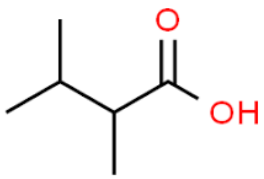
INDIAN SCHOOL AL WADI AL KABIR

FINAL EXAMINATION (2023-24)
Sub: Chemistry (043)
SET-II -MS

Date: 29.02.2024 **Max. Marks: 70**
Class: XI **Time Allowed: 3 hours**

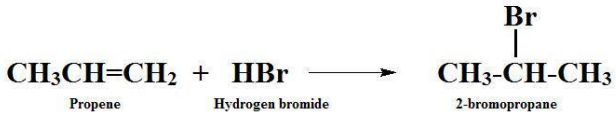
1.	c) multiple proportion	1
2.	(c)0.125 mol	1
3.	(b) 3	1
4.	a) F	1
5.	c) covalent bonds involving H, N, or O	1
6.	c) Open system	1
7.	(a) the rates of the forward and reverse reactions are equal.	1
8.	(a) the ratio of product concentrations to reactant concentrations at equilibrium.	1
9.	(a) transfer of electrons between atoms or ions.	1
10.	a) loses electrons and is oxidised.	1
11	(c) hyperconjugation effect	1
12	(b) But-1-ene	1
13.	A If both Assertion & Reason are true and the reason is the correct explanation of the assertion.	1
14	A If both Assertion & Reason are true and the reason is the correct explanation of the assertion.	1
15.	D If Assertion is false but Reason is true	1

16.	A If both Assertion & Reason are true and the reason is the correct explanation of the assertion.	1
17.	The percentage of Carbon :24.0 g/mol÷ 46.0 g/mol ×100 = 52.2 % of Carbon The percentage of Hydrogen :6.0 g/mol ÷46.0 g/mol ×100 = 13.0 % OR $C = 54.5\ 54/12 = 4.54\ 4.54/2.27 = 2$ $H = 9.1\ 9.1/1 = 9.1\ 9.1/2.27 = 4$ $O = 36.4\ 36.4/16 = 2.27\ 2.27/2.27 = 1$ C_2H_4O	1 1 1 1
18	Size of an atom or effective nuclear charge Explanation using Na and Mg	½ +½ 1
19.	Qc = $[HBr]^2/[H_2][Br_2]=2.25x10^4$ As Qc i s greater than Kc the reaction will shift in the reverse direction.	1 1
20	Heterolytic fission resulting in the electrons shifted to Carbon making a carbanion	1 1
21.	(a) Alkanes contain only carbon-carbon and carbon-hydrogen bonds. Because carbon and hydrogen have similar electronegativity values, the C—H bonds are essentially nonpolar. (b) As the branching increases boiling point reduces OR (a) A- Eclipsed form B- Staggered form (b) Staggered form more stable because torsional strain less	1 1 ½ +½ ½ +½
22.	Section C (a) Limiting reagent is the one that limits the formation of products (b) Mg is the limiting reagent (c) 5 Mg —-----> 5MgO = 200 g MgO	 1 1 1
23	(a) Heisenberg's uncertainty principle states that it is impossible to measure exactly both the position and the momentum of an object simultaneously (b) λ= h/mv = $6.626x10^{-34}/0.1 \times 30 = 2.212x10^{-34}$ m	1 1

	OR (a) angular nodes = 1 radial nodes = 0 (b) E= 2.18×10^{-18} [1 - 1/25) $=2.09\times10^{-18}$ J	1 ½ +½ 2
24.	(a) Noble gases have stable electronic configuration. Hence to add an electron the energy has to be provided (b) Because the atomic size increases on moving down the group and hence the ionisation energy decreases (c) Nitrogen has half-filled electronic configuration hence stable	1 1 1
25.	(a) if the atoms have significantly different electronegativities (b) CO_2 and CCl_4 opposite dipoles get cancelled or symmetrical molecule	(1) x3
26.	(a) Δ G= ΔH-TΔS The reaction will be spontaneous when Δ G is negative ΔH -ve and ΔS +ve means Δ G will be always -ve for any temperature (b) Mass, Volume, internal energy - extensive Pressure - intensive	1 ½ x4 =2
27.	(a) $6\ H^+ + 5NO_2^- + 2MnO_4^- \rightarrow 5NO_3^- + 2\ Mn^{2+} + 3H_2O$ (b) (i) Fe(ll)O (ii) $Sn(II)Cl_2$	2 ½ + ½
28	(a) (i) H^+ electrophile (ii) NH_3 nucleophile (iii) BF_3 electrophile (iv) OH^- nucleophile  (b) (c) 1-chloro-2-methylpropane	½ x4 =2 ½ ½
29.	(a) n=3, l = 0 (b) 9 (c) $1\ s^2\ 2\ s^2\ 2\ p^6\ 3\ s^2\ 3\ p^6\ 4\ s^1\ 3\ d^5$. OR (c) 7 electrons	1 1 2 2
30	(a) 0 (b) Δ G= -2.303RT logKc = -2.303x8.3x300=-5734.47J (c) $2\ CO_2 + 3\ H_2O$ - Δ Hf (C_2H_6) =-700KJ/mol Δ Hf (C_2H_6) = -920 KJ/mol OR (c) Now ΔU= ΔH - ΔngRT	1 ½ ½ 1 1 1 ½

	$\Delta ng = 2 - 4 = -2$ $-93 \times 10^3 - (-2) \times 8.314 \times 300$ $= -88011.6$ J	½
31	(a) I - H_2 gas yield increases II- H_2 gas yield decreases III- no change (b) I -Kc increases II remains the same III remains the same (c) A homogeneous equilibrium is one in which all species are present in the same phase. Any relevant Example (d) HF < HCl < HBr < HI OR (a) $pH = -\log[H+] = -\log 10^{-1} = 1$ (b) A solution whose pH is not altered to any great extent by the addition of small quantities of either an acid or base is called buffer solution. Acidic buffer - Sodium ethanoate + Ethanoic acid (c) conjugate acid, H_3O^+, OH- conjugate base (d) (I) solubility decreases (II) Ag^+ concentration decreases. (e) Henry's law states that at the amount of gas that is dissolved in a liquid is directly proportional to the partial pressure of that gas above the liquid when the temperature is kept constant	½ x3 = 1.5 ½ x3 = 1.5 ½ ½ 1 1 ½ +½ ½ +½ ½ ½ 1
32.	(a) 5 σ and 2 π bonds. (b) 0 (c) $: C \equiv O :$ (d) the size of Lithium-ion is much smaller than the size of Sodium ion (e) Sigma bond is formed by linear or co-axial overlapping of the atomic orbitals of two atoms while pi bonds are formed by the parallel or lateral overlapping of the atomic orbitals. (f) Trigonal pyramidal ;107^0 (g) failed to explain the relative stability of molecules. The shape of the molecule is not predicted by the octet rule.	1x5=5

33.

a. 

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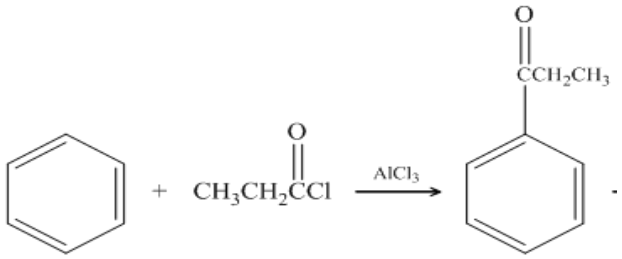
b. $2CH_3CH_2 + 2Na \xrightarrow{Dryether} CH_3\text{-}CH_2\text{-}CH_2\text{-}CH_3 + 2NaBr$

2

c. 

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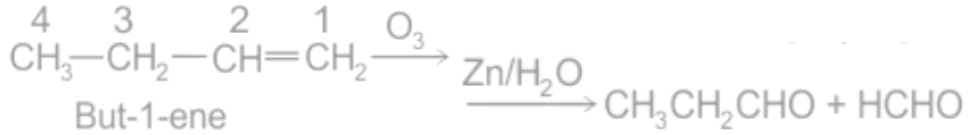
(ii) 

1

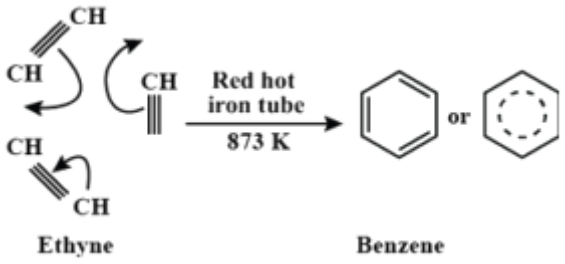
OR

2

(a)

i) $C_2H_5COONa(s) + NaOH(s) \xrightarrow{CaO\ /300^0C} Na_2CO_3(s) + C_2H_6(g)$

Sodium propionate — Sodium hydroxide — Sodium carbonate — Ethane

(ii) 

b. $CH_3 - CH = CH_2 + HBr \xrightarrow{peroxide} CH_2CH_2CH_2Br$

c. Toluene adds electron density to the ring making electrophilic substitution easier

d.Trans-But-2-ene has a high packing strength due to its symmetric shape