



The Jammu & Kashmir State Board of School Education
Behari Colony, Jammu

Class XI Chemistry

Time: 3 Hours

Total Marks: 70

General Instructions

1. All questions are compulsory
2. Question nos. 1 to 5 are very short answer questions and carry 1 mark each.
3. Question nos. 6 to 12 are short answer questions and carry 2 marks each.
4. Question nos. 13 to 24 are also short answer questions and carry 3 marks each
5. Question nos. 25 to 27 are long answer questions and carry 5 marks each
6. Use log tables if necessary, use of calculators is not allowed.

Q. 1 Write the formula of the compound Nickel (II) sulphate? [1]

Q. 2 The following reaction is an example of a [1]



- i) Displacement reaction
 - ii) Combination reaction
 - iii) Redox reaction
 - iv) Neutralisation reaction
- (a) (i) and (iv) (b) (ii) and (iii)
(c) (i) and (iii) (d) (iii) and (iv)

Q. 3 Give the values for principal quantum number and magnetic quantum number for 19th electron of K (Potassium). [1]

Q. 4 What shapes are associated with sp^3d and sp^3d^2 hybrid orbitals? [1]

Q. 5 $2A(\text{g}) + B(\text{g}) \longrightarrow 4C(\text{g}) + \text{Heat}$ [1]

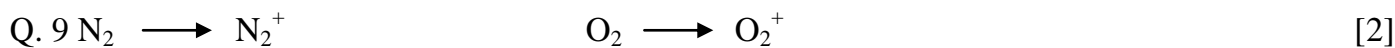
What is the effect of adding Heat at constant volume on above equilibrium?

Q. 6 Which of the following has largest size? Mg, Mg^{2+} , Al^{3+} , Al [2]

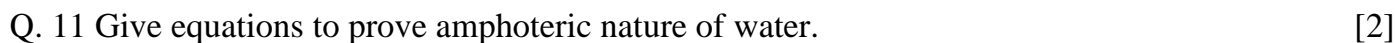
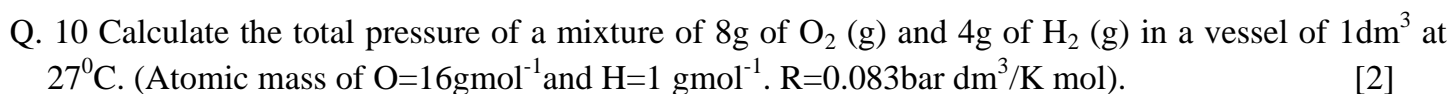
Q. 7 Give IUPAC name and symbol of element with atomic number 110 and 115. [2]

Q. 8 Give reasons: [2]

- (i) Anhydrous AlCl_3 is covalent but hydrated AlCl_3 is electrovalent. Explain
- (ii) Boric acid behaves as Lewis acid? Explain



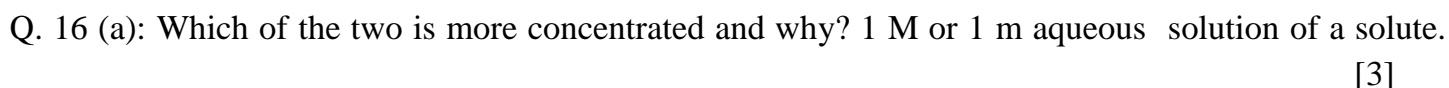
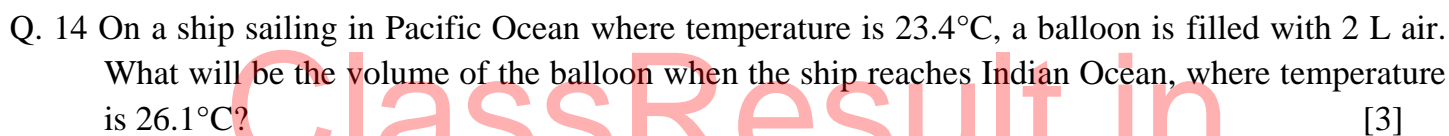
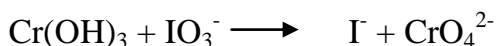
Why is there an increase in bond order in going from O_2 to O_2^+ while a decrease in going from N_2 to N_2^+ ?



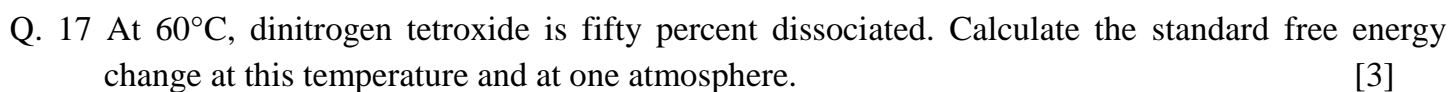
OR

Arrange benzene, hexane and ethyne in decreasing order of acidic behavior.

Also give reasons for this behaviour.



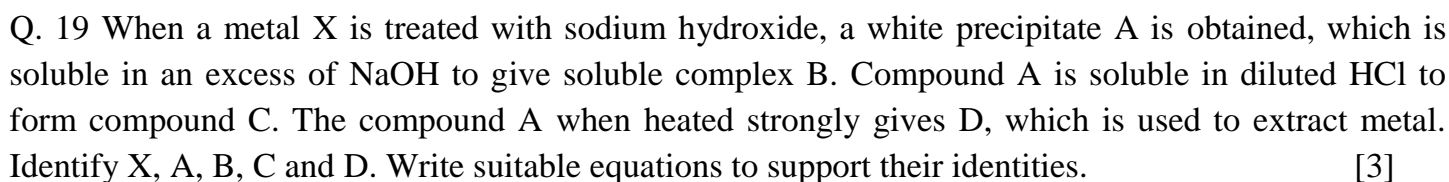
(b) Calculate the total number of molecules of methane present in 1.6 g?



(i) Ethanol and Methoxy methane

(ii) o-cresol and m-cresol

(iii) Pentan-3-one and pentan-2-one



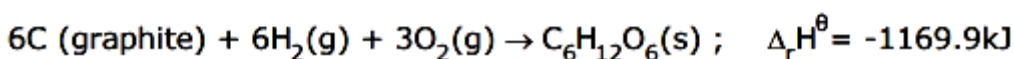
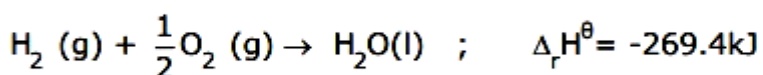
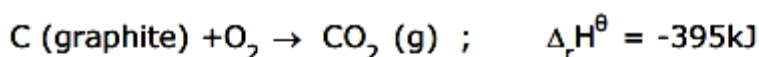
Q. 20 Calculate the energy associated with the first orbit of He^+ . What is the radius of this orbit? [3]

Q. 21 Rashmi and Rekha are doing a research on the people working with coal tar. According to the report prepared by them, people who work under prolonged exposure to coal tar suffers from skin cancer and asks the authorities to vacant the factories. [3]

(a) What is the reason behind the people getting infected with skin cancer?

(b) What values are associated with it?

Q. 22 Calculate the enthalpy of combustion of glucose from the following data [3]



Q. 23 [3]

(a) Fish do not grow as well in warm water as in cold water. Why?

(b) Why does rain water normally have a pH about 5.6?

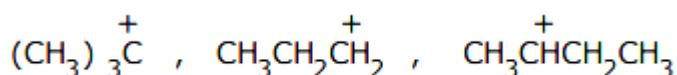
(c) Name two major greenhouse gases.

Q. 24 0.2325g of an organic compound was analysed for nitrogen by Duma's method. 31.7mL of moist nitrogen was collected at 25°C and 755.8mm Hg pressure. Calculate the percentage of N in the sample. (Aq. Tension of water at 25°C is 23.8mm). [3]

OR

(a) Why cannot sulphuric acid be used to acidify sodium extract for testing S using lead acetate solution?

(b) Which of the carbocations is most stable and why?



(c) Why does a liquid vaporize below its boiling point in steam distillation process?

Q. 25 [5]

(a) Convert:

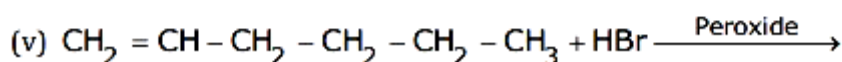
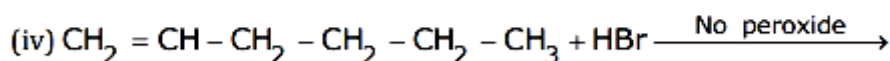
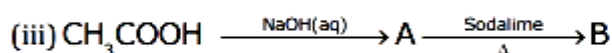
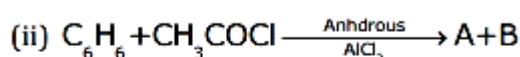
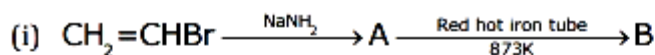
(i) Propene to propane-1,2-diol

(ii) Isopropylbromide to n-propylbromide

- (b) An alkene on ozonolysis gives butan-2-one and 2-methylpropanal. Give the structure and IUPAC name of Alkene. What products will be obtained when it is treated with hot, concentrated KMnO_4 ?

OR

Complete the equations:



- Q. 26 Calculate the pH of a 0.10M ammonia solution. Calculate the pH after 50.0 mL of this solution if treated with 25.0 mL of 0.10M HCl. The dissociation constant of ammonia, $K_b = 1.77 \times 10^{-5}$.

[5]

OR

Calculate the pH of the resultant mixtures:

10mL of 0.2M $\text{Ca}(\text{OH})_2$ + 25 mL of 0.1 M HCl

- Q. 27 Give reasons for the following

[5]

- Unlike Na_2CO_3 , K_2CO_3 cannot be prepared by Solvay process. Why?
- Why are alkali metals not found in nature?
- Sodium is less reactive than potassium, why?
- Alkali metals are good reducing agents, Why?
- Alkali metals are paramagnetic but their salts are diamagnetic. Why?

OR

Complete the following reactions:

- Why does the solubility of alkaline earth metal carbonates and sulphates in water decrease down the group?
- Arrange the following alkali metal ions in decreasing order of their mobility:
 Li^+ , Na^+ , K^+ , Rb^+ , Cs^+ . Explain
- NaOH is a stronger base than LiOH . Explain
- Why are alkali metals kept in paraffin or kerosene ?
- Why does lithium show properties uncommon to the rest of the alkali metals?