYSICAL MET, MARINE
MET AND ENV.MET
PART C : ENVIRONMENTAL
METEOROLOGY**

**INDIA METEOROLOGICAL DEPARTMENT
INTEGRATED MET. TRAINING COURSE (IMTC)**

FINAL EXAMINATION

PAPER –II : PHYSICAL MET, MARINE MET AND ENV.MET

PART C : Environmental Meteorology

1] Fill in the blanks :

1. _____ may have warming or cooling effects, depending on their characteristics.
(Aerosols/GHGs)
2. PM10 is the aerosol of size _____ than 10 micrometer diameter. (More/Less)
3. _____ is naturally occurring greenhouse gases. (Water Vapour/N₂O).
4. Stratospheric Ozone Layer absorbs _____ part of sun's radiation. (Infrared / UV-B)
5. At -112 °C temperature, Ozone condenses to form a dark _____ liquid. (green / blue)
6. Sulfur dioxide is an acid precursor, which is a source of acid rain produced when it combines with water droplets to form _____ acid
7. Marine plankton, sea water, plants, volcanic eruption are natural source of _____.
8. Mie scattering explains _____.
9. Platelet aerosol have _____ long dimensions and _____ small dimensions (2&1 / 1& 2)
10. _____ and _____ are primary pollutants (SO₂ and NO₂ / SO₂ and O₃)
11. Ozone Layer thickness _____ with latitude. (Increases / decreases)
12. Wave band 5 μm is equal to _____ Cm⁻¹ (2000 / 2500)
13. Shape of Isometric aerosols is _____ .
14. Water vapour is _____ gas in the atmosphere.
15. _____ is a greenhouse gases.
16. Ground level Ozone is _____ pollutant.

17. CO₂ has absorption band at _____ μm.
18. _____ and _____ are green house gases
19. Sulfate aerosols cause _____ Radiative Forcing at the top of the atmosphere
20. _____ is a natural source of aerosols
21. SO₂ has absorption band at _____ nm
22. In total column ozone measurement by Dobson Spectrophotometer, the relative intensities of _____ UV radiations are compared.
23. One Dobson Unit (DU) is defined to be _____ thickness of the column of the atmosphere at standard temperature and pressure.
24. Montreal protocol was signed in year _____
25. Size of the accumulation mode aerosols ranging from _____ to _____
26. If the ratio $\frac{NO_2}{NO} > 3$ then formation of O₃ is _____
27. Sulphate aerosol is of _____ type.
28. Size of the accumulation mode aerosols ranging from _____ to _____
29. PM₁₀ stands for _____, that are larger than _____ μm and smaller than _____ μm.
30. If Air Quality index (AQI) is 401-500, it means _____.

2] State with brief reason the following statement is True or False

1. The concentration of hygroscopic aerosols does not affect cloud and precipitation.
2. Ozone hole is stronger in Northern Hemisphere over Arctic region then Southern Hemispheric Antarctic region.
3. SERINUS 10 UV Analyzer uses ECC sensor to monitor Surface Ozone due to better accuracy and ease in handling the instrument.
4. The concentration of CO₂ is essentially the same all over the world, but the concentration of aerosols varies considerably from one location to another. Explain with reason.

5. Name any five air pollutants for which ambient air quality standards are defined under environment protection act of India.
6. Ozone is good up above but bad at surface.
7. Aerosols do not have any direct effect.
8. At a location horizontal visibility increases after precipitation.
9. Concentration of many VOC is higher in indoor than outdoor.
10. In diurnal variation, concentration of ozone is maximum at midday.
11. Ground level ozone is produced by photolysis of UV photons.
12. Condensation and Nucleation processes are same.
13. Positive Radiative Forcing in the atmosphere cause warming of earth atmosphere
14. Thermal structure of Stratosphere is due to ozone presence.
15. Methane concentration was about 1000 times higher billions of year ago than the present level In the middle troposphere ozone is atmospheric cleanser.
16. Equilibrium pH level for rain water and CO₂ go down with increase in atmospheric CO₂ levels.
17. N₂O (nitrous oxide) has no sink in the troposphere.
18. F-gases effect the climate much longer time than water vapour and ozone.
19. Net radiative effect of the aerosols is warming of the Earth's atmosphere.
20. Tropospheric ozone is bad for living organisms.
21. The scale of AQI is ranging from 0-500.
22. Aerosols do not have any direct effect.
23. Net radiative effect of the aerosols is warming of the Earth's atmosphere.
24. Air pollution problems are more acute when winds are weak or calm.
25. Stratospheric ozone reduces global warming
26. Temperature inversions influence air pollution.
27. Aerosols do not have any direct effect.
28. Wind speed influences Air Quality.

3] Answer the following questions

1. What are the Direct and Indirect effects of Aerosol?
2. What is the principle of measurement total ozone in Dobson Spectrophotometer.

3. What is air pollution. What are the different mechanisms for removal of air pollutants from air?
4. What are Primary and Secondary pollutants. Give two examples of each and describe their sources.
5. If the number of aerosol particles in the Earth's atmosphere doubled (composition remains the same) what would the impact be (increase, decrease, remain the same) on the following:

(i) Concentration of cloud particles,	(ii) Size of cloud particles
(iii) Cloud cover	(iv) Cloud liquid water content

Briefly explain your answers.
6. Why air pollution matters ? How it can be reduced ?
7. Give classification of aerosols based on size, formation mechanism and life time. Briefly describe the atmospheric removal process / sink for each class of aerosol.
8. What is the principle of measurement of ozone in SERINUS 10 UV Analyzer. What is the role of ozone scrubber in the analyzer.
9. Write a note on Acid Rain Effect on Soils.
10. Describe NDIR method for measurement of CO₂
11. Write cycle of four reactions from photolysis of Chlorofluorocarbons to release of free
12. chlorine atom
13. What is the principle of measurement total ozone in Dobson Spectrophotometer.
14. What is air pollution. What are the different mechanisms for removal of air pollutants from air?
15. Write a note on Air Quality Index
16. Describe the method for measurement of surface ozone by UV photometer / UV analyzer.

17. Describe any three sources and two sinks of Carbon dioxide (CO₂).
18. Discuss in brief on Air Quality Index
19. Define Atmospheric Aerosols. Write a note on its classification based on size, chemical composition and optical properties.
20. Write a note on stratospheric and tropospheric Ozone.
21. What are Indirect effects of Aerosol?
22. Define Atmospheric Aerosols. Write a note on its classification based on size, chemical composition and optical properties.
23. Write a note on Emission Inventory.
24. Explain interaction of CFCs with Ozone.
25. How does Earth's atmosphere act as a 'greenhouse'?
26. What is emission inventory? What are their uses in scientific field?
27. Define Atmospheric Aerosols. Write a note on its classification based on size, chemical composition and optical properties.
28. Write a short note on Air Quality Index