

SUNRISEVILLE SCHOOL, NOIDA
SUMMERS HOLIDAY HOMEWORK (2018 – 2019)
Class XII SCIENCE

ENGLISH

1. Select five comprehension for note-making from any sample paper or bbc compacta write(title, heading, sub-headings key to abbreviation and summary in 80 words)
2. Write five notice on five different topics in 50 words from bbc or any other sample paper in your writing note book.
3. Prepare five report in 175-200 words on the current topics (Events, Accidents, and incidents)
4. Write five articles in different topics (related to current affairs) in 175-200 words.
5. Prepare five speech on the five different topics in 175-200 words with format of the speech.

CHEMISTRY

Q1. Write structure of the following Comounds.

- (a) 2-Chloro-3-methylpentane
- (b) 1-Bromo-4-sec.butyl-2-methylbenzene
- (c) 1,2-Dibromoproane
- (d) 3-Bromocyclohexane
- (e) 4-methylpent-3-en-2-one

Q2. Distinguish between

- (a) Hexagonal and monoclinic unit cell
- (b) Ferromagnetism and Paramagnetism

Q3. Arrange each set of compound in order of increasing boiling points.

- (1) Bromomethane, Bromoform, Chloromethene, Dibromomethane
- (2) 1-Chloropropane, Isopropyl chloride, 1-Chlorobutane.

Q4. Define the following.

- (a) Schottky defect
- (b) Frenkel defect
- (c) F-centre

Q5. What are ambident nucleophiles? Explain with an example.

Q6. What type of substances exhibit anti-ferromagnetism?

Q7. What is meant by Dopping in a semiconductor?

Q8. Which compound in each of the following pairs will react faster in S_N2 reaction with $-OH$?

- (a) CH_3Br or CH_3I
- (b) $(CH_3)_3CCl$ or CH_3Cl

Q9. "Stability of a crystal is related to the magnitude of its melting point". How?

Q10. How will bring about the following conversions?

- (a) Ethanol to but-1-yne
- (b) Ethanol to ethyl fluoride
- (c) Toluene to benzyl alcohol
- (d) 1-Chlorobutane to n-octane

Q11. Give the uses of Freon 12, DDT, carbon tetrachloride and iodoform.

Q12. Why are crystalline solids anisotropic ?

Q13. What is the condition to be satisfied for a compound to be chiral ?

Q14. Define the following terms in relation to crystalline solids.

(a) Unit cell (b) Coordination number

Give one example in each case.

Q15. What is a racemic modification ?

Q16. Explain as to why haloarenes are much less reactive than haloalkanes towards nucleophilic substitution reactions.

Q18. What happens when $\text{CH}_3\text{-Br}$ is treated with KCN ?

Q19. Give reasons for the following:

(a) Ethyl iodide undergoes $\text{S}_{\text{N}}2$ reaction faster than ethyl bromide.

(b) C-X bond length in halobenzene is smaller than C-X bond length in $\text{CH}_3\text{-X}$.

Q20. Complete the following reaction equation:

(a) $\text{R-Br} + \text{Mg} \xrightarrow{\text{dry ether}} [\text{A}] \xrightarrow{\text{H}_2\text{O}} [\text{B}]$

(b) $\text{CH}_3\text{CH}_2\text{CH}=\text{CH}_2 + \text{HBr} \xrightarrow{\text{peroxide}} [\text{A}]$

PHYSICS

1. Write 16 experiments of physics in your practical note book.
2. Make models as allotted to the students.
3. Complete note book - Ch I, Ch II, Ch III
4. Learn all derivations in these chapters.
5. Do 10 numericals from each chapter (i.e. total 30 numericals (3 x 10)

BIOLOGY

Prepare a Project on any one of the following topics. It is compulsory for all students. Each project should have a project report and a 3D model.

- a) Sexual reproduction in flowering plants.
- b) Any two diseases caused by bacteria.
- c) Any two diseases caused by virus.
- d) Any two diseases caused by parasites.
- e) Reproduction and its causes

Note: Date of submission: 4th July, 2018

MATHEMATICS

Q1. The volume of a cube is increasing at a constant rate. Prove that the increase in surface area varies

inversely as the length of the edge of the cube.

Q2. Find the equation of tangent to the curve $x = 3\sin t$, $y = \cos 2t$, at $t = \frac{\pi}{4}$.

Q3. Find the intervals in which $f(x) = 2x^3 - 9x^2 + 12x + 15$ is:

- (i) Increasing
- (ii) Decreasing

Q4. Prove that the curves $x = y^2$ and $xy = k$ intersect at right angle if $8k^2 = 1$.

Q5. Find the points on the curve $x^2 + y^2 - 2x - 3 = 0$ at which tangents are parallel to x-axis.

Q6. Water is running into a conical vessel, 15cm deep and 5 cm in radius, at the rate of $0.1 \text{ cm}^3/\text{sec}$. When the water is 6 cm deep, find at what rate is (i) the water level rising? (ii) the water-surface area increasing? (iii) the wetted surface of the vessel increasing? (Ans: $1/40 \text{ cm}/\text{sec}$, $1/2 \cdot 10 \cdot 2 \cdot 30 \cdot 30 \text{ cm}^2/\text{sec}$, cm^2/sec)

Q7. Find an angle θ , which increases twice as fast as its sine. (Ans: 3π)

Q8. A balloon in the form of a right circular cone surmounted by a hemisphere, having a diameter equal to the height of the cone, is being inflated. How fast is its volume changing with respect to its total height h , when $h = 9\text{cm}$. (Ans: $3/12\pi \text{ cm}^3/\text{sec}$)

Q9. The volume of metal in a hollow sphere is constant. If the inner radius is increasing at the rate of $1 \text{ cm}/\text{sec}$, find the rate of increase of the outer radius when the radii are 4cm and 8cm respectively. (Ans: $14 \text{ cm}/\text{sec}$)

Q10. A kite 120 m high and 130 m of string is out. If the kite is moving away horizontally at the rate of $52 \text{ m}/\text{sec}$, find the rate at which the string is being paid out. (Ans: $20\text{m}/\text{sec}$)

Q11. $\tan\left(\frac{\pi}{4} + \frac{1}{2} \cos^{-1} \frac{a}{b}\right) + \tan\left(\frac{\pi}{4} - \frac{1}{2} \cos^{-1} \frac{a}{b}\right) = \frac{2b}{a}$

Q12. Solve for x: $\tan^{-1} x + 1 + \tan^{-1} x - 1 = \tan^{-1} \frac{8}{31}$

Q13. Prove that: $2\tan^{-1} \frac{1}{5} + \tan^{-1} \frac{1}{8} = \tan^{-1} \frac{4}{7}$.

Q14. Prove that: $\tan^{-1} \frac{1}{3} + \tan^{-1} \frac{1}{5} + \tan^{-1} \frac{1}{7} + \tan^{-1} \frac{1}{8} = \frac{\pi}{4}$

Q15. Solve for x: $\tan^{-1} 2x + \tan^{-1} 3x = \frac{\pi}{4}$

Q16. Prove that: $\sin^{-1} \frac{12}{13} + \cos^{-1} \frac{4}{5} + \tan^{-1} \frac{63}{16} = \pi$

Q17. Prove that: $\sin^{-1} \frac{4}{5} + \sin^{-1} \frac{5}{13} + \sin^{-1} \frac{16}{25} = \frac{\pi}{2}$

Q18. Let $A = \begin{vmatrix} 3 & 2 & 5 \\ 4 & 1 & 3 \\ 0 & 6 & 7 \end{vmatrix}$ express A as a sum of two matrices such that one is symmetric & other is skew symmetric.

Q19. Let $A = \begin{bmatrix} 0 & \tan \frac{\alpha}{2} \\ -\tan \frac{\alpha}{2} & 0 \end{bmatrix}$ & I is the identity matrix of order 2.

Show that $(I + A) = (I - A) \begin{bmatrix} \cos \alpha & -\sin \alpha \\ \sin \alpha & \cos \alpha \end{bmatrix}$

Q20. Using matrices solve

$$x - y + 2z = 7$$

$$3x + 4y - 5z = 5$$

$$2x - y + 3z = 12$$

Q21. If $A = \begin{bmatrix} 2 & 0 & 1 \\ 2 & 1 & 3 \\ 1 & -1 & 0 \end{bmatrix}$ find $A^2 - 5A + 4I$ and hence find a matrix X such that $A^2 - 5A + 4I + X = 0$.

Q22. Using properties of determinants, Prove:

$$\begin{vmatrix} 1 + a^2 - b^2 & 2ab & -2b \\ 2ab & 1 - a^2 + b^2 & 2a \\ 2b & -2a & 1 - a^2 - b^2 \end{vmatrix} = (1 + a^2 + b^2)^3$$

Q23. Using properties of determinants, Prove:

$$\begin{vmatrix} a^2 + 1 & ab & ac \\ ab & b^2 + 1 & bc \\ ca & cb & c^2 + 1 \end{vmatrix} = 1 + a^2 + b^2 + c^2$$

Q24. Solve for x:

$$\begin{vmatrix} 3x - 8 & 3 & 3 \\ 3 & 3x - 8 & 3 \\ 3 & 3 & 3x - 8 \end{vmatrix} = 0.$$

Q25. If $y = \tan^{-1} \frac{\sqrt{1+x} - \sqrt{1-x}}{\sqrt{1+x} + \sqrt{1-x}}$, find $\frac{dy}{dx}$.

Q26. If $x\sqrt{1+y} + y\sqrt{1+x} = 0$, find $\frac{dy}{dx}$.

Q27. If $y = \tan^{-1} \frac{\sqrt{1+\sin x} + \sqrt{1-\sin x}}{\sqrt{1+\sin x} - \sqrt{1-\sin x}}$, find $\frac{dy}{dx}$.

Q28. If $f(x) = \sqrt{\frac{\sec x - 1}{\sec x + 1}}$, find $f'(x)$. Also find $f'(\frac{\pi}{2})$.

Q29. For what value of k the following function is continuous:

$$f(x) = \begin{cases} 2x + 1, & x < 2 \\ k, & x = 2 \end{cases}$$

$$3x - 1, \quad x > 2$$

Q30. If $(\cos x)^y = (\cos y)^x$, find $\frac{dy}{dx}$.

Q31. If $y = \operatorname{cosec}^{-1} x$, then show that $x(x^2 - 1) \frac{d^2y}{dx^2} + (2x^2 - 1) \frac{dy}{dx} = 0$

Q32. Find $\frac{dy}{dx}$ if $(x^2 + y^2)^2 = xy$.

Q33. If $y = 3 \cos(\log x) + 4 \sin(\log x)$, then find $\frac{dy}{dx}$. Type equation here.

Q34. If $\sin y = x \sin(a + y)$, prove that $\frac{dy}{dx} = \frac{\sin^2(a + y)}{\sin a}$

Q35. If $(\cos x)^y = (\sin y)^x$, find $\frac{dy}{dx}$.

Q36. If $\log(x^2 + y^2) = 2 \tan^{-1} \frac{y}{x}$, then show that $\frac{dy}{dx} = \frac{x + y}{x - y}$

Q37. Find $\frac{dy}{dx}$ if $y^x + x^y = a^b$, where a, b are constants.

Q38. Find $\frac{dy}{dx}$ if $y = \cos^{-1} \left(\frac{2x + 1}{1 + 4x} \right)$

Q39. If $x = a(\theta - \sin \theta)$, $y = a(1 + \cos \theta)$, find $\frac{dy}{dx}$.

Q40. Differentiate the given function with respect to x : $(\log x)^x + x^{\log x}$

Q41. If $x^m y^n = (x + y)^{m+n}$, prove that $\frac{dy}{dx} = \frac{y}{x}$

Q.42 Diff. the given with respect to x :

$$x^{\sin x} + (\sin x)^{\cos x}$$

Q.44 Show that $\int_0^{\frac{\pi}{2}} (\sqrt{\tan x} + \sqrt{\cot x}) dx = \sqrt{2} \pi$

Q.45 Find $\int \frac{\cos x dx}{(2 + \sin x)(3 + 4 \sin x)}$

Q46 Evaluate: $\int (x - 3) \sqrt{x^2 + 3x - 18} dx$

Q47. Find $\int_0^{\frac{\pi}{2}} \log \sin x dx$

Q48. Find $\int \sin x \cdot \sin 2x \cdot \sin 3x dx$