

Half-Yearly Examination - 2018

CHEMISTRY

Time : 2.30 hrs.

Max. Marks : 70

Instructions : 1) Check the question paper for fairness of Printing. If there is any lack of fairness, inform the Hall Supervisor immediately. 2) Use Blue Or Black Ink to write and underlined and Pencil to draw diagrams. Note : Draw diagrams and write equations wherever necessary.

SECTION - I

Note : i) Answer all the questions.

15 x 1 = 15

ii) Choose the most suitable answers from the given four alternatives and write the options code and the corresponding answer.

- 7.5 g of a gas occupies a volume of 5.6 litres at 0°C and 1 atm pressure. The gas is
a) NO b) N₂O c) CO d) CO₂
- Match the List I and List II correctly by using the code given below :

List - I				List - II			
A) 4s orbital				1. Rutherford's experiment			
B) 3d ⁵				2. 3 nodal planes			
C) Limitation of Bohr theory				3. Partially filled orbital			
D) Existence of nucleus				4. Multi electron atom			
A B C D	A B C D	A B C D	A B C D				
a) 1 2 3 4	b) 2 3 4 1	c) 4 3 2 1	d) 2 4 1 3				
- The energy of light of wavelength 45 nm is
a) 6.67 x 10¹⁶ g b) 6.67 x 10¹¹ g b) 4.42 x 10⁻¹⁸ J d) 4.42 x 10⁻¹⁵ J
- In the third period, the first ionisation potential is in the order
a) Na > Al > Mg > Si > P b) Na < Al < Mg < Si < P c) Mg > Na > Si > P > Al d) Na < Al < Mg < P < Si
- Water is a/an a) basic oxide b) acidic oxide c) amphoteric oxide d) none of these
- The product obtained as a result of a reaction of nitrogen with CaC₂ is
a) Ca(CN₂) b) CaN₂ c) Ca(CN)₂ d) Ca₃N₂
- If the pressure of the gas in a 10L container is 5 atm, then the pressure of the same gas in 15L container
a) 15 atm b) 10 atm c) 7.5 atm d) 3.25 atm
- Which of the following statement/s is/are correct?
a) Molar heat of vaporization is an intensive property b) Formation of ice is an exothermic process
c) Lattice energy decides the stability of ionic compounds d) At absolute zero entropy is positive
a) 1, 3, 4 b) 4 only c) 1, 2, 3 d) 2 and 3
- The initial and final temperatures of a heat engine are 816°C and 21°C respectively. The percentage efficiency is
a) 73% b) 23% c) 45% d) 37%
- An equilibrium constant of 3.2 x 10⁻⁶ for a reaction means, the equilibrium is
a) Largely towards forward reaction b) Largely towards reverse reaction c) Never established d) none of these
- Which of the binary mixtures exhibits positive deviation from Raoult's law?
a) Acetone + Chloroform b) Water + Nitric acid c) HCl + Water d) Ethanol + Water
- In an organic compound, phosphorous is estimated as
a) Mg₂OP₂O₇ b) Mg₃(PO₄)₂ c) (NH₄)₃PO₄ · 12MoO₃ d) Both a & c
- Statement : Chloro acetic acid is more acidic than acetic acid.
Reason : Chloro group has +I effect.
a) Both Assertion, Reason are correct b) Assertion is false. Reason are correct
c) Assertion is correct, Reason is false d) Both Assertion and Reason are false

14. In the hydrocarbon $\text{CH}_2 = \text{C} = \text{CH}_2$, the state of hybridization of carbon 1, 2, 3 is respectively
 a) sp, sp^2, sp^3 b) sp^3, sp^2, sp^3 c) sp^2, sp, sp d) sp^2, sp^2, sp^2
15. Benzene reacts with chlorine in presence of sun light gives a compound (A). The compound and its use are
 a) C_6Cl_6 ; insecticide b) $\text{C}_6\text{H}_6\text{Cl}_6$; insecticide c) $\text{C}_6\text{H}_5\text{Cl}$; insecticide d) $\text{C}_6\text{H}_5\text{Cl}_6$; sterilising agent

SECTION - II

Answer any six question and question number 18 is compulsory.

6 x 2 = 12

16. Write the electronic concept of oxidation and reduction reactions.
17. What are electronic ions?
18. Write the combustion of n-hexane with equation.
19. Mention the uses of plaster of paris.
20. Distinguish real and ideal gases.
21. Mention any two methods of converting para hydrogen into ortho hydrogen.
22. 0.6% solution of urea and 1.8% solution containing a solute (A) are isotonic with each other. Calculate the molecular weight of the solute (A).
23. How would you detect the presence of sulphur in an organic compound?
24. Draw the staggered and eclipsed conformers of n-butane.

TEN

SECTION - III

Answer any six questions and question number 27 is compulsory.

6 x 3 = 18

25. How many moles of hydrogen is required to produce 10 moles of ammonia?
26. State Pauli's exclusion principle.
27. Find out the Δn_p values and write the K_c and K_p relation for the equilibrium reactions
 i) Decomposition of ammonia ii) Formation of NO
28. How does iron react with steam?
29. Give the expressions of critical constants.
30. Write the electrode reactions involved in the electrolytic method of preparation of sodium hydroxide.
31. State Henry's law.
32. Give the structural formulae of the following compounds.
 i) 3-cyclohexyl pentan-2-one ii) 2-ethyl but -3-enoic acid
33. Write Friedel-Craft's reaction.

SECTION - IV

Answer all the questions.

5 x 5 = 25

34. i) Calculate the number of molecules in 22g of methane. (2)
 ii) Calculate the effective nuclear charge of Na^+ ion (3) (OR)
 Discuss the assumptions of Bohr model of the atom (5)
35. i) Give two examples of each of the type of hydrogen bonding. (2)
 ii) How do alkali metals react with oxygen? (3) (OR)
 Explain Andrew's isotherm of carbon dioxide. (5)
36. Derive the relation between ΔH and ΔU for an ideal gas. (5) (OR)
 i) Define molal boiling point elevation constant (2)
 ii) Trans isomer is more stable than cis isomer. Why? (3)
37. Explain the substitution reaction and elimination reaction with example. (5) (OR)
 i) What is oxidation number? (2)
 ii) How will you distinguish terminal and non-terminal alkynes? (3)
38. i) Identify the period number and group number of the given elements. a) calcium b) silver (2)
 ii) Hard water forms scum with soap. Why? (3)
 (OR) An organic compound (A) of molecular formula C_8H_8 on ozonolysis, followed by hydrolysis yields (B) and (C). Further (A) reacts with HBr to form (D). Identify (A) to (D) and explain the reactions. (5)