

Delhi International School
Class –XI
Subject – Chemistry
Summer Vacation Homework (2018-19)

1. What are laws of chemical combinations? Discuss any three laws in detail?
2. Why is it necessary to balance a chemical equation? Give examples (at least 5) for balancing a chemical equation by hit and trail method.
3. What are the main postulates of Dalton's atomic theory? What were its limitations? How the theory has been modified?
4. A solution has been prepared by dissolving 5.6g of KOH in 250ml of it. Calculate the molarity of solution?
5. What is the difference between molarity and molality?
6. Calculate the molecular mass of the following:
(a) H_2SO_4 (b) Na_2SO_4 (c) $\text{C}_6\text{H}_{12}\text{O}_6$ (d) H_2PO_4
7. Determine the empirical formula of an oxide of iron which has 60.9% iron and 30.1% dioxygen by mass. (Atomic masses: Fe = 55.85amu, O = 16.00amu)
8. Calculate the mass of sodium acetate (CH_3COONa) required to make 500mL of 0.375 molar aqueous solution molar mass of sodium acetate is 82.0245gmol^{-1} .
9. Calculate the concentration of nitric acid in moles per litre in a sample which has a density. 1.41gmL^{-1} and the mass percent of nitric acid in it being 69%.
10. What do you mean by significant figures? Calculate significant figures in the following:
(a) 0.0025 (b) 208 (c) 5005 (d) 126000 (e) 300.0
(e) 4.0035 (f) 0.00398 (g) 1.002 (h) 20.00
11. What is the SI unit of mass? How is it defined?
12. What is the concentration of sugar ($\text{C}_{12}\text{H}_{22}\text{O}_{11}$) in mol L^{-1} if its 20g are dissolved in enough water to make a final volume upto 2L?
13. If the density of methanol is 0.793Kg L^{-1} . What is its volume, needed for making 2.5L of its 0.25M solution?
14. A sample of drinking water was found to be severely contaminated with chloroform, CHCl_3 , supposed to be carcinogenic in nature. The level of contamination was 15ppm (by mass).
(i) Express this in percent by mass.
(ii) Determine the molality of chloroform in the water sample.
15. If the speed of light is $3 \times 10^8\text{ms}^{-1}$. Calculate the distance covered by light in 2.00ns.
16. What is photoelectric effect? Explain this effect on the basis of quantum theory of electromagnetic radiations.
17. What is the difference between orbit and orbital?
18. What are the principles of writing electronic configuration (state all the three principles) write electronic configuration of atoms from atomic number 1 to 30.
19. Name three quantum numbers which are necessary to describe an orbital. What are the permitted values of these quantum number when $n = 4$.

20. How many electrons s, p and d sub shells can accommodate?
21. Explain why half-filled and completely filled orbitals have extra stability?
22. What is Bohr's atomic orbital of an atom. Explain.
23. What is Zeeman Effect?
24. What is the difference between emission spectra and absorption spectra?
25. What is shielding effect?
26. Calculate the wavelength of an electron moving with a velocity of $2.05 \times 10^7 \text{ms}^{-1}$?
27. Calculate the wave number for the longest wavelength transition in the Balmer series of atomic hydrogen?
28. How many nodes are present in 4d orbital?
29. Calculate the wavelength, frequency and wave number of a light wave whose period is $4.0 \times 10^{-10}\text{s}$?
30. What is the number of photons of light with a wavelength of 4000pm that provide 1J of energy?
31. What is the basic theme of organisation in the periodic table?
32. Which important property did Mendeleev use to classify the elements in his periodic table & did he stick to that?
33. What is the basic difference in approach between the Mendeleev's periodic law and the modern periodic law?
34. How does atomic radius vary in a period and in a group? How do you explain the variation?
35. Explain why cations are smaller and anions are larger in radii than their parent atom?
36. What are the various factors due to which the ionization enthalpy of the main group elements tends to decrease down a group?
37. Would you expect the second electron gain enthalpy of oxygen as positive, more negative or less negative than the first? Justify your answer.
38. Write the general electronic configuration of s, p, d and f-block elements.
39. Explain why electronegativity of elements increases on moving from left to right in the periodic table?
40. Explain why electron gain enthalpy of fluorine is less negative than that of chlorine.
41. Define ionization enthalpy. Discuss the factors affecting ionization enthalpy of the elements and its trends in the periodic table.
42. In what manner is the long form of periodic table better than Mendeleev's periodic table? Explain with examples.

Delhi International School
Class –XI
Subject – Physics
Summer Vacation Homework (2018-19)

1. Check the accuracy of given equations?
(i) $v = u + at$ (ii) $s = ut + \frac{1}{2}at^2$ (iii) $v^2 - u^2 = 2as$
2. Find percentage error in $X = \frac{a^3 b^2}{\sqrt{c} d}$. If the percentage error in a, b, c and d respectively 1%, 2%, 3% and 4% respectively.
3. How many significant figures are there in (i) 8.004600 (ii) 0.00902 (iii) 4.3006 (iv) 9.2510 (v) 0.7710
4. Convert, Newton into joule.
5. Find the relative error in Z if $Z = \frac{A^4 B^{\frac{1}{3}}}{CD^{\frac{3}{2}}}$.
6. The radius of a sphere is measured as (2.1 ± 0.5) cm. Calculate its surface area with error limits. (Ans. $\Delta A = 26.4\text{cm}^2$)
7. A force of $(2500 \pm 0.02)\text{m}^2$. Calculate error in pressure exerted over the area. (Ans. $\Delta P = \pm 503.9$) N/m^2
8. If the unit of force is 100N, unit of length is 10m and unit of time is 100s, what is the unit of mass in this system of unit? ($M = 10^5\text{kg}$)
9. Write the dimensions of a and b in the relation.
10. What do you understand by the positive and negative time?
11. What is significance of velocity time graph?
12. Check the correctness of the relation:
$$v = \sqrt{\frac{2GM}{R}}$$
13. Check the correctness of the relation:
$$v = \frac{1}{2i} \sqrt{\frac{f}{m}}$$
 where m is mass per unit length.
 $F \rightarrow$ tension, $v \rightarrow$ frequency
 $\ell \rightarrow$ length of string.
14. Check the correctness of formula $F = \frac{mv^2}{R}$
15. Can the speed of a body change if its velocity is constant?
16. Check the accuracy of the following:
(i) $D_n = u + \frac{a}{2}(2n - 1)$
(ii) $t = 2\pi \sqrt{\frac{\ell}{g}}$
17. Convert the value of $G = 6.66 \times 10^{-11} \text{ Nm}^2 \text{ kg}^{-2}$ into CGN system.
18. Find the value of force 100 dyne on a system based on a meter, kilogram and minute as fundamental units.
19. Establish the formula for frequency of a string which depends upon length (ℓ) of the string, tension (T) in the string and mass per unit length (m) of the string.

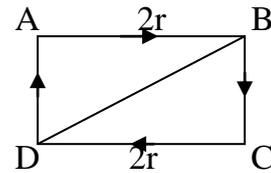
20. The velocity v of a particle is given in terms of time t by the equation.

$$v = at = \frac{6}{t + c}$$

What are the dimensions of a , b and c .

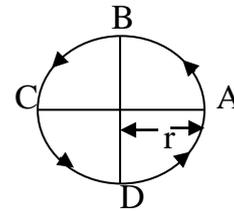
21. In the gas equation $(p + \frac{a}{v^2})(v - b) = RT$. Where T is absolute temperature, P is pressure and v is volume, what are the dimensions of constant a and b ?
22. Density of a substance is $\delta = \frac{m}{v}$, where $M = (20 \pm 0.2)\text{kg}$ and $v = (10 \pm 0.1)\text{m}^3$. Calculate percentage error in δ .
23. What do you mean by least count?
24. Find the magnitude of vector $\vec{R} = -\hat{i} - \hat{j} - \hat{k}$.
25. What do you mean by a resolution of a vector?
26. Find the distance and displacement:

- (i) When object moves from A to B then B to D.
 (ii) When object moves from A to B then B to C.



27. Find the distance and displacement:

- (i) From A to B
 (ii) From B to C then to D
 (iii) From A to D via ABCD



28. If $\vec{A} = 6\text{N}$, $\vec{B} = 4\text{N}$, $Q = 180^\circ$. Find the resultant vector.
29. Define various types of vectors?
30. What is triangle law of vector addition? Give analytical treatment of it to find magnitude resultant vector and its direction?
31. Write the dimensions of a and b in the relation $P = \frac{b - x^2}{at}$ where P is power, x is distance and t is time.
32. Is energy density and pressure have the same dimensions. Comment.
33. Identify the physical quantity x defined as $x = \frac{IFv^2}{W\ell^3}$, where I is moment of inertia, F is force, v is velocity, w is work and ℓ is length.
34. Time for 20 oscillations of a pendulum is measured as $t_1 = 39.6\text{s}$, $t_2 = 39.9\text{s}$, $t_3 = 39.5\text{s}$. What is the precision in the measurements? (Find mean absolute error).
35. An artificial satellite is revolving around a planet of mass M and Radius R , in a circular orbit of radius r . From Kepler's third law about the period of a satellite around a common central body, square of the period of revolution T is proportional to the cube of the radius of the orbit r . Show using square of period of revolution. T is proportional to r^3 . Using dimensional analysis $T = \frac{k}{r} \sqrt{\frac{r^3}{g}}$
- Where k is a dimensionless constant, g is acceleration due to gravity.
36. Two forces whose magnitudes are in the ratio 3:5 give a resultant of 28N. If the angle of their inclination is 60° , find the magnitude of each force. (Ans. $F_1 = 12\text{N}$, $F_2 = 20\text{N}$)
37. Two forces acting on a particle in opposite directions have a resultant 1N. if they act at right angle to each other, the resultant is 5N. Find the values of two forces. (Ans. $F_1=4\text{N}$, $F_2=3\text{N}$)

38. The number of significant figures in 0.06900 is
 (a) 5 (b) 4 (c) 2 (d) 3
39. The percentage error in determination of $g = 4r^2 \frac{\ell}{gt^2}$, when ℓ and t are measured with 1% and 2% error is
 (a) 1% (b) 2% (c) 5% (d) 9%
40. Which of the following length measurement is most accurate and why?
 (a) 500.0cm (b) 0.005cm (c) 6.00cm

Note: (i) Every student would prepare one chart related to physics.
 (ii) Students will prepare the project / activity related to science (theoretically + practically).

UNSOLVED MCQ'S

1. The numbers 2.745 and 2.735 on rounding off to 3 significant figures will give:
 (a) 2.75 and 2.74 (b) 2.74 and 2.73 (c) 2.75 and 2.73 (d) 2.74 and 2.74
2. Which of the following measurements is most precise?
 (a) 5.00mm (b) 5.00cm (c) 5.00m (d) 5.00km
3. Which of the following are not units of time?
 (a) second (b) parsec (c) year (d) minute
4. One kilo-watt hour is equal to:
 (a) 3.6×10^6 joule (b) 3.6×10^5 joule (c) 36×10^6 joule (d) 36×10^3 joule
5. In an experiment, four quantities a, b, c and d are measured with percentage error 1%, 2%, 3% and 4% respectively. Quantity P is calculated as $P = \frac{a^3 b^2}{cd}$ % error in P is:
 (a) 4% (b) 14% (c) 10% (d) 7%
6. If force (F), velocity (v) and Time (T) are taken as fundamental units, then the dimensions of mass are:
 (a) $[FVT^{-1}]$ (b) $[FVT^{-2}]$ (c) $[FV^{-1} T^{-1}]$ (d) $[FV^{-1} T]$

PHYSICAL WORLD AND MEASUREMENT

7. Force of friction and tension in a string are:
 (a) gravitational forces (b) electromagnetic forces
 (c) both (a) and (b) (d) neither (a) nor (b)
8. Einstein was awarded Nobel Prize in physics for:
 (a) Theory of relativity (b) law of gravitation
 (c) Uncertainty principle (d) photo electricity
9. How many disintegrations per second make up 1 curie?
 (a) 3.7×10^{10} (b) 3.7×10^{13} (c) 3.7×10^7 (d) none of these
10. Which of the following relations is not correct?
 (a) 1 millibar – 10^2 Pa (b) 1 bar = 760 torr
 (c) 1 bar = 10^4 Pa (d) none of the above
11. Which of the following is a dimensional variable?
 (a) force (b) exponential (c) angle (d) velocity of light in vacuum
12. Which of the following is not a dimensionless variable?
 (a) density (b) specific gravity (c) angle (d) strain

Delhi International School
Class –XI
Subject – Biology
Summer Vacation Homework (2018-19)

1. What is tidal volume?
2. What is the principle of exchange of gases?
3. What is the breathing rate in man?
4. In which organelle of cell does respiration occur?
5. What is the maximum number of O₂ molecules which one hemoglobin molecule can carry?
6. Why vigorous exercises sometimes result in muscular pain?
7. What is fermentation? Does it occur in our body?
8. Write R.Q. for carbohydrates, fats and proteins.
9. What is chloride shift? Write its significance during respiration.
10. Differentiate between oxyhaemoglobin and carbminohaemoglobin with reference to their formation.
11. What is partial pressure? How does it help in gaseous exchange during respiration?
12. Write briefly about Bohr Effect and Haldane effect and their significance.
13. How does exchange of respiratory gases take place in the alveoli or lungs?
14. Describe oxygen-hemoglobin dissociation curve.
15. Where is foramen ovale situated?
16. What is the role of lacteals?
17. What is Cisterna Chyli?
18. What is the name given to blood vessels which generally bring blood to an organ?
19. Which adrenal hormone accelerated the heart beat under normal conditions?
20. Name the blood vessel that transports hormones from the hypothalamus to the anterior pituitary.
21. Write two advantages of hepatic portal system.
22. Name the two types of lymphocytes and write one difference between the two.
23. Expand PDGF. What is its significance?
24. Describe the coronary circulation.
25. Write differences between extracellular and intracellular fluids.
26. How many enzymes are involved in urea cycle?
27. Which limb of loop of Henle is impermeable to water?
28. Where do you find the largest number of sweat glands in man?
29. Name the exact part of the uriniferous tubule (nephron) which is directly influenced by ADH.
30. Explain the function of vasa recta?
31. Ureters do not have valves at their ends opening into the urinary bladder, yet urine does not flow back into them on contraction of the bladder. What is the reason?
32. What is glomerular filtration? What is the normal filtration force in humans?
33. What are the factors that favour glomerulus filtration?
34. Describe the hormonal feedback circuits in controlling renal functions.
35. How does the proximal convoluted tubule of the nephron contribute in homeostasis?