

**HOLIDAY HOME WORK (2023-24)**

**XII SCIENCE**

**ENGLISH CORE**

**Instructions:-**

Each student is supposed to choose any 1 out of the below mentioned topics and present them in the form of projects.

- Child labour is a blot upon Indian society. There are number of children forced to work in order to earn livelihood and support their parents rather than going to school and enjoying their childhood. It is the responsibility of each adult member of the society to help our children come out of these clutches of child labour.( Lost Spring)
- Linguistic chauvinism and cultural domination has been a common feature of human history and number of communities has faced it. Only those people who have resisted it have been successful in saving their identity.(Last Lesson)
- Modern life is full of worries and stress. As a result there is a very common tendency of escapism. A tendency to avoid the present along with its realities and either live in the past with no problems or live in some utopian world where there is no struggle. This kind of defence mechanism of brain can be a tool of stress management but if too much in use, can have devastating impact upon personality. (Third Level)
- Increasing rivalries and a blind race for victory amongst different countries of the world is increasing day by day. It can be on different platforms weather military or economic front. Instead of all this, there is an undercurrent of kindness flowing in the hearts of all human beings which makes this world worth living.(The Enemy)
- Courage is not the absence of fear but triumph over it
  - Introduction
  - Origin of the quote
  - Courage – a choice to act
  - What can one learn from fear
  - Benefits of having courage over fear
  - How and why to overcome fear
  - Fighting against fear is hard but worth it ( Deep Water)
- Karma- The Infinite Loop (Tiger King)
  - Is Karma an infinite loop?
  - What is karma?
  - Karma- a matter of faith
  - Doctrine of Karma
  - Law of causation/ action and reaction/retribution
  - Philosophy of Karma
  - Theories about Karma
  - The subtle cause and effect of Karma
- Cycle of abuse (Aunt Jennifer’s Tigers, The Lost Spring)
  - Intergenerational violence
  - Effects
  - Causes
  - Prevention
  - Types of abuses
  - Legal way to approach

## Art Integrated project

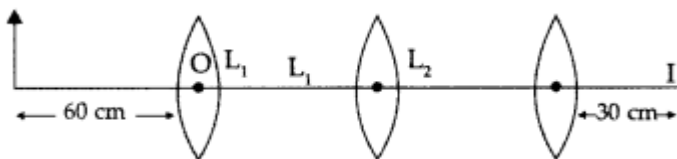
Art-integration is a cross-curricular pedagogical approach that utilizes various aspects and forms of art and culture as the basis for learning of concepts across subjects. As a part of the thrust on experiential learning, art-integrated education will be embedded in classroom transactions not only for creating joyful classrooms, but also for imbibing the Indian ethos through integration of Indian art and culture in the teaching and learning process at every level. This art-integrated approach will strengthen the linkages between education and culture.”

Under this project \*Ek Bharat Shrestha Bharat\* Programme of Government of India has paired State/UT, for **Rajasthan is Nagaland.**

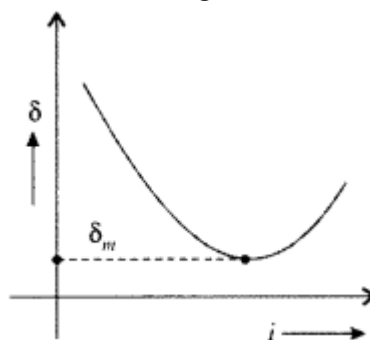
Groups have been already allotted to the students. Do a comparative study and adorn your file with beautiful hand made or print outs and research over the given topic.

### PHYSICS

1. (a) Explain with reason, how the power of a diverging lens changes when
  - (i) it is kept in a medium of refractive index greater than that of the lens,
  - (ii) incident red light is replaced by violet light.
- (b) Three lenses  $L_1$ ,  $L_2$ ,  $L_3$  each of focal length 30 cm are placed co-axially as shown in the figure. An object is held at 60 cm from the optic centre of Lens  $L_1$ . The final real image is formed at the focus of  $L_3$ . Calculate the separation between:
  - (i) ( $L_3$  and  $L_2$ ) and
  - (ii) ( $L_2$  and  $L_3$ ).



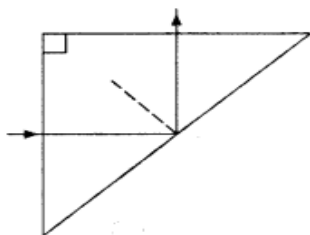
2. (a) Draw a ray diagram to show the image formation by a combination of two thin convex lenses in contact. Obtain the expression for the power of this combination in terms of focal lengths of the lenses.
- (b) A ray of light passing from air through an equilateral glass prism undergoes minimum deviation when the angle of incidence is  $\frac{3}{4}$ th of the angle prism. Calculate the speed of light in the prism.
3. The relation, between the angle of incidence ( $i$ ) and the corresponding, angle of deviation ( $\delta$ ), for a certain optical device, is represented by the graph shown in the figure. Identify this device. Draw a ray diagram for this device and use it for obtaining an expression for the refractive index of the material of this device in terms of an angle characteristic of the device and the angle, marked as  $\delta_m$ , in the graph.



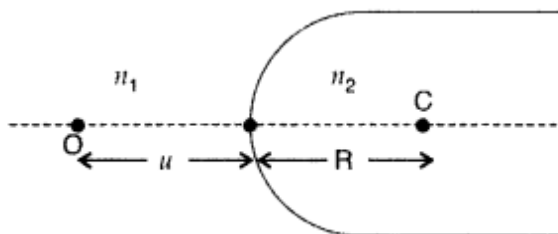
4. (a) A point object, O is on the principal axis of a spherical surface having a radius of curvature, R. Draw a diagram to obtain the relation between the object and image distances, the refractive indices of the media and the radius of curvature of the spherical surface.
- (b) Write the Lens Maker's formula and use it to obtain the range of values of  $\mu$  (the refractive index of the

material of the lens) for which the focal length of an equiconvex lens, kept in air, would have a greater magnitude than that of the radius of curvature of its two surfaces.

5. (a) Draw a labelled ray diagram to obtain the real image formed by an astronomical telescope in normal adjustment position. Define its magnifying power.
- (b) You are given three lenses of power 0.5 D, 4 D and 10 D to design a telescope. Which lenses should be used as objective and eyepiece? Justify your answer. Why is the aperture of the objective preferred to be large?
6. (i) Derive the mathematical relation between refractive indices  $n_1$  and  $n_2$  of two radii and radius of curvature  $R$  for refraction at a convex spherical surface. Consider the object to be a point since lying on the principle axis in rarer medium of refractive index  $n_1$  and a real image formed in the denser medium of refractive index  $n_2$ . Hence, derive lens maker's formula.
- (ii) Light from a point source in air falls on a convex spherical glass surface of refractive index 1.5 and radius of curvature 20 cm. The distance of light source from the glass surface is 100 cm. At what position is the image formed?
7. (i) Plot a graph to show variation of the angle of deviation as a function of angle of incidence for light passing through a prism. Derive an expression for refractive index of the prism in terms of angle of minimum deviation and angle of prism.
- (ii) What is dispersion of light? What is its cause?
- (iii) A ray of light incident normally on one face of a right isosceles prism is totally reflected as shown in figure. What must be the minimum value of refractive index of glass? calculations.



8. (a) A point object 'O' is kept in a medium of refractive index  $n_1$  in front of a convex spherical surface of radius of curvature  $R$  which separates the second medium of refractive index  $n_2$  from the first one, as shown in the figure. Draw the ray diagram showing the image formation and deduce the relationship between the object distance and the image distance in terms of  $n_1$ ,  $n_2$  and  $R$ .



- (b) When the image formed above acts as a virtual object for a concave spherical surface separating the medium  $n_2$  from  $n_1$  ( $n_2 > n_1$ ), draw this ray diagram and write the similar [similar to (a)] relation. Hence obtain the expression for the lens maker's formula.
9. (a) Draw a ray diagram showing the image formation by a compound microscope. Obtain expression for total magnification when the images is formed at infinity.
- (b) How does the resolving power of a compound microscope get affected, when
  - (i) focal length of the objective is decreased.
  - (ii) the wavelength of light is increased? Give reasons to justify your answer.

10. (a) Draw a labelled ray diagram showing the image formation of a distant object by a refracting telescope. Deduce the expression for its magnifying power when the final image is formed at infinity.  
(b) The sum of focal lengths of the two lenses of a refracting telescope is 105 cm. The focal length of one lens is 20 times that of the other. Determine the total magnification of the telescope when the final image is formed at infinity.
11. (a) A point object is placed in front of a double convex lens (of refractive index  $n = n_2/n_1$  with respect to air) with its spherical faces of radii of curvature  $R_1$  and  $R_2$ . Show the path of rays due to refraction at first and subsequently at the second surface to obtain the formation of the real image of the object. Hence obtain the Lens-maker's formula for a thin lens.  
(b) A double convex lens having both faces of the same radius of curvature has refractive index 1.55. Find out the radius of curvature of the lens required to get the focal length of 20 cm.
12. Draw a ray diagram showing the formation of the image by a point object on the principal axis of a spherical convex surface separating two media of refractive indices  $n_1$  and  $n_2$ , when a point source is kept in rarer medium of refractive index  $n_1$ . Derive the relation between object and image distance in terms of refractive index of the medium and radius of curvature of the surface.
13. How is the working of a telescope different from that of a microscope?  
The focal lengths of the objective and eyepiece of a microscope are 1.25 cm and 5 cm respectively. Find the position of the object relative to the objective in order to obtain an angular magnification of 30 in normal adjustment.
14. (a) Plane and convex mirrors produce virtual images of objects. Can they produce real images under some circumstances? Explain  
(b) A virtual image, we always say, cannot be caught on a screen. Yet when we 'see' a virtual image, we are obviously bringing it on to the 'screen' (i.e. the retina) of our eye. Is there a contradiction?  
(c) A diver under water, looks obliquely at a fisherman standing on the bank of a lake. Would the fisherman look taller or shorter to the diver than what he actually is?  
(d) Does the apparent depth of a tank of water change if viewed obliquely? If so, does the apparent depth increase or decrease?  
(e) The refractive index of diamond is much greater than that of ordinary glass. Is this fact of some use to a diamond cutter?
15. A convex lens of focal length 20 cm is placed coaxially with a convex mirror of radius of curvature 20 cm. The two are kept 15 cm apart. A point object is placed 40 cm in front of the convex lens. Find the position of the image formed by this combination. Draw the ray diagram showing the image formation.

## CHEMISTRY

Given below question no 1 to 4 consist of an "Assertion" (A) and "Reason" (R) Type questions. Use the following Key to choose the appropriate answer.

**A.If both (A) and (R) are true, and (R) is the correct explanation of (A).**

**B.If both (A) and (R) are true but (R) is not the correct explanation of (A).**

**C.If (A) is true but (R) is false. D.If (A) is false but (R) is true.**

1. **Assertion:** Presence of a nitro group at ortho or para position increases the reactivity of haloarenes towards nucleophilic substitution.  
**Reason:** Nitro group, being an electron withdrawing group decreases the electron density over the benzene ring.
2. **Assertion:** It is difficult to replace chlorine by  $-OH$  in chlorobenzene in comparison to that in chloroethane.  
**Reason:** Chlorine-carbon (C—Cl) bond in chlorobenzene has a partial double bond character due to resonance.
3. **Assertion:** Chlorobenzene is less reactive than benzene towards the electrophilic substitution reaction.  
**Reason:** Resonance destabilises the carbo cation.

4. **Assertion:** The C–Cl bond length in chlorobenzene is shorter than that in  $\text{CH}_3\text{–Cl}$ .  
**Reason:** In haloarenes Cl is attached to  $\text{sp}^2$  hybridised carbon which is more electronegative than  $\text{sp}^3$  hybridised carbon.
5. Hydrolysis of optically active 2-bromobutane forms optically inactive butan-2-ol. Why?
6. a) Which one out of  $\text{CH}_3\text{CH}(\text{Cl})\text{CH}_2\text{CH}_3$  and  $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{Cl}$  is more easily hydrolysed by  $\text{KOH}(\text{aq})$ .  
b) Arrange the following compounds according to reactivity towards nucleophilic substitution reaction with  $\text{CH}_3\text{ONa}$  4- nitro chloro benzene, 2,4 di nitro chloro benzene, 2,4,6, trinitrochlorobenzene
7. Vinyl chloride is less reactive than allyl chloride. Why?
8. How is chlorobenzene prepared by (a) direct chlorination (b) diazotization method?
9. Why do haloalkenes under go nucleophilic substitution whereas haloarenes under go electrophilic substitution ?
10. What happens when  
a) Thionyl chloride acts upon propan-1-ol. b) Ethanol reacts with  $\text{PBr}_3$
11. What are the IUPAC names of the insecticide DDT and benzenehexachloride? Why is their use banned in India and other countries?
12. Compound 'A' with molecular formula  $\text{C}_4\text{H}_9\text{Br}$  is treated with aq.  $\text{KOH}$  solution. The rate of this reaction depends upon the concentration of the compound 'A' only.  
When another isomer 'B' of this compound was treated with aq.  $\text{KOH}$  solution, the rate of reaction was found to be dependent on concentration of compound and  $\text{KOH}$  both.
- Write down the structural formula of both compounds 'A' and 'B'.
  - Out of these two compounds, which one will be optically active?
13. What is the difference between enantiomers and diastereomers. Illustrate with one example
14. Some alkylhalides undergo substitution whereas some undergo elimination reaction on treatment with bases. Discuss the structural features of alkyl halides with the help of examples which are responsible for this difference?

## CASE BASED

15. Chlorofluoro carbon (CFC) compounds of methane and ethane are collectively known as freons. They are non-inflammable, extremely stable, non-toxic, non-corrosive and low boiling liquids. CFC and gas emitted from the exhaust system of supersonics aeroplanes might be slowly depleting the concentration of the ozone layer in the upper atmosphere. Answer the following questions on the basis of your knowledge in this topic
- Write the formula of freon.
  - Give two uses of chlorofluorocarbons.
  - How does freon-12 deplete ozone layer?
  - Do you think the use of CFCs should be banned? Give reason.
16. Methyl chloride, methyl bromide, ethyl chloride and some chlorofluoromethanes are gases at room temperature. Higher members are liquids or solids. As we have already learnt, molecules of organic halogen compounds are generally polar. Due to greater polarity as well as higher molecular mass as compared to the parent hydrocarbon, the intermolecular forces of attraction (dipole-dipole and van der Waals) are stronger in the halogen derivatives. That is why the boiling points of chlorides, bromides and iodides are considerably higher than those of the hydrocarbons of comparable molecular mass. The attractions get stronger as the molecules get bigger in size and have more electrons.
- Draw all the possible isomers structure of bromobutane and arrange them in increasing order of boiling points.
  - Even though haloalkanes are polar compounds these compounds are least soluble in water. Why?
  - How will you distinguish between chloroethane and bromoethane?



17. i) Arrange in increasing order of boiling points.  
(a) Bromomethane, Bromoform, chloromethane, Dibromo-methane  
(b) 1-chloropropane, Isopropyl chloride, 1-Chlorobutane.  
(c) 1-chloropropane, 1-bromopropane, 1-iodopropane
- ii) Which compound will react faster in SN<sub>2</sub> reaction with OH<sup>-</sup>?  
(a) CH<sub>3</sub>Br and CH<sub>3</sub>I (SN<sub>2</sub>)                      (b) (CH<sub>3</sub>)<sub>3</sub>C-Cl or CH<sub>3</sub>Cl (SN<sub>2</sub>)  
(c) (CH<sub>3</sub>)<sub>3</sub>C-Cl or CH<sub>3</sub>Cl (SN<sub>2</sub>)
18. How the following conversions can be carried out?  
i) But-1-ene to n-butyliodide                      ii) 2-Chloropropane to 1-propanol  
iii) Isopropyl alcohol to iodoforms              iv) Chlorobenzene to p-nitrophenol  
v) 2-Bromopropane to 1-bromopropane

## MATHEMATICS

**Chapter 1-** All Examples

**Chapter 2-** All Formula

**Chapter 3-** Short questions (RD Sharma) example

**Chapter 4-** All Examples

## BIOLOGY

1. Explain the male reproductive system.
2. Explain the female reproductive system
3. Explain spermatogenesis.
4. Explain oogenesis.
5. Draw a well labeled diagram of male and female reproductive system.
6. State the function of filiform apparatus found in mature embryo sac of an angiosperm.
7. Explain the process of microsporogenesis.
8. Draw a diagrammatic sketch of a T.S. of an anther of an angiosperm.

## INFORMATICS PRACTICES

Complete your projects (topics given already individually to students), take inputs from the users for each functions/blocks defined in the program.

Topics:

1. Store Management
2. School Management
3. IPL Score Board
4. Game Shop
5. Library Management

Submit your project (blue print and code) on below mentioned email id.

supriyabansal1012@gmail.com

Write the code in your practical files (after getting it verified).