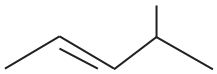
SRI BHAGAWAN MAHAVEER JAIN COLLEGE Vishweshwarapuram, Bangalore. **Mock Question Paper** – January 2020	**Course:** I year PUC **Subject:** Chemistry **Max. Marks:** 70 **Duration:** 3:15

Instructions:
(A) The question paper has five parts A,B, C, D_4 and D_5
(B) In Part A, each question carries one mark, In Part B, each question carries two marks, In Part C, each question carries three marks, In part D_4 and D_5 each question carries five marks.
(C) Write balanced chemical equations and draw neat labelled diagram wherever necessary.

PART-A

I **Answer ALL the following questions:** **1 x 10 = 10**

1 Define mole.
2 Write ideal gas equation for 'n' moles of a gas.
3 Calculate the pH of 0.1M CH_3COOH.
4 State Modern periodic law.
5 Which metal can displace hydrogen from dilute acids from the following data.
$E^o_{Zn/Zn^{+2}} = -0.76V$, $E^o_{Cu/Cu^{+2}} = 0.34V$.
6 Name the gas liberated when sodium metal reacts with water.
7 Give an example for zeolite.
8 Complete the following equation:
$HCOOH \xrightarrow[373K]{conc H_2SO_4} \_\_\_\_\_ + \_\_\_\_\_$
9 Write the IUPAC name of 
10 Name the organic product obtained when sodium benzoate is treated with sodalime.

PART-B

II **Answer any FIVE of the following:** **2 x 5 = 10**

11 Mention any two postulates of Dalton's atomic theory.
12 Write the mathematical expression for compressibility factor, explain the terms involved. What is the value of compressibility factor for an ideal gas?
13 Explain the structure of ammonia molecule on the basis of VSEPR theory.
14 Give the reactions involved in preparation of Caustic soda by Castner Kellner cell.
15 Give any two differences between diamond and graphite.
16 Explain alkylation of benzene by Friedal Craft's reaction with an example.
17 Explain ozonolysis reaction of alkenes with an example.
18 How is "ozone layer" formed in the stratosphere? Name a chief chemical that causes its depletion.

PART-C

III **Answer any FIVE of the following:** **3 x 5 = 15**

19 What are isoelectronic species? Arrange the following in the increasing order of their ionic radius : N^{-3}, Mg^{+2}, Na^{+}, O^{-2}. **3M**
20 Calculate the formal charge on each oxygen atom in ozone molecule. **3M**
21 a) The dipole moment of BF_3 is zero. Explain. **2M**
b) Give an example for intramolecular hydrogen bonding. **1M**
22 a) Mention any two limitations of octet rule. **2M**
b) Between lithium iodide and lithium chloride, which one is more acidic? **1M**
23 Balance the redox reaction by oxidation number method.
$MnO^-_{4(aq)} + Br^-_{(aq)} \rightarrow MnO_{2(s)} + BrO^-_{3(aq)}$ (Basic medium) **3M**
24 Complete the following reactions:
(i) $C_{(s)} + H_2O_{(g)} \xrightarrow{\Delta}$ **1M**
(ii) $CO_{(g)} + H_2O_{(g)} \xrightarrow{\Delta}$. **1M**
(iii) $Zn_{(s)} + 2H^+_{(aq)} \rightarrow$ **1M**

25 a) What is Plaster of Paris? How is it obtained. **2M**
b) What is dead burnt plaster? **1M**
26 a) How is diborane prepared in the laboratory? **2M**
b) Graphite is a good conductor of electricity. Give reason **1M**

PART-D_4

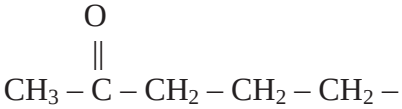
IV Answer any FIVE of the following: **5 x 5 = 25**

27 a) The density of 3M solution of NaCl is 1.25g/mol. Calculate molality of the solution. **2M**
b) A jug contains 2L of milk. Calculate the volume of milk in m^3. **2M**
c) Give an example for heterogenous mixture. **1M**
28 a) Write any two postulates of Rutherford's nuclear model of an atom. **2M**
b) A 100 watt bulb emits monochromatic light of wavelength 400 nm. Calculate the number of photons emitted per second by the bulb. **3M**
29 a) A golf ball has a mass of 40g, and a speed of 45m/s. If the speed can be measured with in accuracy of 2%, calculate the uncertainity in the position. **3M**
b) Name the orbital when n = 3 and l = 2. **1M**
c) Draw the shape of $2p_z$ orbital. **1M**
30 a) What is an isotherm? Draw PV versus P isotherm for an ideal gas. **2M**
b) Explain why:-
(i) Water has a higher vapour pressure than mercury. **1M**
(ii) The gases are highly compressible. **1M**
(iii) Real gases approach ideal behaviour at low pressures and high temperatures. **1M**
31 a) State first law of thermodynamics and give its mathematical form. **2M**
b) Derive the relation between C_p and C_v for an ideal gas. **2M**
c) Define adiabatic process. **1M**
32 a) Find out the value of equilibrium constant for the following reaction at 298K.
$2NH_{3(g)} + CO_{2(g)} \rightleftharpoons NH_2CONH_{2(aq)} + H_2O_{(l)}$. Standard Gibb's energy change ΔG° at the given temperature is -13.6kJ/mol (Given, R = 8.314 JK^{-1} mol^{-1}). **3M**
b) Calculate ΔH at 298K for the reaction
$\frac{1}{2}N_{2(g)} + \frac{3}{2}H_{2(g)} \rightarrow NH_{3(g)}$, given that ΔH for the formation of NH_3 has a value of -46.0kJ/mol (Given, R = 8.314JK^{-1} mol^{-1}). **2M**
33 a) Arrange the following in the increasing order of acid strength.
HF, NH_3, CH_4, H_2O. **1M**
b) What are lewis acids? Give an example. **2M**
c) What is the effect of temperature on the equilibrium?
$2NO_{2(g)} \rightleftharpoons N_2O_{4(g)}$; ΔH=-57.2kJ **2M**
34 a) For the equilibrium,
$2NOCl_{(g)} \rightleftharpoons 2NO_{(g)} + Cl_{2(g)}$, the value of the equilibrium constant, K_C is 3.75 x 10^{-6} at 1069 K. Calculate K_P for the reaction at this temperature. **2M**
b) Derive the ionic product of water and give its value at 25°C. **3M**

PART-D_5

V Answer any TWO of the following: **5 x 2 = 10**

35 a) With neat labelled diagram, describe the estimation of nitrogen by Dumas method. **3M**
b) Write any two differences between inductive and electromeric effect. **2M**
36 a) How do you detect nitrogen by Lassaigne's reagent? **2M**
b) A liquid has three components. Which technique is suitable to separate them? **1M**
c) Give an example for neutral nucleophile. **1M**
d) Give the IUPAC nomenclature of



1M
37 a) Explain Kolbe's reaction with a suitable example. **2M**
b) Explain the mechanism of chlorination of methane. **3M**

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