St. Mary's School, Dwarka
Cycle Test-1
Class XI
Subject: Chemistry (043)

Reading Time: 15 mins.
Writing Time: 2hrs.   M.M.: 50
No. of questions: 19

General Instructions :

(i)   All questions are compulsory.
(ii) Question numbers 1 to 4 are very short answer question, each of 1 mark. Answer them in one word or one sentence each.
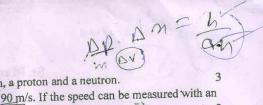(iii) Question numbers 5 to 8 are short answer questions of 2 marks each. Answer them in about 30 words each.
(iv) Question numbers 9 to 16 are also short answer questions of 3 marks each. Answer them in about 40 words each.
(v)   Question number 17 is a Value Based Questions and carries 4 marks. Answer in about 50 words.
(vi) Question numbers 18 and 19 are long answer questions of 5 marks each. Answer them in about 70 words each.
(vii) Use log table, if necessary.
(viii) Please check that this question paper contains 19 questions.

Q1.   What are derived units ? Give an example.   1

Q2.   Express the following numbers to four significant figures :
      (i) 5.607892   (ii) 1.78986×10^3 1

Q3.   Define the term precision and accuracy.   1

Q4.   Give significance of azimuthal number.   1

Q5.   Convert into meter :
      (i) 7 nm (diameter of small virus)
      (ii) 40 Em (thickness of Milky Way galaxy)
      (iii) 1.4 Gm (diameter of sun)
      (iv) 41 Pm (distance of nearest star).   2

Q6.   Express the following in SI units using power of 10 notation :
      (i) 1.35 mm   (ii) 1 day   (iii) 6.45 mL   (iv) 48 µg   2

Q7.   Calculate the molarity of the NaOH in the solution prepared by dissolving its 4 g in enough water to form 250 mL of the solution. (Na molar mass = 23 g/mol, O =16, H=1)   2

Q8.   Give two points of difference between cathode rays and anode rays.   2

Q9.   (i) If the elemental composition of butyric acid is found to be 54.2% C, 9.2% H and 36.6% O, determine the empirical formula. C_4H_4O
      (ii) The molecular mass of butyric acid was determined to be 88 u. What is the molecular formula ?   3

Q10. Define molarity and molality of a solution with their respective units.
      In order to preserve a solution for a longer duration which concentration term will you prefer and why ?   3

Q11. What is Aufbau principle ? Write electronic configuration of the elements with atomic number 8, 17, 24 and 29.   3

1

Q12. Compare the characteristic properties of an electron, a proton and a neutron. 3

Q13. Table tennis ball has a mass of 10 g and a speed of 90 m/s. If the speed can be measured with an accuracy of 4%. What is the uncertainty in speed and position ? 3

Q14. What designation is given to a subshell having:
(i) n = 2, ℓ = 0; (ii) n = 4, ℓ = 1 (iii) n = 4, ℓ = 2
(iv) n = 7, ℓ = 4 (v) n = 6 , ℓ = 3 (vi) n = 3, ℓ = 2 3

Q15. List three main differences between orbit and orbital. 3

Q16. (i) Define the term mass number (A).
(ii) State Heisenberg's Uncertainty Principle.
(iii) State Hund's rule of maximum multiplicity. 3

Q17. As India's National Broadcaster and also the premier Public Service Broadcaster, All India Radio (AIR) has been serving to inform, educate and entertain the masses since it's inception, truly living up to its motto – 'Bahujan Hitaya : Bahujan Sukhaya'. One of the largest broadcasting organisations in the world in terms of the number of languages of broadcast, the spectrum of socio-economic and cultural diversity it serves, AIR's home service comprises 420 stations today located across the country, reaching nearly 92% of the country's area and 99.19 % of the total population. AIR originates programming in 23 languages and 146 dialects. The Radio stations of AIR broadcasts on a frequency of 98.5 MHz and 1120 KHz.
(i) Calculate the wavelength of the electromagnetic radiation emitted by the transmitter.
(ii) What part of electromagnetic spectrum does this radiation belong to ?
(iii) What are the values associated with AIR ?
(iv) Which one can be heard at longer distance ? 4

Q18. Calcium carbonate reacts with aqueous HCl to give $CaCl_2$ and CO_2 according to the reaction given below :
$CaCO_3(s)$ + 2HCl(aq) ----------→ $CaCl_2$(aq) + $CO_2(g)$ + H_2O(aq)
What mass of $CaCl_2$ will be formed when 250 mL of 0.76M HCl reacts with 1000 g of $CaCO_3$?
Name the limiting reagent. Calculate the number of moles of $CaCl_2$ formed in the reaction. 5

Q19. Commercially available concentrated hydrochloric acid contains 38% HCl by mass.
(a) What is the molarity of this solution ? The density is 1.19 g mL^{-1}.
(b) What volume of concentrated HCl is required to make 1.00L of 0.10 M HCl ?