+3 set 1

1. Vaska's complex is

A. six coordinate with Ir(III)	B. four coordinate with Ir(I)
C. four coordinate with Rh(I)	D. four coordinate with Rh(III)

2. In diborane the B-H-B angles are about

A. 100°	B. 90°
C. 93°	D. 83°

3. In a commercial preparation dry heating of Na_2CO_3 with urea gives

A. NaCN, CO_2 and NH_3	B. NaOCN, CO_2 and NH_3
C. NaCN, CH_4 and NO_2	D. NaOCN, CO and N_2H_4

4. Arrange the following Lewis acids in the order of increasing softness

Cu^+, Au^+, Ag^+ and K^+

A. $Au^+<K^+<Ag^+<Cu^+$	B. $K^+<Ag^+<Au^+<Cu^+$
C. $K^+<Ag^+<Cu^+<Au^+$	D. $K^+<Cu^+<Ag^+<Au^+$

5. Electronic configuration of the central metal ion in the compound $[W(CO)_6]$ is

A. d^5, t_{2g}^5, S=1/2	B. d^6, t_{2g}^6, S=0
C. d^4, t_{2g}^4, S=1	D. d^6, $t_{2g}^4e_g^2$, S=2

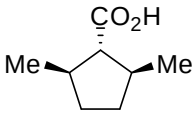
6. A solution of (-)-2-chloro-2-phenylethane in toluene racemises slowly in the presence of small amount of $SbCl_5$, due to the formation of

A. Carbanion	B. Carbene
C. Free radical	D. Carbocation

7. Which of the following alcohol will react faster with Lucas reagent at room temperature is

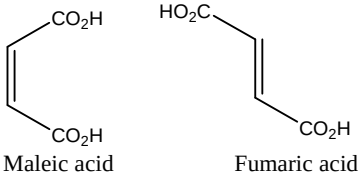
A. Butan-1-ol	B. Butan-2-ol
C. 2-Methylpropan-1-ol	D. 2-Methylpropan-2-ol

8. Which of the following statement is true about this molecule?



A. Chiral	B. Achiral due to presence of plane of symmetry
C. It is racemic	D. Chiral but optically inactive

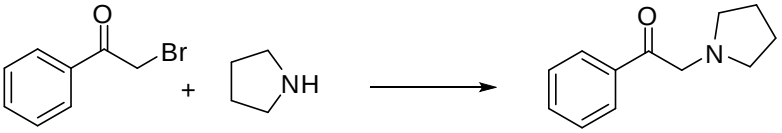
9. Which of the following statement is true about maleic acid and fumaric acid?



Maleic acid Fumaric acid

A. Maleate mono anion is much more stabilized than fumarate mono anion.	B. Fumarate mono anion is much more stabilized than maleate mono anion.
C. Both the mono anions have same stability.	D. None of the above is true

10. The following reaction follows a



A. S_N1 pathway	B. S_N2 pathway
C. Mixed S_N1 and S_N2 pathway	D. None

11. A vapor at 39 atm and 25 °C was allowed to expand adiabatically to a final pressure of 1.00 atm through a porous wall. Calculate the final temperature. The Joule–Thomson coefficient, μ, at 25°C is 0.32 K atm^{-1}; assume that it remains constant over this temperature range.

A. 13 °C	B. 18 °C
C. 28 °C	D. 30 °C

12. Which one of the following is an extensive quantity?

A. density	B. Heat capacity
C. pressure	D. specific heat capacity

13. In the gas-phase reaction A + B $\rightleftharpoons$ 2C + 3D, it was found that when 15.0 mol A, 18.0 mol B, were mixed and allowed to come to equilibrium at 600 K, the resulting mixture contained 10 mol C at a total pressure of 1 bar. What is the value of K^0_p at 600 K

A. 0.023	B. 0.037
C. 1.500	D. 0.500

14. Given: E° (Ag^+/Ag) = 0.8 V at 298 K and E° (Zn^{+2}/Zn) = - 0.76 V at 298 K . An $AgNO_3$ solution containing a silver electrode is connected by means of a salt bridge to a $ZnCl_2$ solution containing a zinc electrode. Find the correct answer for the constructed cell at 298 K.

A. Ag (anode), Zn (cathode), flow of electrons Ag→ Zn	B. Zn (anode), Ag (cathode), flow of electrons Ag → Zn
C. Zn (anode), Ag (cathode), flow of electrons Zn → Ag	D. Ag (anode), Zn (cathode), flow of electrons Zn → Ag

15. Given the reactions (a) and (b) below, determine ΔH^o_r for reaction (c) at 298 K.

(a) $H_2(g) + Br_2(l) \rightarrow 2\ HBr(g)$ $\Delta H^o_r = -72.80\ kJ\ mol^{-1}$ at 298 K
(b) $2\ H_2(g) + O_2(g) \rightarrow 2\ H_2O(g)$ $\Delta H^o_r = -483.64\ kJ\ mol^{-1}$ at 298 K
(c) $4\ HBr(g) + O_2(g) \rightarrow 2\ Br_2(l) + 2\ H_2O(g)$

A. $-338\ kJ\ mol^{-1}$	B. $338\ kJ\ mol^{-1}$
C. $243\ kJ\ mol^{-1}$	D. $-243\ kJ\ mol^{-1}$

Key:

Q. no.	Answer
1	B
2	D
3	B
4	D
5	B
6	D
7	D
8	B
9	A
10	B
11	A
12	B
13	A
14	C
15	A