

## CLASS XI

### ENGLISH

#### The Photograph

- Q1. What does the word 'cardboard' denote in the poem? Why has this word been used?
- Q2. What has the camera captured?
- Q3. What has not changed over the years? Does this suggest something to you?
- Q4. The poet's mother laughed at the snapshot. What did this laugh indicate?
- Q5. What is the meaning of the line "Both wry with the laboured ease or loss"
- Q6. The three stanzas depict three different phases. What are they?

#### The Portrait of a Lady

1. Grandmother has been portrayed as a strong lady and an affectionate grandmother. Write a brief character sketch of the grandmother in the light of above statement?
2. How was grandmother's life in the city different from her life in the village?
3. Describe the three phases of the author's relationship with his grandmother before he went abroad for further studies?

#### The Summer of the Beautiful White Horse

1. You will probably agree that this story does not have breathless adventure and exciting action. Then what in your opinion makes it interesting?
2. Did the boys return the horse because they were conscience-stricken or because they were afraid?
3. The story revolves around characters who belong to a tribe in Armenia. Mourad and Aram are members of the Garoghlanian family. Now locate Armenia and Assyria on the atlas and prepare a write-up on the Garoghlanian tribes. You may write about people, their names, traits, geographical and economic features as suggested in the story.

## MATHEMATICS

1. Determine  $A \times B$  where  $A = \{a, b, c, d\}$  and  $B = \{1, 2, 3\}$ .
2. Determine the symmetric difference  $A \_ B$  where  $A = \{a, b, c, d\}$  and  $B = \{c, d, e\}$ .
3. What is the domain and range of the relation  $R$  where  $R = \{(a, p), (a, r), (b, q)\}$ .
4. Determine the inverse relation  $R^{-1}$  where  $R = \{(a, 2), (a, 5), (b, 3), (b, 4), (c, 1)\}$ .
5. If  $X$  and  $Y$  are subsets of the universal set  $U$ , then show that
  - (i)  $Y \subset X \cup Y$
  - (ii)  $X \cap Y \subset X$
  - (iii)  $X \subset Y \implies X \cap Y = X$
6. Find the power set of
  - (i)  $\{1, 2, 3, \{1\}\}$
  - (ii)  $\{\}$
  - (iii)  $\{\{\}\}$
  - (iv)  $\{1, \{1, 2\}, 3\}$
  - (v)  $\{1, \{\}\}$
7. Draw the Venn diagrams to illustrate the following relationship among sets  $E$ ,  $M$  and  $U$ , where  $E$  is the set of students studying English in a school,  $M$  is the set of students studying Mathematics in the same school,  $U$  is the set of all students in that school.
  - (i) All the students who study Mathematics study English, but some students who study English do not study Mathematics.
  - (ii) There is no student who studies both Mathematics and English.
  - (iii) Some of the students study Mathematics but do not study English, some study English but do not study Mathematics, and some study both.

- (iv) Not all students study Mathematics, but every students studying English studies Mathematics.
8. For all sets A, B and C Is  $(A \cap B) \cup C = A \cap (B \cup C)$  ? Justify your statement.
  9. For all sets A, B and C is  $(A - B) \cap (C - B) = (A \cap C) - B$  ? Justify your answer.
  10. Let P be the set of prime numbers and let  $S = \{t \mid 2^t - 1 \text{ is a prime}\}$ . Prove that  $S \subset P$ .
  11. From 50 students taking examinations in Mathematics, Physics and Chemistry, each of the student has passed in at least one of the subject, 37 passed Mathematics, 24 Physics and 43 Chemistry. At most 19 passed Mathematics and Physics, at most 29 Mathematics and Chemistry and at most 20 Physics and Chemistry. What is the largest possible number that could have passed all three examination?
  12. Two finite sets have  $m$  and  $n$  elements respectively. The total number of subsets of first set is 56 more than the total number of subsets of the second set. Find the values of  $m$  and  $n$  .
  13. If A and B are two finite sets, then  $n(A) + n(B)$  is equal to ? . Write in terms of union and intersection.
  14. Given  $L = \{1, 2, 3, 4\}$ ,  $M = \{3, 4, 5, 6\}$  and  $N = \{1, 3, 5\}$  .Verify that  $L - (M \cup N) = (L - M) \cap (L - N)$ .
  15. If  $Y = \{1, 2, 3, \dots, 10\}$ , and  $a$  represents any element of Y, write the following sets, containing all the elements satisfying the given conditions. (i)  $a \in Y$  but  $a^2 \notin Y$  (ii)  $a + 1 = 6, a \in Y$  (iii)  $a$  is less than 6 and  $a \in Y$
  16. A, B and C are subsets of Universal Set U. If  $A = \{2, 4, 6, 8, 12, 20\}$ ,  $B = \{3, 6, 9, 12, 15\}$ ,  $C = \{5, 10, 15, 20\}$  and U is the set of all whole numbers, draw a Venn diagram showing the relation of U, A, B and C.
  17. Out of 100 students; 15 passed in English, 12 passed in Mathematics, 8 in Science, 6 in English and Mathematics, 7 in Mathematics and Science; 4 in English and Science; 4 in all the three. Find how many passed
    - (i) in English and Mathematics but not in Science
    - (ii) in Mathematics and Science but not in English
    - (iii) in Mathematics only
    - (iv) in more than one subject only .
  18. In a class of 60 students, 25 students play cricket and 20 students play tennis, and 10 students play both the games. Then, the number of students who play neither is \_\_\_\_\_.
  19. In a class of 60 students, 25 students play cricket and 20 students play tennis, and 10 students play both the games. Find the number of students who play neither?
  20. Prove that  $2^{2^n} - 1$  is divisible by 3.
  21. Prove that  $2n + 1 < 2^n$ , for all natural numbers  $n > 2$ .
  22. Prove by the Principle of Mathematical Induction that  $1 \times 1! + 2 \times 2! + 3 \times 3! + \dots + n \times n! = (n + 1)! - 1$  for all natural numbers  $n$ .
  23. Prove that  $n(n^2 + 5)$  is divisible by 6, for each natural number  $n$ .
  24. For any natural number  $n$ , Prove that  $7^n - 2^n$  is divisible by 5.
  25.  $1 + 5 + 9 + \dots + (4n - 3) = n(2n - 1)$  for all natural numbers  $n$ . Prove it.
  26. If  $P(n) : 2n < n!, n \in \mathbf{N}$ , then  $P(n)$  is true for all  $n > \underline{\hspace{2cm}}$ . Also prove the statement by PMI .
  27. Prove that  $2 + 4 + 6 + \dots + 2n = n^2 + n$  for all natural numbers  $n$ .
  28. Practice all the questions from Misc. Exc. Of the Chap.1 "Sets" from NCERT .

29. Practice all the questions from EXC. 4.1 of NCERT.  
 30. Practice all the questions from EXC. 2.1 and 2.2 of NCERT .

## PHYSICS

1. What is the difference between accuracy and precision of measurement?
2. Find the dimension of  $\eta$  in the expression  $F = 6\pi\eta rv$ , where 'F' is the force, 'r' is the radius and 'v' is velocity of an object,  $6\pi = \text{constant}$ .
3. The force (F) on an object depends on the mass (m) of the body, velocity (v) of the body and radius (r) of circular path in which the body is moving. With the help of dimension analysis derive an empirical formula for the force.
4. The frequency of simple pendulum is depends on the acceleration due to gravity (g) and length (l) of the pendulum. Obtain an empirical formula with the help of dimensional analysis.
5. We measure the period of oscillations of a simple pendulum In successive measurements, the eading turn out to be 2.63s,2.56s,2.42s,2.71s,2.80s .calculate absolute error,relative error, resolution is 0.016.
6. Check the dimensional consistency of the expression centripetal force,  $F = \frac{mv^2}{r}$  .
7. The distance 'x' covered by a body as a function of time 't' is given by the equation  $x = at + bt^2$  . Where 'x' is in meter and 't' in seconds. What is the dimension of a and 'b'?
8. A physical quantity Q is given by  $Q = \frac{A^2 \cdot B^{\frac{3}{2}}}{C^4 \cdot D^{\frac{1}{2}}}$  . Their percentage error in A, B, C, and D are 1 %, 2%, 4% and 2% respectively. Find the percentage error in Q.
9. Find the dimension of a and b in the expression  $P = \frac{bx - 2t}{2a}$  where p is pressure, x is distance and t is time.
10. Find the percentage of error in volume of a sphere of radius  $r = 10 \pm 0.02$  cm. Also find the volume of the given sphere.
11. What is relative error? Find % of error in X where  $X = a^2b / \sqrt{c} \cdot d$  if %of error in a,b,c,d are 1%,2%,3%and 4% respectively.
12. Check whether the following formulae are dimensionally correct or not?  
 a) $x = x_0 + v_0t + (1/2)at$  b) $1/2mv^2 = mgh$  c) $s = ut + (1/2)at^2$  d) $v^2 - u^2 = 2as$
13. 17) Using dimensional formulas convert:  
 a) One Newton into dynes b) one Joule into ergs
14. Check whether the following formulae are dimensionally correct or not?  
 a) $W = 1/2 mv^2 - 1/2mu^2$  b) $W = 1/2 MV^2$  c) $L = MVR$  d) $I = MR^2$
15. Find the dimension of  $\frac{a}{b}$  in the equation  $P = \frac{a - t^2}{bx}$  where P is pressure, x is distance and t is time.
16. 21. A physical quantity is given as  $p = \frac{2\sqrt{ab}}{c^3}$  if the percentage of error a,b,c are 2%,1% and 4% respectively .calculate the percentage of error in p.
17. Write advantages and drawbacks of dimensional formula /analysis.
18. What is percentage error in volume of a sphere, when error in measuring its radius is 2%?

19. The resistance R is the ratio of potential difference (V) and current (I) what is the Percentage error in R if  $v=(100\pm 5)\text{Volt}$  and  $I=(10\pm 0.2)\text{A}$  ?
20. The length and breadth of a Rectangle are  $(5.7\pm 0.1)\text{ cm}$  and  $(3.4\pm 0.2)\text{ cm}$  .  
Calculate the area of Rectangle with error limit?
21. Practice / write all the notes given in the class.
22. Solve all in text questions of NCERT I n chapter 2.
23. Solve the solved examples from S L Arora in measurement and vector.

## CHEMISTRY

Answer the following questions.

1. Define the following terms: Molarity, molality, normality, mole fraction, limiting reagent, atomic mass, molecular mass, mole, formula mass.
2. State and explain: Law of Multiple proportions, Gay Lussac's law of gaseous volumes, Avogadro law, Law of reciprocal proportions.
3. Discuss the postulates and drawbacks of Dalton's Atomic Theory.
4. State the number of significant figures in each of the following numbers:  $2.653\times 10^4$ , 0.00368, 653, 0.368, 0.0300
5. Express the following numbers to four significant figures: 5.607892, 32.392800,  $1.78986\times 10^3$ , 0.007837
6. One million silver atoms weigh  $1.79\times 10^{-16}\text{ g}$ . Calculate the atomic mass of silver.
7. What would be the mass of 5.0 mole of ammonia. Calculate the number of ammonia molecules and nitrogen and hydrogen atoms in it.
8. Butyric acid contains C, H, O. A 4.24 mg sample of butyric acid is completely burnt. It gives 8.45 mg of  $\text{CO}_2$  and 3.46 mg of water. What is the mass % of each element in butyric acid? If the elemental composition of butyric acid is found to be 54.2% C, 9.2% H, 36.6% O, determine its empirical formula. The molecular mass of butyric acid was determined to be 88 u. What is the molecular formula?
9. 3.00 g of  $\text{H}_2$  react with 29.00 g of  $\text{O}_2$  to yield  $\text{H}_2\text{O}$ .  
(a) Which is the limiting reactant?  
(b) Calculate the maximum amount of water that can be formed.  
(c) Calculate the amount of one of the reactants which remains unreacted.
10. What mass of copper oxide will be obtained by heating 12.35 g of copper carbonate?
11. A small piece of commercial zinc weighing 10 g is made to react with excess of dilute sulphuric acid. The total volume of hydrogen gas liberated was found to be 3.1 liter at NTP. Determine the % purity of the zinc sample.
12. What volume of 10 M HCl and 3 M HCl should be mixed to obtain 1 L of 6 M HCl solution?
13. Why does the molality of a solution remain unchanged with temperature?
14. Calculate the total no of electrons present in 1.6 g of methane.
15. How are 0.50 mol  $\text{Na}_2\text{CO}_3$  and 0.50 M  $\text{Na}_2\text{CO}_3$  different?
16. Calculate the molality of a solution of ethanol in water in which the mole fraction of ethanol is 0.040.

17. Calculate the no of atoms in each of the following: 52 moles of Ar, 52 u of He, 52 g of He.
18. Compare the characteristics of electrons, protons, neutrons with respect to their mass and charge.
19. Compare charges and masses of  $\alpha$ ,  $\beta$ ,  $\gamma$  radiations.
20. What conclusions did Rutherford reach from the scattering experiment of  $\alpha$ -particles by thin metallic sheet?
21. Calculate the wave number for the shortest wavelength transition in the Balmer series of atomic hydrogen.
22. A substance on analysis gave the following percentage composition: Na = 43.4%, C = 11.3%, O = 45.3%. Determine its empirical and molecular formulae.  
Given: the relative molecular mass of the compound is 106.
23. Electrons are emitted with zero velocity from a metal surface when it is exposed to radiation of wavelength  $6800 \text{ \AA}$ . Calculate threshold frequency and work function of the metal.
24. If the velocity of the electron in Bohr's first orbit is  $2.19 \times 10^6 \text{ ms}^{-1}$ , calculate the de Broglie wavelength associated with it?
25. What is the maximum no of emission lines when the excited electron of a H atom in  $n=6$  drops to the ground state?
26. What is the energy in joules, required to shift the electron of the H atom from the first Bohr orbit to the fifth Bohr orbit and what is the wavelength of the light emitted when the electron returns to the ground state? The ground state electron energy is  $-2.18 \times 10^{-11}$  ergs.

## BIOLOGY

- Q1). Identify correct sequence of taxonomical categories
  - a) Species, order, phylum, kingdom
  - b) Genus, species, order, kingdom
  - c) Species, genus, order, phylum
- Q2) Define the following term
  - a) Phylum b) Class c) Family d) Order e) Genus
- Q3) Illustrate taxonomical hierarchy with suitable examples of a plant and an animal.
- Q4) What does 'algal bloom' and 'red tides' signify?
- Q5) How are viroids different from viruses.
- Q6) Describe briefly 4 major groups of protozoa
- Q7) What do the terms phycobiont and mycobiont signify?
- Q8) Differentiate between i) homosporous and heterosporous pteridophyte ii) red algae and brown algae.
- Q9) Describe life cycle of an angiosperm
- Q10) Describe plant life cycle and alternation in generation with the help of diagram.

## COMPUTER SCIENCE

- Q1. Convert the hexadecimal numbers to decimal  
(a) B9 (b) C23F
- Q2. Convert the decimal numbers to hexadecimal  
(a) 132 (b) 5232
- Q3. Convert the following hexadecimal numbers to octal  
(a) DFA (b) 1CA
- Q4. Convert the following octal numbers to decimal  
(a) 546 (b) 765
- Q5. Convert the following octal numbers to hexadecimal  
(a) 213 (b) 452
- Q6. Find the eight bit 2's complement of the following decimal numbers  
(a) -23 (b) -54
- Q7. Represent -34 in sign and magnitude representation.
- Q8. What will be decimal equivalent of 1100100000110010 using mantissa exponent method?
- Q9. Code the word 'BIN' using ASCII code.
- Q10. Write a program to find the area of a triangle.
- Q11. Write a program to find the Simple Interest.
- Q12. What are tokens? Explain.
- Q13. What is the role of compiler?
- Q14. What is cin and cout?
- Q15. Why iostream.h is important?

