DPP - Daily Practice Problems

Chapter-wise Sheets

Date : | Start Time : | End Time :

CHEMISTRY CC14

SYLLABUS : Environmental Chemistry

Max. Marks : 180 **Marking Scheme :** + 4 for correct & (–1) for incorrect **Time : 60 min.**

INSTRUCTIONS : This Daily Practice Problem Sheet contains 45 MCQ's. For each question only one option is correct. Darken the correct circle/ bubble in the Response Grid provided on each page.

1. The substance which is a primary pollutant?
(a) H_2SO_4 (b) CO
(c) PAN (d) Aldehydes

2. Ozone layer of stratosphere requires protection from indiscriminate use of
(a) balloons
(b) pesticides
(c) atomic explosions
(d) aerosols and high flying jets

3. Which of the following acts as a sink for CO?
(a) Plants
(b) Haemoglobin
(c) Microorganisms present in the soil
(d) Oceans

4. The viable particulate among the following is
(a) fumes (b) algae
(c) smoke (d) mist

5. Which of the following statements is not true about classical smog?
(a) Its main components are produced by the action of sunlight on emissions of automobiles and factories.
(b) Produced in cold and humid climate.
(c) It contains compounds of reducing nature.
(d) It contains smoke fog and sulphur dioxide.

6. Match the columns

	Column-I		Column-II
A.	Nitrous oxide from car exhausts	I.	Secondary pollutant
B.	Chlorofluorocarbon (CFCs)	II.	Combustion of fossil fuels, wood, etc
C.	Methane	III.	Denitrification
D.	Ozone (O_3)	IV.	Refrigerators, aerosol, sprays
E	Carbon dioxide	V.	Cattle, rice fields, toilets.

(a) A – III; B – IV; C – V; D – I; E – II
(b) A – V; B – I; C – III; D – IV; E – II
(c) A – IV; B – V; C – I; D – II; E – III
(d) A – I; B – III; C – IV; D – V; E – II

RESPONSE GRID	1. ⓐⓑⓒⓓ 2. ⓐⓑⓒⓓ 3. ⓐⓑⓒⓓ 4. ⓐⓑⓒⓓ 5. ⓐⓑⓒⓓ 6. ⓐⓑⓒⓓ

Space for Rough Work

7. Which of the following sequence of T and F is correct for given statements. Here T stands for True statement and F stands for False statement.
   (i) Troposphere is the lowest region of atmosphere in which the human beings along with other organisms live.
   (ii) Troposphere extends up to the height of 10 km from sea level.
   (iii) Stratosphere lies above troposphere, between 10 and 20 km above sea level.
   (iv) Troposphere contains much little water vapour, dinitrogen, dioxygen and ozone
   (v) Stratosphere contains ozone, and cloud formation also takes place in this region.
   (a) TTTTT (b) TFTFF
   (c) TTFFF (d) TFTFT
8. Green chemistry means such reactions which :
   (a) produce colour during reactions
   (b) reduce the use and production of hazardous chemicals
   (c) are related to the depletion of ozone layer
   (d) study the reactions in plants
9. Photochemical smog consists of excessive amount of X, in addition to aldehydes, ketones, peroxyacetyl nitrate (PAN), and so forth, X is :
   (a) CO (b) CH_4 (c) O_3 (d) CO_2
10. Which of the following statements about polar stratosphere clouds (PSCs) is not correct?
   (a) PSCs do not react with chlorine nitrate and HCl
   (b) Type I clouds are formed at about –77°C and contain solid $HNO_3 . 3H_2O$
   (c) Type II clouds are formed at about –85°C and contain some ice
   (d) A tight whirlpool of wind called Polar Vortex is formed which surrounds Antarctica
11. Match the columns

Column-I		Column-II	
A.	Oxides of sulphur	I.	Global warming
B.	Nitrogen dioxide	II.	Damage to kidney
C.	Carbon dioxide	III.	'Blue baby' syndrome
D.	Nitrate in drinking water	IV.	Respiratory diseases
E.	Lead	V.	Red haze in traffic and congested areas

   (a) A – V.; B – I.; C – III.; D – IV.; E – II.
   (b) A – IV.; B – V.; C – I.; D – III.; E – II.
   (c) A – IV.; B – II.; C – I.; D – V.; E – III.
   (d) A – II.; B – IV.; C – V.; D – III.; E – I.
12. Which of the following statements are not correct?
   (i) F^- ion concentration above 2ppm causes brown mottling in teeth.
   (ii) Excessive F^- (over 10 ppm) causes harmful effect to bones and teeth.
   (iii) Excessive lead in drinking water causes disease methemoglobinemia
   (iv) Deficiency of sulphate in drinking water causes laxative effect.
   (a) (ii) and (iv) (b) (ii) and (iii)
   (c) (ii), (iii) and (iv) (d) (iii) and (iv)
13. The gas leaked from a storage tank of the Union Carbide plant in Bhopal gas tragedy was :
   (a) Methyl isocyanate (b) Methylamine
   (c) Ammonia (d) Phosgene
14. Minamata disease is due to pollution of
   (a) aresenic into the atmosphere
   (b) organic waste into drinking water
   (c) oil spill in water
   (d) industrial waste mercury into fishing water
15. Eutrophication causes reduction in
   (a) dissolved oxygen (b) nutrients
   (c) dissolved salts (d) All the above
16. Which of the following is/are formed when ozone reacts with the unburnt hydrocarbons in polluted air ?
   (i) Formaldehyde (ii) Acrolein
   (iii) Peroxyacetyl nitrate (iv) Formic acid
   (a) (i) and (iv) (b) (ii) only
   (c) (iii) only (d) (i), (ii) and (iii)
17. Use of which of the following solvent in dry cleaning will result in less harm to ground water ?
   (a) $Cl_2C=CCl_2$ (b) Liquid CO_2
   (c) H_2O_2 (d) None of these
18. Which among the following statements is *false*?
   (a) Oil slick in sea water increases D.O. value
   (b) The main reason for river water pollution is industrial and domestic sewage discharge
   (c) Surface water contains a lot of organic matter mineral nutrients and radioactive materials
   (d) Oil spill in sea water causes heavy damage to fishery

RESPONSE GRID					
	7. ⓐⓑⓒⓓ	8. ⓐⓑⓒⓓ	9. ⓐⓑⓒⓓ	10. ⓐⓑⓒⓓ	11. ⓐⓑⓒⓓ
	12. ⓐⓑⓒⓓ	13. ⓐⓑⓒⓓ	14. ⓐⓑⓒⓓ	15. ⓐⓑⓒⓓ	16. ⓐⓑⓒⓓ
	17. ⓐⓑⓒⓓ	18. ⓐⓑⓒⓓ			

Space for Rough Work

19. The false statement among the followings :
(a) The average residence time of NO is one month
(b) Limestone acts as a sink for SO_x
(c) SO_x can be removed from flue gases by passing through a solution of citrate ions
(d) Ammonia acts as a sink for NO_x

20. The aromatic compounds present as particulates are
(a) polycyclic aromatic hydrocarbons
(b) benzene
(c) toluene
(d) nitrobenzene

21. Which one of the following pairs is mismatched ?
(a) Fossil fuel burning - release of CO_2
(b) Nuclear power - radioactive wastes
(c) Solar energy - Greenhouse effect
(d) Biomass burning - release of CO_2

22. Which one of the following statement is **not** true ?
(a) pH of drinking water should be between 5.5 – 9.5.
(b) Concentration of DO below 6 ppm is good for the growth of fish.
(c) Clean water would have a BOD value of less than 5 ppm.
(d) Oxides of sulphur, nitrogen and carbon are the most widespread air pollutant.

23. Surface water contains
(a) suspended impurity (b) salt + organic matter
(c) only salt (d) organic matter

24. Formation of London smog takes place in
(a) winter during day time
(b) summer during daytime
(c) summer during morning time
(d) winter during morning time

25. Dinitrogen and dioxygen are main constituents of air but these do not react with each other to form oxides of nitrogen because _____.
(a) the reaction is endothermic and requires very high temperature.
(b) the reaction can be initiated only in presence of a catalyst.
(c) oxides of nitrogen are unstable.
(d) N_2 and O_2 are unreactive

26. Which one of the following statements is correct ?
(a) Extensive use of chemical fertilizers may lead to cutrophication of nearby water bodies
(b) Both Azotobacter and Rhizobium fix atmospheric nitrogen in root nodules of plants
(c) Cyanobacteria such as Anabaena and Nostoc are important mobilizers of phosphates and potassium for plant nutrition in soil
(d) At present it is not possible to grow maize without chemical fertilizers

27. Lichens do not like to grow in cities
(a) because of absence of the right type of algae and fungi
(b) because of lack of moisture
(c) because of SO_2 pollution
(d) because natural habitat is missing

28. Which of the following statements about the depletion of ozone layer is correct?
(a) The problem of ozone depletion is less serious at poles because NO_2 solidifies and is not available for consuming $ClO^{\bullet}$ radicals.
(b) The problem of ozone depletion is more serious at poles because ice crystals in the clouds over poles act as catalyst for photochemical reactions involving the decomposition of ozone of $Cl^{\bullet}$ and $ClO^{\bullet}$ radicals.
(c) Freons and chlorofluorocarbons are inert. Chemically, they do not react with ozone in stratosphere.
(d) Oxides of nitrogen also do not react with ozone in stratosphere.

29. Acid rain is caused by or recent reports of acid rain in some industrial cities are due to the effect of atmospheric pollution by
(a) excessive release of CO_2 by burning of fuels like wood and charcoal, cutting of forests and increased animal population
(b) excessive release of NO_2 and SO_2 in atmosphere by burning of fossil fuel
(c) excessive release of NH_3 by industrial plants and coal gas
(d) excessive release of CO in atmosphere by incomplete combustion of coke, charcoal and other carbonaceous fuel in paucity of oxygen.

RESPONSE GRID					
	19. ⓐⓑⓒⓓ	20. ⓐⓑⓒⓓ	21. ⓐⓑⓒⓓ	22. ⓐⓑⓒⓓ	23. ⓐⓑⓒⓓ
	24. ⓐⓑⓒⓓ	25. ⓐⓑⓒⓓ	26. ⓐⓑⓒⓓ	27. ⓐⓑⓒⓓ	28. ⓐⓑⓒⓓ
	29. ⓐⓑⓒⓓ				

Space for Rough Work

30. A water sample has ppm level concentration of following anions
$F^- = 10$; $SO_4^{2-} = 100$; $NO_3^- = 50$
the anion/anions that make/makes the water sample unsuitable for drinking is/are :
(a) only NO_3^- (b) both SO_4^{2-} and NO_3^-
(c) only F^- (d) only SO_4^{2-}

31. Which of the following is the major cause of global warming?
(a) re-radiation of U.V. rays by CO_2 and H_2O
(b) re-radiation of I.R. rays by CO_2 and H_2O
(c) re-radiation of I.R. rays by O_2 and N_2
(d) re-radiation of U.V. rays by O_2 and N_2

32. Identify the incorrect statement from the following :
(a) Ozone absorbs the intense ultraviolet radiation of the sun.
(b) Depletion of ozone layer is because of its chemical reactions with chlorofluoro alkanes.
(c) Ozone absorbs infrared radiation.
(d) Oxides of nitrogen in the atmosphere can cause the depletion of ozone layer.

33. BOD is connected with
(a) microbes and organic matter
(b) organic matter
(c) microbes
(d) None of the above

34. Which of the following is not a common component of Photochemical Smog?
(a) Ozone (b) Acrolein
(c) Peroxyacetyl nitrate (d) Chlorofluorocarbons

35. In which of the following regions hydrogen and helium are found?
(a) Stratosphere (b) Mesosphere
(c) Exosphere (d) Troposphere

36. Formation of ozone in the upper atmosphere from oxygen takes place by the action of
(a) nitrogen oxides (b) ultraviolet rays
(c) cosmic rays (d) free radicals

37. Which of the following is/are the hazardous pollutant(s) present in automobile exhaust gases?
(i) N_2 (ii) CO
(iii) CH_4 (iv) Oxides of nitrogen
(a) (ii)and(iii) (b) (i)and(ii)
(c) (ii)and(iv) (d) (i)and(iii)

38. The non-viable particulate among the following is
(a) dust (b) bacteria
(c) moulds (d) fungi

39. The region containing water vapour is
(a) thermosphere (b) stratosphere
(c) troposphere (d) mesosphere

40. The biggest particulate matter is
(a) HNO_3 droplets (b) soot
(c) H_2SO_4 droplets (d) fly ash

41. How many time oxyhaemoglobin is less stable than carboxyhaemoglobin?
(a) 50 (b) 200
(c) 500 (d) 300

42. When rain is accompanied bya thunderstorm, the collected rain water will have a pH value
(a) slightly lower than that of rain water without thunderstorm
(b) slightly higher than that when the thunderstorm is not there
(c) uninfluenced by occurrence of thunderstorm
(d) which depends upon the amount of dust in air

43. Which of the following can control the photochemical smog?
(A) Use of catalytic converters in automobiles.
(B) Plantation of trees like *pinus*, *pyrus* and *vitis* etc.
(C) Using less sulphur containing fossil fuels.
(a) A and C (b) B
(c) A and B (d) A, B and C

44. Which of the following statement is false?
(a) London smog is oxidising in nature
(b) Photochemical smog causes irritation in eyes
(c) London smog is a mixture of smoke and fog
(d) Photochemical smog results in the formation of PAN

45. Depletion of ozone layer causes
(a) Breast cancer (b) Blood cancer
(c) Lung cancer (d) Skin cancer

RESPONSE GRID					
	30. ⓐⓑⓒⓓ	**31.** ⓐⓑⓒⓓ	**32.** ⓐⓑⓒⓓ	**33.** ⓐⓑⓒⓓ	**34.** ⓐⓑⓒⓓ
	35. ⓐⓑⓒⓓ	**36.** ⓐⓑⓒⓓ	**37.** ⓐⓑⓒⓓ	**38.** ⓐⓑⓒⓓ	**39.** ⓐⓑⓒⓓ
	40. ⓐⓑⓒⓓ	**41.** ⓐⓑⓒⓓ	**42.** ⓐⓑⓒⓓ	**43.** ⓐⓑⓒⓓ	**44.** ⓐⓑⓒⓓ
	45. ⓐⓑⓒⓓ				

Space for Rough Work

DAILY PRACTICE PROBLEMS — CHEMISTRY SOLUTIONS — DPP/CC14

1. **(b)** CO is a primary pollutant.
2. **(d)** Aerosols use CFC and flying jets release NO. Both causes depletion of ozone layer.
3. **(c)** CO is converted into CO_2 by microorganism present in soil.
4. **(b)** Algae
5. **(a)**
6. **(a)**
7. **(c)** For statement (iii), Stratosphere lies above troposphere between 10 and 50 km above sea level cloud formation takes place in troposphere.
   For statement (iv), Troposphere is a turbulent, dusty zone containing air, much water vapour and clouds.
   For statement (v), Stratosphere contains dinitrogen, dioxygen, ozone and little water vapour.
8. **(b)** Green chemistry may be defined as the programme of developing new chemical products and chemical processes or making improvements in the already existing compounds and processes so as to make less harmful to human health and environment. This means the same as to reduce the use and production of hazardous chemicals.
9. **(c)** Chemical pollutants in photochemical smog are nitrogen oxides (NO and NO_2), volatile organic compounds, ozone (O_3) and peroxyacetyl nitrate.
10. **(a)** PSCs react with chlorine nitrate and HCl to give HOCl and Cl_2.
11. **(b)**
12. **(d)** For statement (iii), Methemoglobinemia (blue baby syndrome) is caused due to excess of nitrate in drinking water.
    For statement (iv), Excessive sulphate (> 500 ppm) in drinking water causes laxative effect, otherwise at moderate levels it is harmless.
13. **(a)** Methyl isocyanate, $CH_3 - N = C = O$
14. **(d)** Minamata is caused by Hg poisoning.
15. **(a)** Eutrophication causes reduction in D.O
16. **(d)** $3CH_4 + 2O_3 \xrightarrow{\text{Polluted air}}$

$$\underset{\text{Formaldehyde}}{3CH_2=O} + \underset{\text{Acrolein}}{CH_2=CH-CHO} +$$

$$CH_3-\overset{\overset{O}{\|}}{C}OONO_2$$

    Peroxyacetyl nitrate (PAN)
17. **(b)** Replacement of earlier used tetra chloroethene as solvent for dry cleaning by liquid CO_2 results in less harm to ground water.
18. **(a)** Oil slick in sea water decreases D.O value.
19. **(a)** The average residence time of NO is 4 days.
20. **(a)** PAH (Polycyclic Aromatic Hydrocarbon)
21. **(c)** Solar energy is not responsible for green house effect instead it is a source of energy for the plants and animals.
22. **(b)** The ideal value of D.O for growth of fishes is 8 mg/ℓ. 7mg /ℓ is desirable range, below this value fishes get susceptible to disease. A value of 2 mg/ ℓ or below is lethal for fishes.
23. **(b)** Surface water contains salts + organic matter.
24. **(d)** London smog is formed in morning during winter.
25. **(a)**
26. **(a)**
27. **(c)** Because they are very sensitive to sulphur dioxide and in cities the amount of SO_2 is high so lichen do not grow in cities.
28. **(c)** Freons and chlorofluorocarbon find their way to stratosphere through without being destroyed in the troposphere due to their low reactivity. In the stratosphere the Cl and Br atoms are liberated from the parent compounds by the action of ultraviolet light e.g.

$$CF_2Cl_2 + h\nu \longrightarrow CF_2Cl + Cl$$

$$CFCl_3 + h\nu \longrightarrow CFCl_2 + Cl$$

    The Cl atoms can destroy ozone molecules through a variety of catalytic cycles.
29. **(b)** When SO_2 pollution in air is much higher. Sometimes, SO_2 mixes in the air with small particles of metals near the factories and gets oxidised into sulphur trioxide SO_3. These gases are harmful and they react with water to form sulphuric acid (H_2SO_4) or sulphurous acid (H_2SO_3) and come down to earth with rain water, it is called acid rain or acid precipitation.
30. **(c)** Above 2 ppm concentration of F^- in drinking water cause brown mottling of teeth.
31. **(b)**
32. **(c)** The ozone layer, existing between 20 to 35 km above the earth's surface, shield the earth from the harmful U. V. radiations from the sun.
    Depletion of ozone is caused by oxides of nitrogen

$$N_2O + h\upsilon \longrightarrow \underset{\text{reactive nitric oxide}}{NO} + N$$

$$NO + O_3 \longrightarrow NO_2 + O_2$$

$$O_3 + h\upsilon \longrightarrow O_2 + O$$

$$NO_2 + O \longrightarrow NO + O_2$$

$$2O_3 + h\upsilon \longrightarrow 3O_2 \text{ (Net reaction)}$$

    The presence of oxides of nitrogen increase the decomposition of O_3.

33. **(a)** BOD is connected with microbes and organic matter

34. **(d)** The oxidised hydrocarbons and ozone in presence of humidity cause photochemical smog.
Hydrocarbons + O_2, NO_2, NO, O, O_3, Peroxides, formaldehyde, peroxyacetyl-nitrate (PAN), acrodein etc.
Hence chlorofluorocarbons are not common component of photochemical smog.

35. **(c)** H_2, He and ionic oxygen are present in exosphere.

36. **(b)** In presence of U.V. rays O_2 is converted into O_3.

37. **(c)** CO and oxides of nitrogen are poisonous gases present in automobile exhaust gases.

38. **(a)** Dust

39. **(c)** Troposphere contains water vapour.

40. **(d)** Fly ash.

41. **(d)** Carboxyhaemoglobin is 300 times more stable than oxyhaemoglobin.

42. **(a)** Normal rain water has pH 5.6. Thunderstorm results in the formation of NO and HNO_3 which lowers the pH.

43. **(c)** Usually catalytic converters are used in the automobiles, which prevent the release of nitrogen oxide and hydrocarbons to the atmosphere. Certain plants e.g., *Pinus*, *Juniparus*, *Quercus*, *Pyrus* and *Vitis* can metabolise nitrogen oxide and therefore, their plantation could help in this matter.

44. **(a)** London smog is reducing in nature.

45. **(d)** Depletion of ozone layer causes skin cancer.