

Minor –I CVL 720: Air Pollution and Control

Time: 1 Hr.

Marks: 30

Date: 8.11.2020

Note: All answers are to be written on the answer sheet only. Nothing should be written on the question paper. Question 1 is having 25% negative marking.

Q1. Answer the following

(1x10=10)

(i) In the stratosphere the ambient temperature

- a. Decrease with increasing altitude upto 10kms b. Increase with increasing altitude upto 50kms
c. Decrease with increasing altitude upto 80kms d. Remains Isothermal

(ii) The common atmospheric gases that do not absorb incoming short-wave solar radiation are

- a. O₃, CO₂, H₂O vapor b. NO₂, SO₂, CO c. O₂, N₂O, SF₆ d. CH₄

(iii) The concentration of H₂O vapor varies in the atmosphere because

- a. Variation in atmospheric temperature b. Presence of humidity
c. Continuous phase changes of H₂O vapors d. Uptake by plants and humans

(iv) In the Chapman's cycle, the tropospheric O₃ forms from reactions in presence of

- a. Sunlight's infrared range b. Sunlight's long-wave range
c. Sunlight's ultraviolet range d. Sunlight's radio range

(v) The biological response of air pollutants by humans is

- a. Acute respiratory disease b. Chronic respiratory diseases
c. Pulmonary ailments d. Dose-Response curve

(vi) The effect of O₃ on car tires is

- a. Cracking b. Brittleness c. Melting d. Color change

(vii) Air pollution studies are generally limited to a height of

- a. 600m from Earth's surface
b. 1000 m from Earth's surface
c. 1500 m from Earth's surface
d. 2000 m from Earth's surface

(viii) Leukemia is a consequence of exposure to

- a. Ozone b. Carbon Monoxide c. Lead d. Benzene

(ix) The reaction of [O] with [N₂] in combustion chamber is

- a. Exothermic b. Equilibrium c. Controlled d. Endothermic

(x) The acidified deposits within the boiler and chimney is called

- a. Acid smut b. Acid mist c. Dry acid deposit d. Wet acid deposit

Q2 Match the following

($\frac{1}{2} \times 6 = 3$)

- | | |
|--------------------------|------------------------------|
| (i) Forest fire | (a) Volatile organic carbons |
| (ii) Dust storms | (b) Aldehydes |
| (iii) Oceans | (c) SO ₂ |
| (iv) Plants and trees | (d) Particulate matter |
| (v) Thermal power plants | (e) Salts |
| (vi) Incinerations | (f) Unburnt hydrocarbons |

Q3 (a) Define air pollution as per OECD definition and the systems definition?

(b) Write the reactions that take place within combustion chamber of vehicle? How do these contribute to ozone depletion?

(c) Define aerodynamic diameter of particle?

(d) Tabulate and describe the names of ambient air monitoring stations as per WHO.

(2 x 4 = 8)

Q4. (a) Describe Isokinetic sampling process with neat diagram ?

(b) Draw a schematic diagram of various types of air sampling systems?

(c) List the data needed to be collected in stack sampling?

(2 x 3 = 6)

Q5. If average stack gas concentration is 90 $\mu\text{g}/\text{m}^3$ and volumetric flow rate of gas is 4 m^3/sec , calculate the mass emission rate of the gas?

(3)