



Admission No : Class :

- Answer all questions

Universal gas constant $R = 8.314 \text{ JK}^{-1} \text{ mol}^{-1}$

Avagadro constant $N_A = 6.022 \times 10^{23} \text{ mol}^{-1}$

Velocity of light $= 3 \times 10^8 \text{ ms}^{-1}$

Planck's constant $= 6.626 \times 10^{-34} \text{ Js}$

(01) "Energy is quantized or that energy is emitted or absorbed only in integral multiples of discrete units of energy." This was revealed by,

- (1) Max Planck
(4) William Aston

- (2) Neil Bohr
(5) Mosley

- (3) Albert Einstein

(02) "An electron in motion around nucleus can behave like a wave & it possess a wave length." This fact was revealed by.

- (1) Max Planck
(4) Hund

- (2) William Aston
(5) James Chadwick

- (3) Louis de Broglie

(03) What is the wave length (in nm) of an electron revolving around nucleus with a speed $3 \times 10^3 \text{ ms}^{-1}$

Mass of an electron $= 9.1 \times 10^{-28} \text{ g}$

- (1) 364

- (2) 243

- (3) 228

- (4) 334

- (5) 520

(04) The no. of electron in a Cr ($z=24$) atom with quantum number $\ell = 0$ & $m_\ell = -1$ are respectively,

- (1) 8 & 6

- (2) 8 & 5

- (3) 6 & 5

- (4) 7 & 5

- (5) 7 & 6

(05) Element M forms a molecule MCl_4 which is covalent & with zero dipole moment. M belongs to group.

- (1) 13

- (2) 14

- (3) 15

- (4) 14 or 16

- (5) 14 or 18

(06) The No. of unstable lewis structures that can be drawn for CO_2 molecule are.

- (1) 2

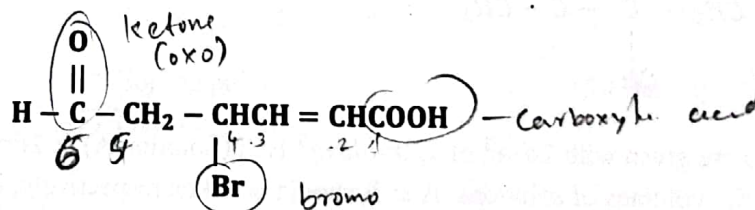
- (2) 3

- (3) 4

- (4) 6

- (5) 7

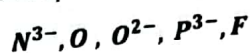
(07)



IUPAC name of above compound is,

- (1) 4-bromo-5-formylpent-2-enoic acid ☒
- (2) 4-bromo-5-formyl-2-pentenoic acid ☒
- (3) 4-bromo-6-oxohex-2-eneoic acid ☒
- (4) 4-bromo-6-oxo-2-hexenoic acid ☒
- (5) 4-bromo-6-oxo-2-hexenoicacid ☒

(08) The correct decreasing order of radius of below species is,



(1) $P^{3-} > N^{3-} > O > F > O^{2-}$

(4) $P^{3-} > N^{3-} > O > O^{2-} > F$

(2) $P^{3-} > N^{3-} > O^{2-} > O > F$
 (5) $P^{3-} > N^{3-} > F > O^{2-} > O$

(3) $N^{3-} > P^{3-} > O^{2-} > O > F$

(09) There are n_1 moles of an ideal gas within a rigid closed vessel at temperature $T_1(K)$ & pressure $P_1(Pa)$. When certain amount of gas is removed from the vessel, temperature & pressure changes to $T_2(K)$ & $P_2(Pa)$ respectively. What is the number of moles of gas remaining in the vessel?

(1) $\frac{T_2 P_2}{n_1 T_1 P_1}$

(2) $\frac{n_1 T_1 P_1}{T_2 P_2}$

(3) $\frac{n_1 T_1 P_2}{T_2 P_1}$

(4) $\frac{n_1 T_1 P_1}{T_2 P_2}$

(5) $\frac{n_1 T_2 P_1}{T_1 P_2}$

(10) In question no. 9 above, if volume of rigid vessel is V & removed number of moles is n_2 , which of the following statement is correct?

(1) $n_2 = n_1 + n_2 - \left(\frac{n_1 P_2 R}{P_1 T_2}\right) \times$

(2) $n_2 = \left(\frac{n_1 P_2}{P_1 T_1}\right) - n_1$

(3) $n_2 = n_1 - \left(\frac{n_1 P_2 R}{P_1 T_1}\right) \times$

(4) $n_2 = \left(\frac{n_1 P_2}{P_1 T_2}\right) - \left(\frac{P_1 V}{RT_1}\right)$

(5) $n_2 = \left(\frac{P_1 V}{RT_1}\right) - \left(\frac{T_2 P_2 n_1}{T_1 P_1}\right)$

(11) Total no. of electron exchanged in a process where 3 moles of ethanol (C_2H_5OH) is oxidized to acetic acid (CH_3COOH) using $K_2Cr_2O_7/H^+$ is,

(1) 6

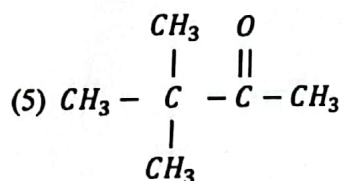
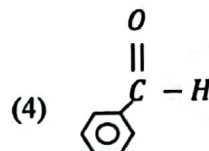
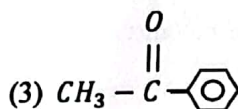
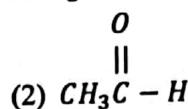
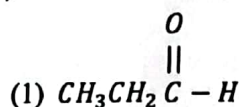
(2) 12

(3) 24

(4) 18

(5) 9

(12) Which of the following do not undergo aldol condensation on treating with $NaOH(aq)$?



(13) You are given with $1dm^3$ of $1.2mol dm^{-3}$ HCl (Solution A) & $1dm^3$ of $0.3mol dm^{-3}$ HCl (Solution B). what are the volumes of solutions A & B should be taken respectively, in order to prepare a HCl solution of $300cm^3$ with concentration $0.6mol dm^{-3}$.

(1) $150cm^3, 150cm^3$

(2) $200cm^3, 100cm^3$

(3) $100cm^3, 200cm^3$

(4) $50cm^3, 250cm^3$

(5) $250cm^3, 50cm^3$

(14) 4g of NaOH was dissolved in water & obtained a solution with, molality $0.1mol kg^{-1}$. Calculate the molarity of this solution ($mol dm^{-3}$)

(density of water = density of solution = $1g cm^{-3}$) ($NaOH = 40g mol^{-1}$)

(1) 0.1

(2) 0.0996

(3) 0.095

(4) 0.1004

(5) 1.0114

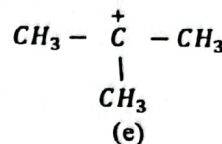
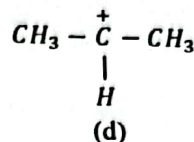
(15) When MO_3^- ion & I^- are reacting together 1 mol of MO_3^- ion is reduced to M^{n+} ion & 6 mols I^- ions are oxidized to I_2 what is the value of n?

- (1) 1 (2) -1 (3) 2 (4) -2 (5) 5

(16) In CH_3COCH_2COOH molecule what are the oxidation numbers of C in CO & COOH groups respectively,

- (1) +4, +4 (2) +3, +4 (3) +3, +2 (4) +2, +2 (5) +2, +3

(17)



The correct order of increasing stability of above carbonations is,

- (1) $a < b < c < d < e$ (2) $e < d < c < a < b$ (3) $c < d < e < a < b$
 (4) $c < d < e < b < a$ (5) $e < c < d < a < b$

(18) Wrong statement on H-bonding,

- (1) Due to H-bonding ice has 9% extra free space than in liquid water.
 (2) During cooling kinetic energy decreases & the no. of H-bonding among water molecules increases.
 (3) H-bonding exist within a solution mixture of water and acetone (CH_3COCH_3)
 (4) H-bonding is a type of strong dipole-dipole interaction.
 (5) Due to formation of intermolecular H-bonding para-nitrophenol has lower boiling point than ortho-nitrophenol.

(19) In a particular $BaSO_4$ solution, mass fraction of $BaSO_4$ is 2.33×10^{-3} . Density of that solution is $1.0 gcm^{-3}$. What is the concentration of $BaSO_4$ in above solution in $mmoldm^{-3}$?

$Ba = 137$

$S = 32$

$O = 16$

- (1) 1 (2) 10 (3) 100 (4) 23.3 (5) 2.33

(20) Incorrect statement of elements of s-block,

- (1) Electro-negativity decreases down the group.
 (2) Forms ionic Hydrides.
 (3) Strength of metallic bonding increases down the group.
 (4) Basicity of oxides increase down the group.
 (5) Thermal stability of carbonates increases down the group.

21) Not an intensive property,

- (1) Refractive index (2) Boiling point (3) Density
 (4) Mass (5) Freezing point

22) Which on the following statement is false?

- (1) $SO_{2(g)}$ reacts with $Mg_{(s)}$ & forms $MgO_{(s)}$ & $S_{(s)}$
 (2) $SO_{2(g)}$ reacts with $Mg_{(s)}$ & forms $MgO_{(s)}$ & $MgS_{(s)}$
 (3) Due to lowest oxidation states H_2S do not act as an oxidizing agent.
 (4) SO_2 reduces Fe^{3+} to Fe^{2+}
 (5) Concentrated H_2SO_4 dehydrate hydrocarbons & it act as strong dehydrating agent.

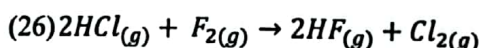
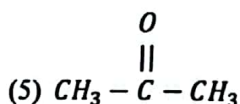
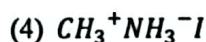
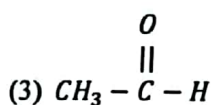
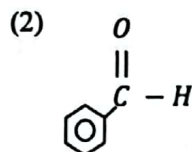
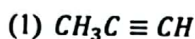
(23) Correct statement on d-block elements.

- (1) The maximum oxidation no. of all d-block elements is equal to sum of 3d & 4s electrons.
- (2) 1st ionization energy of 3d elements is less than 4s elements.
- (3) In d-element the ion with highest oxidation state shows highest electro-negativity.
- (4) The atomic radius of 3d- element decrease from Sc to Zn.
- (5) Sc or Zn do not make coloured ions.

(24) Aqueous solution of metal A is green in colour. When conc. HCl is added to it turns yellow & on addition of conc. NH₃ forms a dark blue colour. A can be,

- (1) Cu²⁺ (2) Ni²⁺ (3) Fe²⁺ (4) Fe³⁺ (5) Co²⁺

(25) Which of the following do not react with ammoniacal AgNO₃.



The standard enthalpy change for above reaction is -356.2 kJmol⁻¹. The standard enthalpy of formation for HF_(g) is -263.3 kJmol⁻¹.

What is the standard enthalpy of formation for HCl_(g)

- (1) 82.9 (2) -82.9 (3) 170.4 (4) -85.2 (5) 85.2

(27) A sample mixture with a mass 70.75g contains only AgBr & AgCl. A stream of Cl_{2(g)} is passed through it at a high temperature & converted it completely to AgCl. mass of the sample got decreased by 13.35g. what is the mass % of AgBr in initial sample?

Ag = 108

Cl = 35.5

Br = 80

- (1) 79.7 (2) 20.3 (3) 46.4 (4) 53.6 (5) 82.6

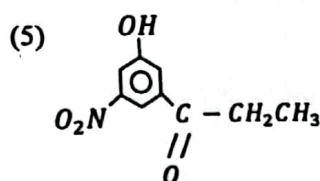
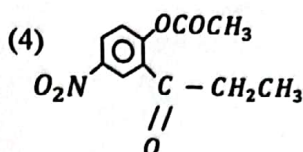
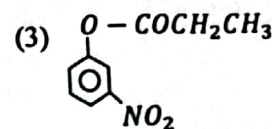
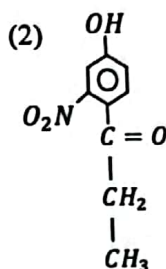
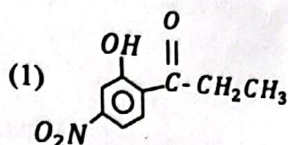
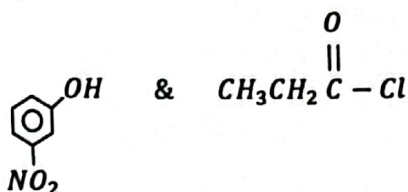
(28) Select the incorrect statement out of the following.

- (1) The first electron affinity of Mg is positive.
- (2) The second electron affinity of Mg is positive.
- (3) SbCl_{3(aq)} on dilution with water forms a white precipitate.
- (4) The effective nuclear charge felt by valence electrons of Be is less than 4
- (5) Across the second period ionic radius decreased.

(29) Wrong statement about a reaction between an alkene & HBr is,

- (1) It is an electrophilic addition reaction.
- (2) The polarity of HBr contributes to it's effectivity.
- (3) One of the step is nucleophilic addition.
- (4) May give two products as major & minor.
- (5) An asymmetric alkene always gives an asymmetric carbocation.

Q.0) Which one of the following will be produced by reaction between,



From question no. 31 to 40 four statements are given as (a), (b), (c), & (d) select the correct option as given below.

(1) Statements a & b are correct.

(2) Statements b & c are correct.

(3) Statements c & d are correct.

(4) Statements a & d are correct.

(5) Any other number of combination is/are correct.

(31) correct statement on reaction of alkyl halides with $\text{CH}_3\text{CH}_2\text{OH}/\text{Na}$

a) Nucleophilic substitution reaction.

b) Primary alkyl halides react in single step.

c) Tertiary alkyl halides react slowly in two steps.

d) Alkoxide ion acts as an electrophile.

(32) Correct statement on 4-bromo-2-pentene.

a) Shows diastereomerism

b) Shows enantiomerism

c) Total no. of isomers is 4

d) 4 stereoisomers present

(33) Complex $\text{K}_4\text{FeC}_6\text{N}_6$ is converted to complex compound $\text{K}_3\text{FeC}_5\text{H}_2\text{N}_5\text{O}$. Correct statement on above conversion is,

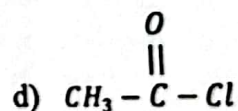
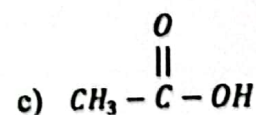
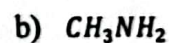
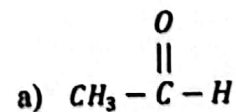
a) Oxidation number of Fe changes.

b) Coordination number changes.

c) One ligand is removed & another ligand is coordinated.

d) In both CN^- act as a ligand.

(34) Which of the following would give an alkane with Grignard reagent.



(35) True statement on mechanism of nitration of benzene is,

- a) H_2SO_4 act a dehydrating agent.
 b) Electrophilic addition reaction.
 c) HSO_4^- ion acts as a lewis acid.
 d) NO_2^+ ion act an electrophile.

(36) Which of the following is/are acid oxide/s?

- a) CrO_3
 b) Mn_2O_7
 c) Mn_2O_3
 d) CrO

(37) Suitable method to synthesis NH_3 is by,

- a) Reacting KNO_3 with Zn & $NaOH$
 b) Reacting KNO_3 with Al powder & $NaOH$
 c) Adding $NaOH$ to NH_4NO_2
 d) Heating NH_4NO_3

(38) True statement on Zn^{2+} ion is,

- a) Gives a permanent precipitate with NH_3
 b) Gives a permanent precipitate with $NaOH$
 c) Oxide is yellow in colour when heated.
 d) Forms a complex compound with 4 NH_3 molecules.

(39) Correct statement about ideal gases.

- a) At some pressure & temperature volume of 1 mol of a gas is constant.
 b) Pressure of a constant mass of gas is inversely proportional to volume.
 c) Volume of a constant mass of gas is directly proportional to temperature.
 d) With the increase in temperature inter molecular interaction becomes much weaker.

(40) Ions which gives a green colour in aqueous solutions.

- a) Fe^{2+}
 b) Ni^{2+}
 c) Cu^+
 d) MnO_4^-

• From question no. 41-50 two statements are given. Select the correct option as given instructions below.

- (1) Statement I & II are correct. Statement II explains I.
 (2) Statement I & II are correct. Statement II do not explains I.
 (3) Statement I is true. Statement II is false.
 (4) Statement I is false statement II is true.
 (5) Statement I & II are false.

Statement I	Statement II
(41) During alkylation of Benzene primary & secondary alkyl halides reacts as a carbocation. ☒	Primary alkyl halides on alkylation of benzene react as a polarized molecule. ☒
(42) During nucleophilic substitution reactions primary alkyl halides react in single step & tertiary halides react in two steps. ☒	The rate of nucleophilic substitution reaction of tertiary alcohols is less than primary alcohols. ☒
(43) Cl_2 in the presence of cold dil $NaOH$ produce $NaCl$ & $NaOCl$ ☒	Cl_2 with $NaOH$ undergoes disproportionation reaction. ☒
(44) Two solutions containing Zn^{2+} & Cd^{2+} can be differentiated using $NaOH$. ☒	Aqueous Zn^{2+} is colourless but Cd^{2+} aqueous solution is coloured. ☒
(45) Electronegativity of N in NH_4^+ is less than that in NH_2^- ☒	Electronegativity of an atom within a molecule depends on hybridization. ☒
(46) $AlCl_3$ dimerizes as Al_2Cl_6 in gaseous form. ☒	$AlCl_3$ is a lewis acid. ☒
(47) Aniline is more basic than all amines. ☒	High electron density within benzene increases electron density of N in aniline. ☒
(48) Melting point of SbH_3 is higher than NH_3 ☒	The molecular mass & surface area of SbH_3 is considerably higher than that of NH_3 ☒
(49) 1 mol of $SO_{2(g)}$ at temperature 273K & 1 atm pressure has zero entropy. ☒	At standard conditions any compound has zero entropy. ☒
(50) To be protected from covid - 19 virus hand sanitizer can be used easily any where than soap & water. ☒	The isopropyl alcohol in hand sanitizer gives anti-germ character & glycerine gives lubricant nature in hand - sanitizer. ☒