

# SHREE VASISHTHA VIDHYALAYA

## ENGLISH MEDIUM (CBSE)



### Class-XII (Science)

#### Celebrate Responsibly — The Vasishtha Way

Dear Students of Grades XI & XII,

As the festive season approaches, Shree Vasishtha Vidhyalaya extends warm wishes for a joyful, safe, and meaningful Diwali. May this festival of lights bring peace, happiness, and renewed energy to you and your families.

As senior students and role models of the school, you are encouraged to celebrate Diwali in a manner that reflects the Vasishthian values of mindfulness, responsibility, and continuous learning. During the Diwali break, we invite you to engage in the following purposeful activities:

##### Celebrate an Eco-friendly Diwali:

Opt for traditional diyas and natural decorations. Minimize or avoid firecrackers and plastic waste, demonstrating care for the environment.

##### Read and Reflect:

Select at least one book of your choice — fiction, biography, or an inspiring non-fiction title. Reading enhances critical thinking, creativity, and self-awareness.

##### Access our Digital Library – Vasishtha Learning Space:

<https://vasishthalearningspace.my.canva.site/vasishtha-digital-library>

##### Learn a New Skill:

Explore a skill that interests you — communication, creative writing, coding, photography, cooking, or basic financial literacy. Learning together or individually strengthens knowledge and life skills.

##### Recommended platforms:

SWAYAM: <https://swayam.gov.in>

AI for All (Ministry of Education): <https://ai-for-all.in/>

##### Adopt a Healthy Habit:

Incorporate small yet consistent routines — morning exercise, digital detox, mindful eating, or journaling. These habits foster discipline, well-being, and resilience.

Let this Diwali illuminate not only your surroundings but also inspire self-growth, learning, and responsibility.

Wishing all our senior students a safe, eco-conscious, and enriching festive season.

With warm regards,

Shree Vasishtha Vidhyalaya

**Happy Learning !  
Happy Diwali !**

# Assignment (2025 26)

## STD-XII Science

### Please Note:

1. Students are requested to complete the holiday homework in their school notebooks.
2. The school will reopen on Thursday, 6<sup>th</sup> November 2025. for all students (Classes XI-XII), as mentioned in the almanac.

### ENGLISH CORE

**Note: Write in project paper and submit in separate file with Name, Class, Roll No & Subject.**

#### Writing Skills

1. Draft a notice inviting students to participate in various activities for the 'Diwali Eco-Celebration Week' organized by your school.
2. Write a formal invitation inviting the principal, staff, and students to attend the Diwali Mela organized by your school.
3. Write an article in 120–150 words on the topic 'Celebrating a Safe and Eco-friendly Diwali.'
4. Write a report on how your school celebrated Diwali with joy and responsibility, highlighting cultural programmers, decorations, and social awareness drives.
5. Write a letter to the editor of a national daily expressing concern about the rising pollution during Diwali and suggesting measures to control it.

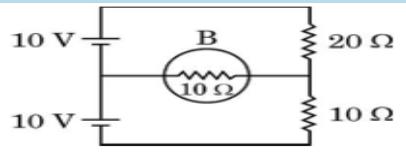
#### Literature

6. What message does the story 'The Last Lesson' convey about language and patriotism?
7. How does the title 'Lost Spring' justify the theme of the story?
8. What lesson does the story 'Deep Water' teach about overcoming fear?
9. How does the story 'The Rattrap' show that goodness can bring transformation?
10. What emotions does the poet experience in 'My Mother at Sixty-Six' while leaving her mother?
11. What is the central idea of the poem 'Keeping Quiet'?
12. How does the story 'The Third Level' reflect the human desire to escape reality?
13. What is the irony in the ending of 'The Tiger King'?
14. What makes Antarctica the perfect place to understand the earth's past, present, and future?

### PHYSICS

- Q1. What is the source of force acting on a current-carrying conductor placed in a magnetic field?  
A point charge  $q$  moving with velocity  $v$  in a uniform magnetic field  $B$ . Find the work done by the magnetic force on the charge.
- Q2. A thin pencil of length  $(f/4)$  is placed coinciding with the principal axis of a mirror of focal length  $f$ . the image of the pencil is real and enlarged, just touches the pencil. Calculate the magnification produced by the mirror.
- Q3. A small conducting sphere A of radius  $r$  charged to a potential  $V$ , is enclosed by a spherical conducting shell B of radius  $R$ . if A and B are connected by a thin wire, calculate the final potential on sphere A and shell B.
- Q4. Three point charges  $Q_1$ ,  $Q_2$  and  $Q_3$  are located in x y plane at points  $(d, 0)$ ,  $(0, 0)$  and  $(d, 0)$  respectively.  $Q_1$  and  $Q_3$  are identical and  $Q_2$  is positive. What will be the nature and value of  $Q_1$  so that the potential energy of the system is zero ?
- Q5. Draw a plot of frequency  $v$  of incident radiations as function of stopping potential  $V_0$  for a given photo emissive material. What information can be obtained from the value of the intercept on the stopping potential axis?  
Calculate (i) the momentum and (ii) de Broglie wavelength, of an electron with kinetic energy of 80 eV.
- Q6. Differentiate between the peak value and root mean square value of an alternating current. Derive the expression for the root mean square value of alternating current, in terms of its peak value.
- Q7. a) A low voltage battery from which high current is required must have low internal resistance. Justify.  
b) A high voltage battery must have a large internal resistance. Justify.

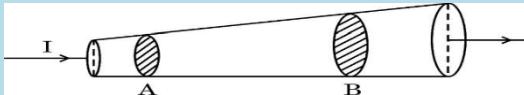
**Q8.** Two cells of emf 10 V each, two resistors of  $20\ \Omega$  and  $10\ \Omega$  and a bulb B of  $10\ \Omega$  resistance are connected together as shown in the figure. Find the current that flows through the bulb.



**Q9.** A current of 5 A is passing along  $+X$  direction through a wire lying along X-axis. Find the magnetic field  $\vec{B}$  at a point  $\vec{r} = (3\hat{i} + 4\hat{j})\text{ m}$  due to 1 cm element of the wire, centred at origin.

**Q10.** Current  $I$  ( $= 1\text{ A}$ ) is passing through a copper rod ( $n = 8.5 \times 10^{28}\text{ m}^{-3}$ ) of varying cross-sections as shown in the figure. The areas of cross-section at points A and B along its length are  $1.0 \times 10^{-7}\text{ m}^2$  and  $2.0 \times 10^{-7}\text{ m}^2$  respectively.

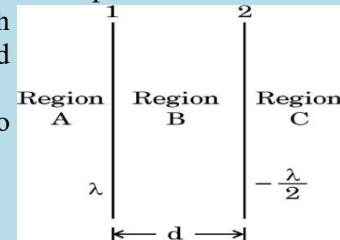
Calculate: (a) the ratio of electric fields at points A and B



**Q11.** a) "There is a limit to the amount of charge that can be stored on a given capacitor. Explain.  
b) A capacitor is charged by a battery to a potential difference  $V$ . It is disconnected from the battery and connected across another identical uncharged capacitor. Calculate the ratio of total energy stored in the combination to the initial energy stored in the capacitor.

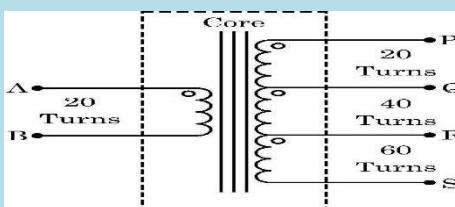
**Q12.** Two infinitely long straight wires 1 and 2 are placed  $d$  distance apart, parallel to each other, as shown in figure. They are uniformly charged having charge densities  $\lambda$  and  $\lambda/2$ .

Locate the position of the point from the wire 1 at which the net electric field is zero and identify the region in which it lies.



**Q13.** The number of turns between different pairs of output terminals are shown for a step up transformer.

Input voltage of 20 V is applied between A and B. between which two terminals will the output be 100 V? explain.

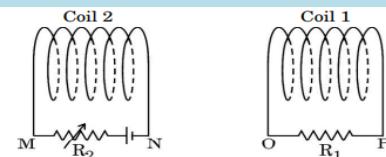


**Q14.** Radiations of two frequencies are incident on a metal surface of work function 2 eV one by one. The energies of their photons are 2.5 eV and 4.5 eV respectively. Find the ratio of the maximum speed of the electrons emitted in the two cases.

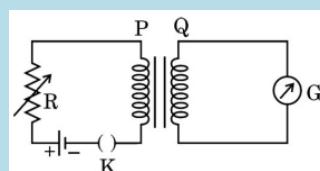
**Q15.** Two coils 1 and 2 are placed close to each other as shown in the figure. Find the direction of induced current in coil 1 in each of the following situations, justifying your answers:

(i) Coil 2 is moving towards coil 1  
(ii) Coil 2 is moving away from coil 1

(iii) The resistance connected with coil 2 is increased keeping both the coil stationary.

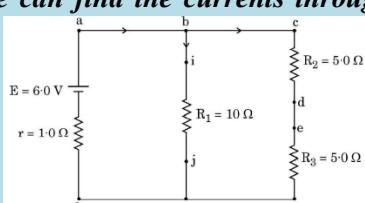


**Q16.** Consider the arrangement of two coils P and Q shown in the figure. When current in coil P is switched on or switched off, a current flows in coil Q. (a) Explain the phenomenon involved in it. (b) Mention two factors on which the current produced in coil Q depends. (c) Give the direction of current in coil Q when there is a current in the coil P and (i)  $R$  is increased, and (ii)  $R$  is decreased.



**Q17.** A beam of light consisting of a known wavelength 520 nm and an unknown wavelength  $\lambda$  experiment produces two interference patterns such that the fourth bright fringe of unknown wavelength coincides with the fifth bright fringe of known wavelength. Find the value of  $\lambda$ .

**Q18.** The following figure shows a circuit diagram. We can find the currents through and potential differences across different resistors using Kirchhoff's rules.



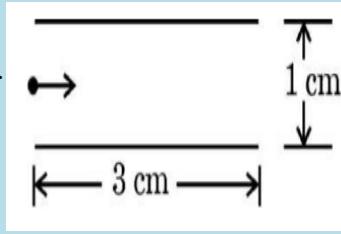
Answer the following questions based on above:

- Which points are at the same potential in the circuit?
- What is the current through arm bg?
- Find the potential difference across resistance  $R_3$ .
- What is the power dissipated in the resistance  $R_2$ ?

**Q19.** A beam of electrons moving horizontally with a velocity of  $3 \times 10^7 \text{ m/s}$  enters a region between two plates as shown in the figure. A suitable potential difference is applied across the plates such that the electron beam just strikes the edge of the lower plate.

Answer the following questions based on the above:

- How long does an electron take to strike the edge?
- What is the shape of the path followed by the electron and why?
- Find the potential difference applied?
- Find the magnitude and direction of the magnetic field which should be created in the space between the plates so that the electron beam goes straight undeviated.



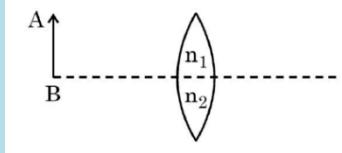
**Q20.** Diffraction of light is bending of light around the corners of an object whose size is comparable with the wavelength of light. Diffraction actually defines the limits of ray optics. This limit for optical instruments is set by the wavelength of light. An experimental arrangement is set up to observe the diffraction pattern due to a single slit.

Answer the following questions based on the above:

- How will the width of central maximum be affected if the wavelength of light is increased?
- Under what conditions is the first minimum obtained?
- Two students are separated by a 7 m partition wall in a room 10 m high. If both light and sound waves can bend around obstacles, how is it that the students are unable to see each other even though they can converse easily?

**Q21.** A lens is transparent optical medium bounded by two surfaces; at least one of which should be spherical. Considering image formation by a single spherical surface successively at the two surfaces of a lens, lens maker's formula is obtained. It is useful to design lenses of desired focal length using surfaces of suitable radii of curvature. This formula helps us obtain a relation between  $u$ ,  $v$ , and  $f$  for a lens. Lenses form images of objects and they are used in a number of optical devices, for example microscope and telescopes.

- An object AB is kept in front of a compound convex lens, as shown in the figure. Will the lens produce one image? If not, explain.



- A real image of an object formed by a convex lens is observed on a screen. If the screen is removed, will the image still be formed? Explain.
- Two convex lenses A and B of focal lengths 15 cm and 10 cm respectively are placed coaxially at a distance  $d$  apart. A point object is kept at a distance 30 cm in front of lens A. Find the value of  $d$  so that the rays emerging from lens B are parallel to its principal axis.

## CHEMISTRY

- What is the general formula for an aldehyde and a ketone?
- How can you distinguish between ethanal and propanal?
- Name the functional group present in aldehydes and ketones.
- What is the IUPAC name of  $\text{CH}_3\text{CHO}$ ?
- Why do aldehydes generally undergo oxidation more easily than ketones?
- Why aldehydes are more reactive toward nucleophilic addition reaction than ketone?
- What is the product when an aldehyde reacts with Fehling's solution?
- Write the mechanism of nucleophilic addition of HCN to a carbonyl compound.
- What is the outcome when a ketone undergoes reduction with  $\text{LiAlH}_4$ ?
- How can you convert a ketone to a hydrocarbon using the Clemmensen reduction?
- Explain the difference in reactivity between formaldehyde, acetaldehyde, and acetone towards nucleophilic addition.
- Convert the following:
  - Ethanal to but-2-enal
  - but-2-ene to ethanal
  - propanone to propane
- What is the IUPAC name of  $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$ ?
- Which test is used to distinguish between primary, secondary, and tertiary alcohols?
- Describe the mechanism of dehydration of ethanol to ethene.
- How can you convert ethanol to ethanoic acid?
- What happens when an alcohol reacts with sodium metal? Write the reaction.

18. What is the structure and functional group of phenol?
19. Why is phenol more acidic than alcohols?
20. What happens when phenol reacts with bromine water?
21. Write the mechanism of the Kolbe's reaction.
22. How does phenol react with dilute nitric acid and concentrated nitric acid?
23. What is the IUPAC name of  $\text{CH}_3\text{CH}_2\text{-O-CH}_2\text{CH}_3$ ?
24. Describe the Williamson synthesis of ethers.
25. Why do ethers show low reactivity towards nucleophiles?
26. What is the product when diethyl ether reacts with HI?
27. How can you distinguish between an ether and an alcohol using a chemical test?
28. Convert the following:
  - (a) Ethanol to ethene
  - (b) Phenol to salicylic acid
  - (c) Anisole to benzene
29. Explain the mechanism of dehydration of ethanol to give ethene.
30. Write a chemical test to distinguish ethanol and phenol.

## MATHEMATICS

1. Let  $A = \{1, 2, 3, \dots, 9\}$  and  $R$  be the relation defined on  $A \times A$  by (a, b)  $R$  (c, d) if  $a + d = b + c$ . Prove that  $R$  is an equivalence relation. Also find the equivalence class  $[(2, 5)]$ .
2. Show that the function  $f: R \rightarrow \{x: x \in R, -1 < x < 1\}$  given by  $f(x) = \frac{x}{1+|x|}$  is one-one and onto. Hence find the inverse of  $f$ .
3. Show that the function  $f$  in  $A = R - \left\{\frac{2}{3}\right\}$  defined as  $f(x) = \frac{4x+3}{6x-4}$  is onto.
4. Complete the tables:

Function	Domain	Principal value	Graph
$\sin^{-1} x$			
$\cos^{-1} x$			
$\tan^{-1} x$			
$\cot^{-1} x$			
$\sec^{-1} x$			
$\operatorname{cosec}^{-1} x$			

5. Find the domain of  $\sin^{-1}(x^2 - 4)$ .
6. Write the solution of  $\tan^{-1} \left[ 2\sin \left[ 2\cos^{-1} \left( \frac{\sqrt{3}}{2} \right) \right] \right]$ .
7. Prove that:  $\tan^{-1} \left( \frac{\sqrt{1+x}-\sqrt{1-x}}{\sqrt{1+x}+\sqrt{1-x}} \right) = \frac{\pi}{4} - \frac{1}{2} \cos^{-1} x, -\frac{1}{\sqrt{2}} \leq x \leq 1$
8. Prove that the product of matrices  $\begin{bmatrix} \cos^2 \theta & \cos \theta \sin \theta \\ \cos \theta \sin \theta & \sin^2 \theta \end{bmatrix}$  and  $\begin{bmatrix} \cos^2 \varphi & \cos \varphi \sin \varphi \\ \cos \varphi \sin \varphi & \sin^2 \varphi \end{bmatrix}$  is a null matrix, when  $\theta$  and  $\varphi$  differ by an odd multiple by  $\frac{\pi}{2}$ .
9. If  $A = \begin{bmatrix} \cos \alpha & \sin \alpha \\ -\sin \alpha & \cos \alpha \end{bmatrix}$ , then find  $\alpha$  satisfying  $0 < \alpha < \frac{\pi}{2}$  when  $A + A^T = \sqrt{2} I_2$ , where  $A^T$  is transpose of  $A$ .
10. Find the maximum value of  $\begin{vmatrix} 1 & 1 & 1 \\ 1 & 1 + \sin \theta & 1 \\ 1 & 1 & 1 + \cos \theta \end{vmatrix}$ .
11. If  $A = \begin{bmatrix} 3 & -1 \\ 4 & 5 \end{bmatrix}$ , find  $\operatorname{adj}(\operatorname{adj} A)$ .
12. If  $A$  is a  $3 \times 3$  invertible matrix, show that for any scalar  $k \neq 0$ ,  $(KA)^{-1} = \frac{1}{k} A^{-1}$ . Hence calculate  $(3A)^{-1}$ , where  $A = \begin{bmatrix} 2 & -1 & 1 \\ -1 & 2 & -1 \\ 1 & -1 & 2 \end{bmatrix}$ .
13. For what value of  $a$  is the function  $f$  defined by  $f(x) = \begin{cases} a \sin \frac{\pi}{2}(x+1), & x \leq 0 \\ \frac{\tan x - \sin x}{x^3}, & x > 0 \end{cases}$  is continuous at  $x=0$ ?
14. Discuss the continuity and differentiability of the function  $f(x) = |x| + |x-1|$  in the interval  $(-1, 2)$ .

15. Differentiate the given function with respect to x,  $f(x) = \sqrt{\log\{\sin\left(\frac{x^3}{3} - 1\right)\}}$ .

16. The radius r of a right circular cone is decreasing at the rate of 3 cm/minute and the height h is increasing at the rate of 2 cm/minute. When r = 9 cm and h = 5 cm, find the rate of change of its volume.

17. Find the intervals in which the function  $f(x) = \sin x - \cos x, 0 \leq x \leq 2\pi$  is  
 (a) strictly increasing      (b) strictly decreasing.

18. Find all the points of local maxima and local minima of function  $f(x) = -x + 2 \sin x$  on  $[0, 2]$ . Also, find local maximum and minimum values.

19. A tank with rectangular base and rectangular sides open at the top is to be constructed so that its depth is 3 m and volume is  $75 \text{ m}^3$ . If building of tank costs Rs. 100 per square meter for the base and Rs. 50 per square meter for the sides, find the cost of least expensive tank.

20. Evaluate:  $\int \frac{\cos x \, dx}{1 + \cos x + \sin x}$ .

21. Find  $\int \frac{2x-1}{(x-1)(x+2)(x-3)} \, dx$

22. Evaluate:  $\int_{-\pi/4}^{\pi/4} \log(\sin x + \cos x) \, dx$

23. Using integration, find the area of the ellipse  $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ , bounded between the lines  $x = -\frac{a}{2}$  to  $x = \frac{a}{2}$ .

24. Solve the differential equation  $2(y+3) - xy \frac{dy}{dx} = 0$  given  $y(1) = -2$ .

25. Solve the differential equation:  $x^2 y \, dx - (x^3 + y^3) \, dy = 0$ .

## BIOLOGY

1. The scutellum observed in a grain of wheat or maize is comparable to which part of the seed in other monocotyledons?  
 (i) Cotyledon      (ii) Endosperm      (iii) Aleurone layer      (iv) Plumule

2. During microsporogenesis, meiosis occurs in :  
 (i) Endothecium      (ii) Microspore mother cells  
 (iii) Microspore tetrads      (iv) Pollen grains.

3. Name a technique by which DNA fragments can be separated.

4. Which of the following is required to perform polymerase chain reaction?  
 (i) Primers, dNTPs and DNA polymerase      (ii) DNA,  $\text{CaCl}_2$  and nuclease  
 (iii)  $\text{Mg}^{+2}$ , DNA      (iv) Both (i) and (iii)

5. Which of the given statement is correct in the context of observing DNA separated by agarose gel electrophoresis?  
 (i) DNA can be seen in visible light  
 (ii) DNA can be seen without staining in visible light  
 (iii) Ethidium bromide stained DNA can be seen in visible light  
 (iv) Ethidium bromide stained DNA can be seen under exposure to UV light.

6. Which of the following will not result in variations among siblings ?  
 (a) Independent assortment of genes      (b) Crossing over  
 (c) Linkage      (d) Mutation

7. If mammalian ovum fails to get fertilised, which one of the following is unlikely ?  
 (a) Corpus luteum will disintegrate.      (b) Progesterone secretion rapidly declines.  
 (c) Estrogen secretion increases.      (d) Primary follicle starts developing

8. Antigen binding site in an antibody is found between  
 (a) two light chain  
 (b) two heavy chains  
 (c) one heavy chain and one light chain  
 (d) either between two light chains or between one heavy and one light chain depending upon the nature of antigen.

### Very short type questions

9. Name the bacteria which are used as a clot buster. Mention about its mode of action.

10. How can microbes be used to decrease the use of chemical fertilizers and pesticides?

11. Mention the site in the body where the B-cells and T-cells are formed. Give one difference between them.

12. Mention the site in the body where the B-cells and T-cells are formed. Give one difference between them.
13. What is adaptive radiation.
14. State a reason for the increased population of dark-colored moths coinciding with the loss of lichens.
15. Give the scientific term for the following:
  1. Release of the ovum from the ovary.
  2. Onset of the menstrual cycle in females.
  3. The structures that pick-up ova from the body cavity.
16. Name the muscular and glandular layer of the human uterus. Which one of these layers undergoes cyclic changes during the menstrual cycle? Name the hormone essential for the maintenance of this layer.
17. Draw a labeled diagram of a part of the seminiferous tubule showing spermatogenesis.
18. (i) List any four characteristics of an ideal contraceptive.  
 (ii) Name two intrauterine contraceptive devices that affect the motility of sperms
19. Name any two assisted reproductive technologies that help infertile couples to have children.

### Long Questions

20. (a) State the hypothesis which S.L. Miller tried to prove in the laboratory with the help of the set up given above.  
 (b) Name the organic compound observed by him in the liquid water after running the above experiment.  
 (c) A scientist simulated a similar set up and added CH<sub>4</sub>, NH<sub>3</sub> and water vapour at 800°C.
21. Differentiate between proliferative and secretory phases.
22. One of the codons on mRNA is AUG. Draw the structure of the tRNA adapter molecule for this codon. Explain the uniqueness of this tRNA.
23. The outline structure of a drug is given below:
  1. Which group of drugs does this represent?
  2. What are the modes of consumption of these drugs?
  3. Name the organ of the body which is affected by the consumption of this drug
24. (a) Explain linkage and recombination as put forth by T.H. Morgan based on his observations with *Drosophila melanogaster* crossing experiment.  
 (b) Write the basis on which Alfred Sturtevant explained gene mapping.

----- : Assertion & Reason : -----

Question 1: Assertion: The first part of the dicot embryo to appear above ground is the leaf.

Reason: Leaves increase the size of plants.

Question 2: Assertion: Insects visit flowers to gather honey.

Reason: Attraction of flowers prevents the insects from damaging the parts.

Question 3: Assertion-The embryo with 8 to 16 blastomeres is called a morula.

Reason-The morula continuously divides to transform into trophoblast.

Question 4: Assertion- the fertilized egg contains 23 pairs of chromosomes

Reason-zygote is formed by the fusion of egg and the sperm.

Question 5: Assertion: Artificial insemination is the method of introduction of semen inside the female.

Reason: This technique is used in those cases where males have low sperm count.

Question 6: Assertion: In dog flowers F<sub>1</sub> plants produce pink flowers.

Reason: It is due to codominance of flower colour alleles with both genes expressing themselves equally.

Question 7: Assertion: Gametes receives only one allele of a gene.

Reason: During gamete formation, mitosis takes place leads to formation of haploid cells.

Question 8: Assertion: A test cross is used to determine the phenotype of an organism.

Reason: F<sub>2</sub> generation of a monohybrid test cross produces one or two phenotypes depending upon the genotype of the unknown organism.

Question 9: Assertion- Wings of butterfly and bat show analogy.

Reason- Analogous organs are anatomically different but functionally similar.

Question 10: Assertion -Hardy Weinberg principle explains the occurrence of variation in population and Species.

Reason- It concludes that disturbances in genetic equilibrium results in evolution.

Question 11: Assertion- Virus infected cells secrete proteins called interferons which protect non -infected cells from further viral infection.

Reason- It is a case of physiological barriers.

Question 12: Assertion- Heroin is an opioid.

Reason- Heroin is obtained from poppy plant.

Question 13: Assertion- Rheumatoid arthritis is an auto-immune disease.

Reason- Here, body attacks self-cells.

Question 14: Assertion: Cyanobacteria like Nostoc and Anabaena are used as biofertilisers.

Reason: Cyanobacteria absorb phosphorus from soil and passes it to crop.

Question 15: Assertion: Saccharomyces cerevisiae is used for making bread.

Reason: Fermentation carried out by Yeast enzymes produces CO<sub>2</sub> .

Question 16: Assertion: the double-stranded DNA is denatured by subjecting it to high temperature of 940 C for 15 seconds.

Reason: One of the separated strands of the DNA is destroyed during denaturation and the other act as a template.

Question 17: Assertion: Genetic engineering can overcome the drawbacks of traditional hybridization.

Reason: Genetic engineering can create desired DNA sequences to meet specific requirements Drawing diagram in plane copy ensure the diagram is clear and well labelled.

**Important Diagrams from all 2 units have been listed below.**

#### **UNIT 06: REPRODUCTION**

Asexual reproductive structures, Diversity of sexuality in Monoecious plant Chara and Dioecious plant Marchantia, T.S (Transverse Section) of a young anther, Stages of microspore maturing into a pollen grain, Anatropous ovule, Mature Embryo Sac, Female Reproductive System in Human Beings, All Diagrams of Gametogenesis topic.

#### **UNIT 07: GENETICS AND EVOLUTION**

Punnet Square, Diagram of Test cross, Incomplete dominance and Dihybrid cross, Pedigree Analysis, Nucleosome, The Hershey-Chase experiment, Replicating Fork, Transcription unit of tRNA, lac Operon, Operation of natural selection on different trait

## **INFORMATICS PRACTICES**

#### **Instructions:**

1) To be Done in IP NoteBook

#### **Python**

- 2) Write a python program to create a dataframe of your choice inspired by your Diwali celebration by taking at least 4 columns and 5 rows and write commands to do the following tasks.
- 3) Add a new record of your choice during runtime.
- 4) Modify the column names to any other names.
- 5) Modify any particular column values to some other values.
- 6) Delete a specific column.
- 7) Delete a specific row
- 8) display first 3 rows
- 9) display last 2 rows.

#### **Mysql**

- 1) Write query to create a database named as vacation.
- 2) Create 2 tables inspired by your vacation trips & observing data around you.
- 3) Specify the reason of selection primary key and foreign key.
- 4) Write a query to add a new column after the table is being created.
- 5) Write a query to modify any specific column name.
- 6) Write a query to delete any record from any table.
- 7) Write a query to show the use of equi join
- 8) Write a query to drop any particular column.
- 9) Write a query to drop both the tables as well as database.

## **PHYSICAL EDUCATION**

1. How can a balanced diet help different family members maintain an ideal body weight?
2. Suggest five healthy dietary habits that a family can adopt to prevent obesity and lifestyle diseases.
3. Explain how regular practice of yoga asanas and pranayama helps in reducing stress and improving mental health.
4. Detail any 4 yoga asanas or pranayama techniques beneficial for gastric problem and period pains.
5. Why is maintaining personal hygiene important for overall health and social well-being?
6. List any five good personal hygiene practices that should be followed in daily life.

### **ARTIFICIAL INTELLIGENCE**

1. What is Artificial Intelligence? Give one real-life example of AI in daily life.
2. How does Google Maps use Artificial Intelligence to help users in real-time navigation?
3. Mention one way AI is used in the healthcare industry. Briefly explain its benefit.
4. How can AI-powered chatbots help businesses improve customer service?
5. Give an example of how AI is used in the education sector. How does it help students?
6. What role does AI play in e-commerce platforms like Amazon or Flipkart?
7. Describe how AI is used in self-driving cars. Mention one advantage.
8. How do smart assistants like Alexa or Siri use Natural Language Processing (NLP)?
9. Explain how AI helps in spam detection in email services.
10. Give one example of AI in agriculture and explain its benefit to farmers.
11. What is Machine Learning? How is it used in Netflix or YouTube recommendations?
12. How can facial recognition systems be used in school security systems?
13. Mention one way AI is helping during natural disasters like floods or earthquakes.
14. How is AI used in banking for fraud detection? Give a real-world example.
15. Describe how AI can help reduce traffic in smart cities.

#### **NOTE:**

- ❖ Students need to complete the subject specific assignments as per the instructed norms.
- ❖ **Submission date for all assignments is 12<sup>th</sup> November, 2025, Wednesday.**
- ❖ These assignments are a part of the Internal Assessments and will be marked for the same. It is mandatory for the students to complete the assignments and submit it to the concerned teachers.
- ❖ Students are requested to clarify any doubts about the assignments during regular classes.

*May the auspicious glow of Diwali Illuminate your Life with joy, prosperity, good health and hosting success.*

