

DELHI PUBLIC SCHOOL, DURGAPUR
REVISION SHEET FOR BLOCK TEST 1, 2018-19
CLASS XI, SUBJECT: CHEMISTRY

CONCEPTUAL

- Q1 State Hund's rule of maximum multiplicity
- Q2 a) With the help of the concept of exchange energy explain the exceptional electronic configuration of Cr.
b) Explain why the energy of an electron is negative.
c) State law of definite proportion
d) State Law of multiple proportion.
- Q3 Write the electronic configuration of elements with the following Z
Z=103, Z=58, Z=118, Z=46, Z=65, Z=92
- Q4. a) When is the energy of an electron regarded as zero?
b) Why is the energy of an electron negative?
c) Write down all the four quantum numbers for i) 19th electron of Cr₂₄,
ii) 21st electron for Sc₂₁.
- Q5. a) How many electrons can be filled in all the orbitals with n+l=5?
b) How many unpaired electrons are there in Pd(Z=46)?
c) Calculate the total no of electrons in a molecule of H₃PO₄. (Phosphoric acid)
d) Is an electron stationary in stationary state?
- Q7. a) The two extra nuclear electrons in He have anti-parallel spins. Explain why?
b) State Heisenberg's Uncertainty Principle and write a mathematical expression for it.
c) The electronic configuration of an element A with Z=47 is [Kr]5s¹4d¹⁰. Locate the position of the element in the Modern periodic table.
- Q8. a) What type of metals are used for photoelectric effect? Explain with an example.
b) Out of 5f and 7s orbitals, which one is filled up first? Why?
c) Which solution is more concentrated 1M or 1molal? Why?
d) An element has fractional atomic mass. What does it indicate?
- Q9. a) Why is it necessary to balance a chemical equation?
b) Out of 1M H₂SO₄ and 1N H₂SO₄, which is more concentrated and why?
- Q10. Why is the value of Avogadro's no 6.022 × 10²³ and not any other value?

NUMERICALS

- Q11. Identify the limiting reagent in the given reaction mixture.
 $X + Y_2 \rightarrow XY_2$
i) 2 moles of X + 3 moles of Y₂
ii) 100 atoms of X + 100 molecules of Y₂
- Q12. Commercially available Conc HCl contains 38% HCl by mass.
i) What is the molarity of the solution if its density is 1.19g/cm⁻³?
ii) What volume of conc. HCl is needed to make 1.0L of 0.2M HCl?
- Q13. A welding fuel gas contains Carbon and Hydrogen only. Burning a small sample of it in Oxygen gives 3.38 gm CO₂, 0.690gm H₂O and no other products. A volume of 10L (measured at STP) of this welding gas is found to weigh 11.6 gm. Calculate i) Empirical Formula ii) Molar mass and iii) Molecular formula of the gas.

- Q14. An impure sample of NaCl which weighed 1.2gm gave on treatment with excess of AgNO₃ solution 2.4gm of AgCl as the precipitate. Calculate the percentage purity of the sample. (Ag=108u, Na=23gm).
- Q15. Calculate the total no. of electrons in 1mole of Methane.
Find a) total no and b) total mass of neutrons in 7mg of ¹⁴C.
Assume that mass of a neutron = 1.675×10^{-27} Kg.
iii) the total no and total mass of protons in 34mg of NH₃ at STP.
Will the answer change if the temperature and pressure are changed?
- Q16. How much energy is required to ionize a H-atom if an electron occupies n=5 orbit?
Compare your answer with the ionization energy of H atom. (Energy required to remove the electron from n=1 orbit?)
- Q17. In an astronomical observation, signals observed from the distance stars are generally weak. If the photon detector receives a total of 3.15×10^{18} J from the radiations of 600 nm , Calculate the no. of photons received by the detector.
- Q18. The velocity associated with a proton moving in a potential difference 1000V is 4.37×10^5 s.
If the hockey ball of mass 0.1kg is moving with this velocity, calculate the wavelength associated with this velocity.
- Q19. The ejection of the photoelectrons from Silver metal in the photoelectric effect experiment can be stopped by applying the voltage of 0.35V when the radiation 256.7 nm is used . Calculate the work function of Silver metal.
- Q20. Calculate the energy required for the process.
 $\text{He}^+(g) \rightarrow \text{He}^{2+}(g) + e^-$
The ionization energy for the H-atom in the ground state is 2.18×10^{-18} J/atom.
- Q21. Find the conjugate acid/base of the following species:
HNO₂, CN⁻, HClO₄,
- Q22. Assuming complete dissociation, calculate the pH of the following solutions: a) 0.003 M HCl b) 0.005 M NaOH.
- Q23. Calcium carbonate reacts with aqueous HCl to give CaCl₂ and CO₂ according to the reaction,
 $\text{CaCO}_3 + 2\text{HCl} \rightarrow \text{CaCl}_2 + \text{CO}_2 + \text{H}_2\text{O}$
What mass of CaCO₃ is required to react completely with 25ml of 0.75M HCl?
- Q24. In astronomical observations, signals observed from the distant stars are generally weak. If the photon detector receives a total of 3.15×10^{18} J from the radiations of 600 nm, calculate the no. of photons received by the detector.
- Q25. a) State Hund's rule of maximum multiplicity
b) Identify the limiting reagent in the given reaction mixture.
 $\text{X} + \text{Y}_2 \rightarrow \text{XY}_2$
i) 2 moles of X + 3 moles of Y₂.
ii) 100 atoms of X+ 100 molecules of Y₂
- Q26. Compare the relative stabilities of the following species and indicate their magnetic properties.
i) N₂, N₂⁺, N₂⁻
ii) Predict the type of hybridization of the following central atom and state their shapes.
a) PCl₅, CO₃²⁻

- a. Define dipole moment. State its unit.
b. State Law of mass action.
- Q27 Calculate the enthalpy of hydrogenation for the reaction below from the data provided:
 $C_2H_4(g) + H_2(g) \rightarrow C_2H_6(g)$
 Data: $C_2H_4 + 3O_2 \rightarrow 2CO_2 + 2H_2O$, $\Delta H = -1401$ kJ
 $C_2H_6 + 7/2O_2 \rightarrow 2CO_2 + 3H_2O$, $\Delta H = -1550$ kJ
 $H_2 + 1/2 O_2 \rightarrow H_2O$, $\Delta H = -286.0$ kJ
- Q28 N_2 combines with H_2 to form Ammonia, Ammonia is the basic raw material for preparing fertilizer. Always associated with a refinery/petrochemical industry we have a fertilizer industry.
 a) What is the value you derived from the above observation?
 b) Why do you have a fertilizer industry always associated with a refinery/petrochemical industry?
 c) If 1 mole of N_2 and 3 moles of H_2 are reacting together at NTP, Calculate the moles of NH_3 which are needed for the fertilizer industry at NTP ?
- Q29 a) Which solution is more concentrated 1M or 1 molal ? Why?
 b) A solution is prepared by dissolving 3.65 gm of HCl in 500 ml of the solution. Also calculate the volume of this solution required to prepare 250ml of .05M solution.
- Q30 a) A gas occupying a volume of 500 L is at $40^\circ C$ under a pressure of 3 bar. What temperature will it have when it is placed in an evacuated chamber of volume 175 L?. The pressure of the gas in the chamber is one-third of its initial pressure.
 b) Calculate the number kJ of heat necessary to raise the temperature of 60 gm of a metal from $35^\circ C$ to $55^\circ C$. Molar heat capacity of metal is 24 J/mol/k
- Q31 Compare the relative stabilities of the following species and indicate their magnetic properties.
 i) O_2 , O_2^+ , O_2^- , O_2^{2-}
 ii) Predict the type of hybridization of the following central atom and state their shapes.
 a) BrF_5 , CO_2
- Q32 Which one out of NH_3 and NF_3 has higher dipole moment and why?
- Q33 Draw the orbital overlap diagram of Ethyne molecule and shape of PCl_5 stating the bond angles and their type of bonds.
- Q34 a) Write the values of all the four quantum no.s of the last electron of K ($Z=19$).
 b) Write the electronic configuration of Th ($Z=90$).
- Q35 Assign reasons:
 a) Ice floats on the surface of water. b) Pure water has the maximum density and minimum volume at $4^\circ C$.