

CLASS XII  
Holiday Homework(2018-19)  
Somerville School, Vasundhara Enclave, Delhi-96

**English:**

1. From newspapers and magazines, collect examples of the following and paste them in a scrapbook:
  - a) One example each of product and service Display Advertisement.
  - b) At least six different categories of Classified Advertisement.
2. Read the novel, 'The Invisible Man'.

**Physics:**

- Q1) Draw a ray diagram to show image formation by a concave mirror when the object is kept between the pole and its focus. Using this diagram, derive the magnification formula for the image formed.
- Q2) Draw a ray diagram to show refraction of a ray of monochromatic light passing through a glass prism. Derive an expression for the refractive index of glass in terms of angle of prism and angle of minimum deviation.
- Q3) Explain briefly how the phenomenon of total internal reflection is used in fibre optics.
- Q4) Obtain the lens makers formula using an appropriate diagram.
- Q5) Describe briefly, with the help of a suitable diagram, how transverse nature of light can be demonstrated by the phenomenon of polarization. When unpolarized light passes from air to a transparent medium, under what condition does the reflected light get polarized?

Q6) Describe Young's double slit experiment to produce interference pattern due to a monochromatic source of light. Deduce the expression for fringe width.

Q7) Use Huygens' Principle to deduce the laws of reflection and refraction of light.

Q8) Two convex lenses of same focal length but of aperture  $A_1$  and  $A_2$  ( $A_2 > A_1$ ), are used as objective lenses in two astronomical telescopes having identical eyepieces. What is the ratio of their resolving power? Which telescope will you prefer and why?

Q9) When monochromatic light travels from one medium to another its wavelength changes but frequency remains the same. Explain.

Q10) Sketch the intensity distribution in the diffraction pattern of a single slit.

Q11) Give two differences between interference and diffraction of light.

Q12) On inverting a telescope and seeing from the side of the objective, the object is seen smaller. Why? Why does it not happen in a compound microscope?

Q13) A person having normal near point (25cm) reads a book through a magnifying glass of focal length 5cm. What are the nearest and farthest distances at which he can put the book before him?

Q14) A compound microscope has an objective of focal length 2cm and an eyepiece of focal length 6.25cm separated by a distance of 15cm. Find the location of an object w.r.t the objective so that the final image is formed at (a) least distance of distinct vision, (b)

infinity. What is the magnifying power of the microscope in each case?

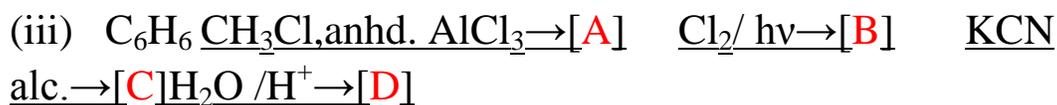
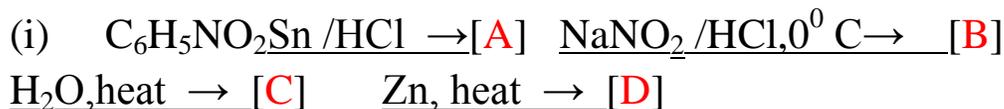
Q15) A person cannot see distinctly any object placed beyond 40cm from his eye. Calculate the power of the lens which will help him to see distant object clearly.

### Chemistry:

1. Explain how iodination of n-butane is a reversible process. Why does it give 2-Iodo butane as the major product?
2. Name the alkene with least number of carbon atoms capable of exhibiting chirality. Draw the structures of the possible enantiomers.
3. Predict the order of reactivity of the following compounds in  $S_N1$  reactions:

Cyclohexylchloride, 1-Chloro-1-methylcyclohexane, 1-Bromo-1-methylcyclohexane, 1-Iodo-1-methylcyclohexane.

4. Convert 2-Bromobutane to Butan-2-one in four steps.
5. Among  $CH_2=CHBr$  and  $CH_2=CH-CH_2Br$ , which compound will react faster in  $S_N1$  reaction with  $OH^-$ ? Why?
6. Complete the missing links:



7. Give reason:
- o-nitrophenol is more acidic than o-methoxyphenol.
  - Alcohols are easily protonated than phenols.
8. What is the function of  $\text{ZnCl}_2$  in the Lucas test of alcohols?
9. An alkene [A]  $\text{C}_{16}\text{H}_{16}$  on ozonolysis gives only one product [B] $\text{C}_8\text{H}_8\text{O}$ . Compound [B] on reaction with  $\text{NaOH}/\text{I}_2$  yields sodium benzoate and also reacts with  $\text{KOH}/\text{NH}_2\text{NH}_2$  to give a hydrocarbon [C]  $\text{C}_8\text{H}_{10}$ . Write the structure of the compounds [B] and [C]. Based on this information, two isomeric structures can be proposed for alkene [A]. Write their structure and identify the isomer which on catalytic hydrogenation ( $\text{H}_2/\text{Pd-C}$ ) give a racemic mixture.
10. Why cannot formaldehyde be prepared by Rosenmund reduction?
11. Convert:
- Acetic acid to propanoic acid
  - Hept-1-ene to hexanoic acid
  - Acetaldehyde to butan-2-one
  - Acetophenone to 2-phenylbutan-2-ol
  - Formaldehyde to acetaldehyde
  - Acetaldehyde to formaldehyde

Prepare a rough draft on the investigatory project chosen by you. The draft should include the following details -

Aim, Apparatus and Chemicals required, Principle, Procedure and Formulae for calculations, if any. Downloaded printouts are not to be submitted.

## Mathematics:

Q.1. Determine whether  $*$  on  $\mathbb{Z}$  defined by  $a * b = ab + 5$  is commutative or associative.

Q.2. Find the value of  $\cos\left[\cos^{-1}\left(-\frac{\sqrt{3}}{2}\right) + \frac{\pi}{6}\right]$ .

Q.3. Find the maximum value of

$$\begin{vmatrix} 1 & 1 & 1 \\ 1 & 1 + \sin\theta & 1 \\ 1 & 1 & 1 + \cos\theta \end{vmatrix}$$

Q.4. If  $(\tan^{-1} x)^2 + (\cot^{-1} x)^2 = \frac{5\pi^2}{8}$ , then find  $x$ .

Q.5. Prove that the function  $f : \mathbb{N} \rightarrow \mathbb{N}$  given by  $f(x) = x^2 + x + 1$  is one – one but not onto.

Q.6. Solve for  $x$ :  $\tan^{-1} x - \cot^{-1} x = \tan^{-1}\left(\frac{1}{\sqrt{3}}\right)$ .

Q.7. Prove that  $\begin{vmatrix} yz - x^2 & zx - y^2 & xy - z^2 \\ zx - y^2 & xy - z^2 & yz - x^2 \\ xy - z^2 & yz - x^2 & zx - y^2 \end{vmatrix}$  is divisible by  $(x + y + z)$  and

hence find the quotient .

Q.8. If  $A = \begin{bmatrix} 8 & 4 & 3 \\ 2 & 1 & 1 \\ 1 & 2 & 2 \end{bmatrix}$ , find  $A^{-1}$ . Using  $A^{-1}$  solve the system of linear equations.

$$8x + 4y + 3z = 19,$$

$$2x + y + z = 5,$$

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

Q.9. Prove the following :

$$\begin{vmatrix} \frac{a^2+b^2}{c} & c & c \\ a & \frac{b^2+c^2}{a} & a \\ b & b & \frac{c^2+a^2}{b} \end{vmatrix} = 4abc$$

Q.10. Find inverse of following matrix by using elementary transformation:

$$A = \begin{bmatrix} 0 & 1 & 2 \\ 1 & 2 & 3 \\ 3 & 1 & 1 \end{bmatrix}$$

### **Computer Science:**

- Prepare flow diagram for project in c++.
- Read blogs/news related to cyber laws and it act 2008.
- Revise chapter-1,2,3,11,12 and read chapter-13.
- Do assignment of 1-14.

### **Biology:**

1. What provided energy for abiotic synthesis on primitive earth?
2. Explain sex determination in Honey bees
3. Why has natural selection not eliminated sickle – cell anemia?
4. State the recapitulation theory? What is its significance?
5. What is the importance of NC paper in DNA Fingerprinting?
6. What is an operon? Describe the major steps involved in operon regulation.
7. What are the three different ways in which selection may occur? Explain.

8. Mention the contribution of the following scientists
- a) Messelson and Stahl
  - b) Stutervat
  - c) Thomas Morgan
  - d) Hugo de Vries

## **Physical Education:**

### Worksheet-1

#### Planning in sports

- Q1) List the various types of tournaments.
- Q2) What do you mean by the term competition?
- Q3) What is fixture?
- Q4) How can extrinsic motivation sometimes kill intrinsic motivation?
- Q5) Write the formula for giving a Bye.
- Q6) Explain any two objectives of planning.
- Q7) Write a note on the term "knockout". Make a knockout fixture for 16 teams.
- Q8) What is the staircase method of a league tournament?
- Q9) What is Bye? What is the method of fixing Byes?
- Q10) List various objectives of planning sports.
- Q11) Explain the formation of committees and its responsibilities pre, during and post competition or sports events .
- Q 12) What is a league tournament? Draw a fixture for seven teams using round robin method .

## Worksheet-2

### Sports and Nutrition

- Q 1) What do you mean by micro and macro elements of diet.
- Q 2) List various non-nutritive components of diet.
- Q3) Why is roughage essential to our body?
- Q4) List a few pitfalls of dieting.
- Q5) Why does the weightlifter's diet include lots of proteins?
- Q6) Write in brief about important minerals requirement.
- Q7) What do you understand by food myths? Discuss briefly about various food myths.
- Q8) Elaborate the important nutrients /elements of a balance diet.
- Q9) Highlight the disadvantage of food supplements.
- Q10) Write a detailed note on functions of fats in our body along with its daily recommendation.
- Q11) What is the "Role of diet on the performance" of a player?
- Q12) We must take care of the proportion of carbohydrate, protein and fats in our diet. Give reason.

### Worksheet-3

#### Yoga and Lifestyle

Q1) What is yoga?

Q2) Make a list identifying the eight stages of yoga.

Q3) Name the different types of yoga.

Q4) What is obesity?

Q5) Mention a few asanas for curing back pain problems and elaborate the procedures for any one of them.

Q6) Elaborate the procedure for performance and benefits of *parvatasana*.

Q7) Mention the asanas that help in reducing obesity. Give details of any one asana.

Q8) Name the asanas which can be done after having meals. Explain the steps used to perform it. List its advantages.

### Worksheet-4

#### Physical Education and Sports for the Differently-abled

Q1) Define the term disability.

Q2) List different types of disability.

Q3) Write a brief note on symptoms and causes of sensory processing disorder (SPD) ?

Q4) What do you mean by Hyper activity?

Q5) Mention three disorders and explain the nature of any one.

Q6) What are the signs of intellectual disability in children?

Q7) What causes intellectual **disability**?

Q8) What are the causes of physical disability?

Q9) List different types of disorders and give a detailed explanation of each.

Q10) Explain different types of general disorders found in everyday life.

Q11) What are the benefits for physical activity for children with special needs.

Q12) Explain the strategies to make physical activities accessible for children with special needs.

## **Economics:**

Prepare a project based on CBSE guidelines.

Suggested topics are -

1. Production possibility curve
2. Demand/Supply and its determinants
3. Production returns to a factor
4. Cost function and cost curves
5. Monopoly or perfect competition ,or monopolistic competition .or oligopoly forms of market.
6. Government budget and its components
7. Credit creation
8. Exchange rate system

9. BOP

10. Any other relevant topic such as HDI, GST, SHG, Dis-investment policy etc.

**N.B :**

The project report should include : Title , Index , Introduction of the theme , Elaboration, Conclusion , Credits / List of resources used / Bibliography

**Psychology:**

Worksheets on chapter- Intelligence and Aptitude, Self and Personality, Human Strengths and Meeting Life Challenges & Psychological Disorder

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