SECTION-A

31. Which of the following represents the lattice structure of $A_{0.95}O$ containing A^{2+}, A^{3+} and O^{2-} ions?

⊙ A^{2+} ⊙ A^{3+} ⊙ O^{2-}

A.

B.

C.
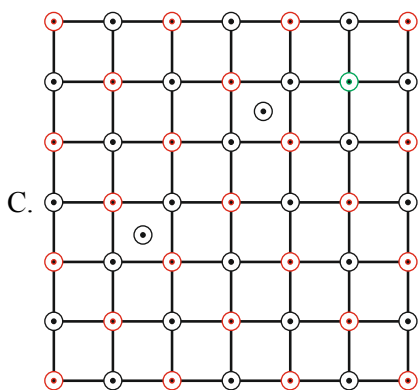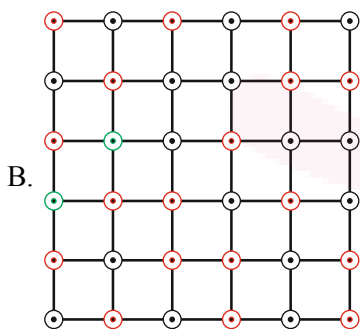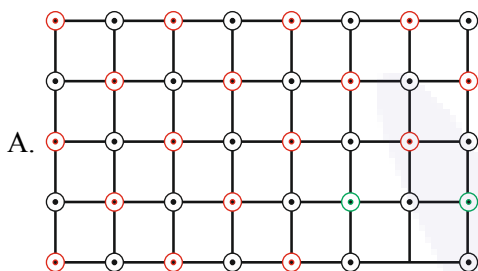
(1) B and C only

(2) B only

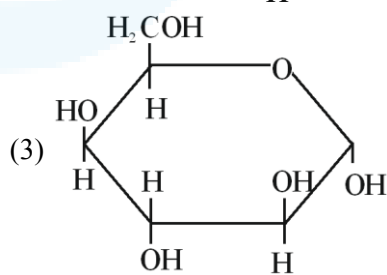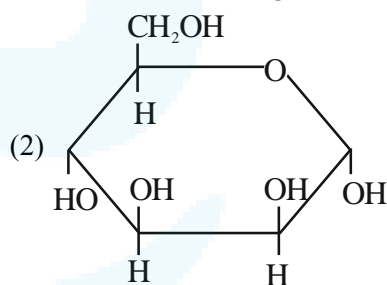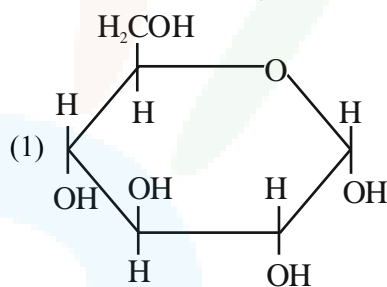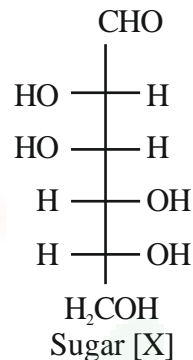(3) A and B only

(4) A only

Official Ans. by NTA (4)

   Ans. (4)

32. The correct representation in six membered pyranose form for the following sugar [X] is

Sugar [X]

(1)

(2)

(3)

(4)
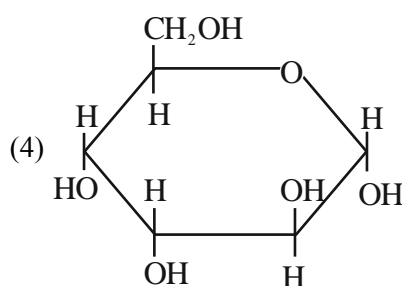
Official Ans. by NTA (2)

   Ans. (2)

33. Highest oxidation state of Mn is exhibited in Mn_2O_7. The correct statements about Mn_2O_7 are

(A) Mn is tetrahedrally surrounded by oxygen atoms

(B) Mn is octahedrally surrounded by oxygen atoms

(C) Contains Mn-O-Mn bridge
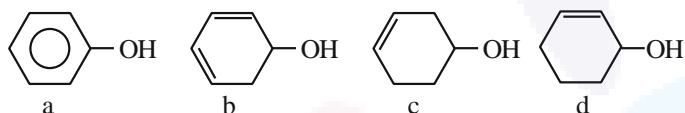
(D) Contains Mn-Mn bond.

Choose the correct answer from the options given below

(1) A and C only

(2) A and D only

(3) B and D only

(4) B and C only

Official Ans. by NTA (1)

Ans. (1)

34. Decreasing order of dehydration of the following alcohols is

(1) a > d > b > c

(2) b > d > c > a

(3) b > a > d > c

(4) d > b > c > a

Official Ans. by NTA (2)

Ans. (2)

35. Given below are two statements: One is labelled as **Assertion A** and the other is labelled as **Reason R**.

Assertion A: Amongst He, Ne, Ar and Kr; 1 g of activated charcoal adsorbs more of Kr.

Reason R : The critical volume V_c (cm^3 mol^{-1}) and critical pressure P_c (atm) is highest for Krypton but the compressibility factor at critical point Z_c is lowest for Krypton.
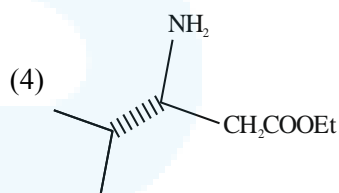
In the light of the above statements, choose the **correct** answer from the options given below.

(1) **A** is true but **R** is false

(2) **A** is false but **R** is true

(3) Both **A** and **R** are true but **R** is **NOT** the correct explanation of **A**

(4) Both **A** and **R** are true and **R** is the correct explanation of **A**

Official Ans. by NTA (1)

Ans. (1)

36. In the following reaction, 'A' is
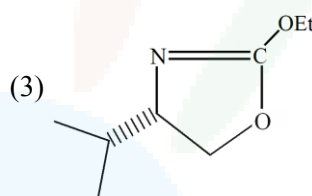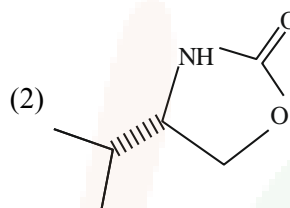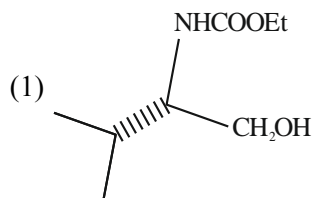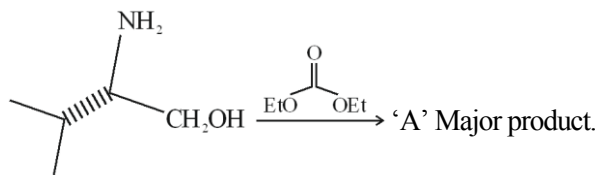
Official Ans. by NTA (2)

Ans. (2)

37. Match **List I** with **List II**.

List-I	List-II
(A) Tranquilizers	(I) Anti blood clotting
(B) Aspirin	(II) Salvarsan
(C) Antibiotic	(III) Antidepressant drugs
(D) Antiseptic	(IV) Soframicine

Choose the correct answer from the options given below:

(1) (A) – IV, (B) – II, (C) – I, (D) – III

(2) (A) – II, (B) – I, (C) – III, (D) – IV

(3) (A) – III, (B) – I, (C) – II, (D) – IV

(4) (A) – II, (B) – IV, (C) – I, (D) – III

Official Ans. by NTA (3)

Ans. (3)

38. Given below are two statements:

Statement I: Chlorine can easily combine with oxygen to from oxides; and the product has a tendency to explode.

Statement II: Chemical reactivity of an element can be determined by its reaction with oxygen and halogens.
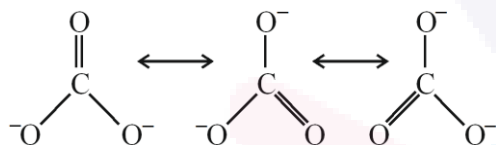
In the light of the above statements, choose the **correct** answer from the options given below.

(1) Both the statements I and II are true

(2) Statement I is true but Statement II is false

(3) Statement I is false but Statement II is true

(4) Both the Statements I and II are false

Official Ans. by NTA (1)

   Ans. (1)

39. Resonance in carbonate ion (CO_3^{2-}) is

Which of the following is true?

(1) It is possible to identify each structure individually by some physical or chemical method.

(2) All these structures are in dynamic equilibrium with each other.

(3) Each structure exists for equal amount of time.

(4) CO_3^{2-} has a single structure i.e., resonance hybrid of the above three structures.

Official Ans. by NTA (4)

   Ans. (4)

40. Identify the incorrect option from the following:
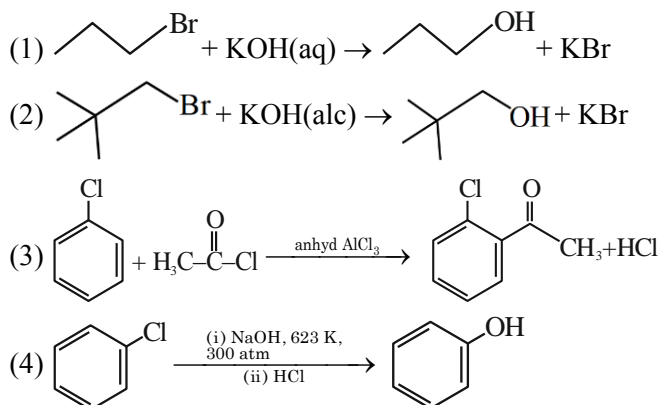
Official Ans. by NTA (2)

   Ans. (2)

41. A solution of $FeCl_3$ when treated with $K_4[Fe(CN)_6]$ gives a prussiun blue precipitate due to the formation of

(1) $K[Fe_2(CN)_6]$

(2) $Fe[Fe(CN)_6]$

(3) $Fe_3[Fe(CN)_6]_2$

(4) $Fe_4[Fe(CN)_6]_3$

Official Ans. by NTA (4)

   Ans. (4)

42. Which of the following are the example of double salt?

(A) $FeSO_4.(NH_4)_2SO_4.6H_2O$

(B) $CuSO_4.4NH_3.H_2O$

(C) $K_2SO_4.Al_2(SO_4)_3.24H_2O$

(D) $Fe(CN)_2.4KCN$

Choose the correct answer.

(1) A and C only

(2) A and B only

(3) A, B and D only

(4) B and D only

Official Ans. by NTA (1)

   Ans. (1)

43. Which of the following complex will show largest splitting of d-orbitals?

(1) $[Fe(C_2O_4)_3]^{3-}$

(2) $[FeF_6]^{3-}$

(3) $[Fe(CN)_6]^{3-}$

(4) $[Fe(NH_3)_6]^{3+}$

Official Ans. by NTA (3)

Allen Ans. (3)

44. How can photochemical smog be controlled?

(1) By using tall chimneys

(2) By complete combustion of fuel

(3) By using catalytic converters in the automobiles/industry

(4) By using catalyst

Official Ans. by NTA (3)

   Ans. (3)

45. Match **List I** with **List II**.

	List I		List II
(A)	Slaked lime	(I)	NaOH
(B)	Dead burnt plaster	(II)	$Ca(OH)_2$
(C)	Caustic soda	(III)	$Na_2CO_3 \cdot 10H_2O$
(D)	Washing soda	(IV)	$CaSO_4$

Choose the correct answer form the options given below:

(1) (A) – I, (B) – IV, (C) – II, (D) – III

(2) (A) – III, (B) – IV, (C) – II, (D) – I

(3) (A) – II, (B) – IV, (C) – I, (D) – III

(4) (A) – III, (B) – II, (C) – IV, (D) – I

Official Ans. by NTA (3)

Ans. (3)

46. Choose the correct statement(s):

A. Beryllium oxide is purely acidic in nature.

B. Beryllium carbonate is kept in the atmosphere of CO_2.

C. Beryllium sulphate is readily soluble in water.

D. Beryllium shows anomalous behavior.

Choose the correct answer from the options given below:

(1) A, B and C only

(2) B, C and D only

(3) A and B only

(4) A only

Official Ans. by NTA (2)

Ans. (2)

47. Given below are two statements: one is labelled as **Assertion A** and the other is labelled as **Reason R**

Assertion A: In an Ellingham diagram, the oxidation of carbon to carbon monoxide shows a negative slope with respect to temperature.

**Reason R:** CO tends to get decomposed at higher temperature.

In the light of the above statements, choose the **correct** answer from the options given below

(1) Both **A** and **R** are correct and **R** is the correct explanation of **A**

(2) **A** is not correct but **R** is correct

(3) Both **A** and **R** are correct but **R** is **NOT** the correct explanation of **A**

(4) **A** is correct but **R** is not correct

Official Ans. by NTA (4)

Ans. (4)

48. But-2-yne is reacted separately with one mole of Hydrogen as shown below:

$$\underline{B} \xleftarrow{\frac{Na}{liq\ NH_3}} CH_3 - \underset{+H_2}{C \equiv C} - CH_3 \xrightarrow[\Delta]{Pd/C} \underline{A}$$
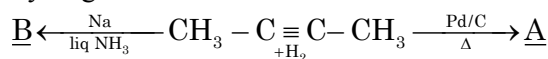
A. A is more soluble than B.

B. The boiling point & melting point of A are higher and lower than B respectively.

C. A is more polar than B because dipole moment of A is zero.

D. Br_2 adds easily to B than A.

Identify the incorrect statements from the options given below :-

(1) B and C only

(2) B, C and D only

(3) A, C and D only

(4) A and B only

Official Ans. by NTA (DROP)

Ans. (Bonus)

49. Given below are two statements: one is labelled as **Assertion A** and the other is labelled as **Reason R**

Assertion A: Hydrogen is an environment friendly fuel.

Reason R: Atomic number of hydrogen is 1 and it is a very light element.

In the light of the above statements, choose the **correct** answer from the options given below

(1) **A** is true but **R** is false

(2) Both **A** and **R** are true but **R** is **NOT** the correct explanation of **A**

(3) **A** is false but **R** is true

(4) Both **A** and **R** are true and **R** is the correct explanation of **A**

Official Ans. by NTA (2)

Ans. (2)

50. Match **List I** and **List II**.

List I	List II
Test	Functional group / Class of Compound
(A) Molisch's Test	(I) Peptide
(B) Biuret Test	(II) Carbohydrate
(C) Carbylamine Test	(III) Primary amine
(D) Schiff s Test	(IV) Aldehyde

Choose the correct answer from the options given below:

(1) (A) – I, (B) – II, (C) – III, (D) – IV

(2) (A) – III, (B) – IV, (C) – I, (D) – II

(3) (A) – II, (B) – I, (C) – III, (D) – IV

(4) (A) – III, (B) – IV, (C) – II, (D) – I

Official Ans. by NTA (3)

Ans. (3)

SECTION-B

51. The density of 3 M solution of NaCl is 1.0 g mL^{-1}. Molality of the solution is _____ $\times 10^{-2}$ m. (Nearest integer).

Given: Molar mass of Na and Cl is 23 and 35.5 g mol^{-1} respectively.

Official Ans. by NTA (364)

   Ans. (364)

52. Electrons in a cathode ray tube have been emitted with a velocity of 1000 ms^{-1}. The number of following statements which is/are <u>true</u> about the emitted radiation is _____ .

   Given : h = 6 × 10^{-34} Js, m$_e$ = 9 × 10^{-31} kg.

   (A) The deBroglie wavelength of the electron emitted is 666.67nm.

   (B) The characteristic of electrons emitted depend upon the material of the electrodes of the cathode ray tube.

   (C) The cathode rays start from cathode and move towards anode.

   (D) The nature of the emitted electrons depends on the nature of the gas present in cathode ray tube.

Official Ans. by NTA (2)

   Ans. (2)

53. Sum of oxidation states of bromine in bromic acid and perbromic acid is _____ .

Official Ans. by NTA (12)

   Ans. (12)

54. At what pH, given half cell MnO_4^- (0.1 M) | Mn^{2+} (0.001 M) will have electrode potential of 1.282 V? _____ (Nearest Integer)

   Given $E^o_{MnO_4^-/Mn^{2+}}$ = 1.54 V, $\dfrac{2.303RT}{F}$ = 0.059V

Official Ans. by NTA (3)

   Ans. (3)

55. Number of isomeric compounds with molecular formula $C_9H_{10}O$ which (i) do not dissolve in NaOH (ii) do not dissolve in HCl. (iii) do not give orange precipitate with 2, 4 – DNP (iv) on hydrogenation give identical compound with molecular formula $C_9H_{12}O$ is _____ .

Official Ans. by NTA (2)

   Ans. (0)

56. (i) X(g) $\rightleftharpoons$ Y(g) + Z(g)   K$_{p1}$ = 3

   (ii) A(g) $\rightleftharpoons$ 2B(g)   K$_{p2}$ = 1

   If the degree of dissociation and initial concentration of both the reactants X(g) and A(g) are equal, then the ratio of the total pressure at equilibrium $\left(\dfrac{p_1}{p_2}\right)$ is equal to x : 1. The value of x is _____ (Nearest integer)
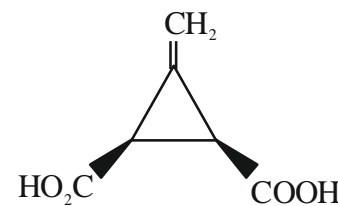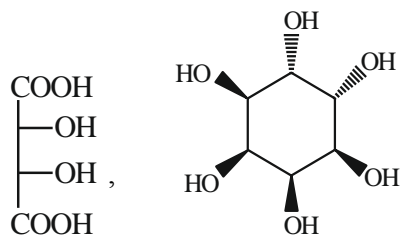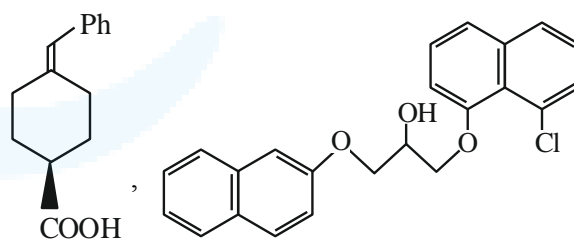
Official Ans. by NTA (12)

   Ans. (12)

57. The total number of chiral compound/s from the following is _____.
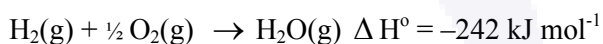

Official Ans. by NTA (2)

   Ans. (2)

58. A and B are two substances undergoing radioactive decay in a container. The half life of A is 15 min and that of B is 5 min. If the initial concentration of B is 4 times that of A and they both start decaying at the same time, how much time will it take for the concentration of both of them to be same? _____ min.
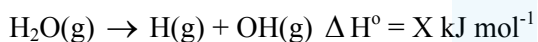
Official Ans. by NTA (15)

Ans. (15)

59. At 25°C, the enthalpy of the following processes are given:

$H_2(g) + O_2(g) \rightarrow 2OH(g)$ $\Delta H^\circ = 78 kJ \, mol^{-1}$

$H_2(g) + \frac{1}{2} O_2(g) \rightarrow H_2O(g)$ $\Delta H^\circ = -242 \, kJ \, mol^{-1}$

$H_2(g) \rightarrow 2H(g)$ $\Delta H^\circ = 436 \, kJ \, mol^{-1}$

$\frac{1}{2} O_2(g) \rightarrow O(g)$ $\Delta H^\circ = 249 \, kJ \, mol^{-1}$

What would be the value of X for the following reaction? _____ (Nearest integer)

$H_2O(g) \rightarrow H(g) + OH(g)$ $\Delta H^\circ = X \, kJ \, mol^{-1}$

Official Ans. by NTA (499)

Ans. (499)

60. 25 mL of an aqueous solution of KCl was found to require 20 mL of 1 M AgNO$_3$ solution when titrated using K$_2$CrO$_4$ as an indicator. What is the depression in freezing point of KCl solution of the given concentration? _____ (Nearest integer).

(Given : $K_f = 2.0 \, K \, kg \, mol^{-1}$)

Assume

1) 100% ionization and

2) density of the aqueous solution as 1 g mL^{-1}

Official Ans. by NTA (3)

Ans. (3)