

**ST. COLUMBUS SCHOOL**  
**DAYAL BAGH, FARIDABAD**  
**CLASS – XII (SCIENCE)**  
**HOLIDAY HOMEWORK (2024-25)**

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**General Instructions:-**

1. Revise the completed syllabus of all the subjects for the Test to be held in July.
  2. Holiday Homework of English, Chemistry, Biology and Mathematics should be done in the respective class work register.
  3. Holiday Homework of Physics should be done in a separate notebook.
  4. Holiday Homework of Computer Science should be done in ruled sheets.
  5. Holiday Homework of Physical Education should be done in the school Practical file.
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**SUBJECT – ENGLISH**

**Answer the questions in 150-200 words.**

1. Revise the syllabus covered.
2. Prepare an article on “Importance of Discipline” for a local daily newspaper in about 150 to 200 words.
3. Rising population, fast and competitive lifestyle, lack of nutritious food, etc. have caused woes for a large section of our population. Providing health care used to be charitable and ethical activity. Today it has become commercialized a money spinning business. Write an article on “How to Provide Proper Healthcare to the Common Man”? You are Karan/Karuna.
4. Mukesh was finally able to fulfil his desire and he became a motor mechanic. He got a job with the most famous car makers Maruti that started a workshop in Firozabad. He lives in a decent house with his wife and children. He remembers his interaction that he had with Anees Jung years ago. He decided to write a letter informing her about his present status of life. Write this letter in about 150 to 200 words.
5. Write a letter to an editor of a national daily in about 150 words, expressing views on nuisance created by stray animals on the road.
6. You are Dhruv/Dhruvika, student editor of your school magazine, “The Buds”. Write a notice to be placed on your school notice board, inviting short stories, articles, poems, etc. from students of all classes for the school magazine. Give all the necessary details.
7. Write in detail the way you employ to avoid harsh reality.(Deep Water)
8. Write a report for your school magazine in about 150 words on Inter House English Poem Recitation competition held at our school.
9. Justify the title of the lesson “Lost Spring”. (200 words)
10. Highlight the significance of the title “My Mother at 66”
11. “A teacher should be a friend, philosopher and a guide for his pupils”. Do you think M. Hamel fits into this image for a teacher? Discuss.

12. What is the advantage of Keeping Quiet?
13. Who is the hero of the story, 'The Tiger King'? How may he be identified?
14. The barefoot rag-pickers of Seemapuri live in periphery of Delhi, yet metaphorically speaking, miles away from it. Comment.
15. What do you think about the Sam's letter to Charley?
16. Make a project file on any one chapter already explained in the class.

### **SUBJECT – PHYSICS**

1. Which orientation of an electric dipole in a uniform electric field would correspond to stable equilibrium?
2. If the radius of the Gaussian surface enclosing a charge is halved, how does the electric flux through the Gaussian surface change ?
3. Define the term electric dipole moment of a dipole. State its S.I. unit
4. In which orientation, a dipole placed in a uniform electric field is instable, unstable equilibrium ?
5. Derive Coulomb's Law from Gauss's Law.
6. Name the physical quantity whose S.I. unit is  $JC^{-1}$ . Is it a scalar or a vector quantity?
7. Define electric dipole moment. Write its S.I. unit.
8. Why should electrostatic field be zero inside a conductor?
9. Why must electrostatic field be normal to the surface at every point of a charged conductor?
10. A charge 'q' is placed at the centre of a cube of side l. What is the electric flux passing through each face of the cube?
11. A charge 'q' is placed at the centre of a cube of side l. What is the electric flux passing through two opposite faces of the cube?
12. Depict the direction of the magnetic field lines due to a circular current carrying loop.
13. What is the direction of the electric field at the surface of a charged conductor having charge density  $\sigma < 0$ ?
14. Why do the electric field lines not form closed loops?
15. Is the electric field due to a charge configuration with total charge zero, necessarily zero? Justify.
16. Two charges of magnitudes  $-2Q$  and  $+Q$  are located at points (a, 0) and (4a,0) respectively. What is the electric flux due to these charges through a sphere of radius '3a' with its centre at the origin?
17. Two charges of magnitudes  $-3Q$  and  $+2Q$  are located at points (a, 0) and (4a, 0) respectively. What is the electric flux due to these charges through a sphere of radius '5a' with its centre at the origin?
18. Write the expression for the work done on an electric dipole of dipole moment p in turning it from its position of stable equilibrium to a position of unstable equilibrium in a uniform

electric field E.

19. Why do the electrostatic field lines not form closed loops?
20. A point charge +Q is placed in the vicinity of a conducting surface. Draw the electric field lines between the surface and the charge.
21. The electric field intensity is zero at a point 'P' on the line joining them as shown. Write two conclusions that you can draw from this.
22. What is the electric flux through a cube of side 1 cm which encloses an electric dipole?
23. Why are electric field lines perpendicular at a point on an equipotential surface of a conductor?
24. How does the electric flux due to a point charge enclosed by a spherical Gaussian surface get affected when its radius is increased?
25. Show on a plot the nature of variation of the electric field (E) and potential (V), of a (small) electric dipole with the distance (r) of the field point from the centre of the dipole.
26. Does the charge given to a metallic sphere depend on whether it is hollow or solid? Give reason for your answer.
27. Draw a plot showing variation of electric field with distance from the centre of a solid conducting sphere of radius R, having a charge of +Q on its surface.
28. Derive an expression for the torque experienced by an electric dipole kept in a uniform electric field.
29. Define electric flux. Write its S.I. unit. A charge q is enclosed by a spherical surface of radius R. If the radius is reduced to half, how would the electric flux through the surface change?
30. A spherical conducting shell of inner radius  $r_1$  and outer radius  $r_2$  has a charge 'Q'. A charge 'q' is placed at the centre of the shell.
  - (a) What is the surface charge density on the
    - (i) inner surface,
    - (ii) outer surface of the shell?
  - (b) Write the expression for the electric field at a point  $x > r_2$  from the centre of the shell.

### **SUBJECT – CHEMISTRY**

1. What is the significance of Henry's Law constant  $K_H$  ?
2. Why are aquatic species more comfortable in cold water in comparison to warm water?
3. (a) Explain the following phenomena with the help of Henry's law.
  - (i) Painful condition known as bends.
  - (ii) Feeling of weakness and discomfort in breathing at high altitude.(b) Why does soda water bottle kept at room temperature fizzes on opening?
4. How does sprinkling of salt help in clearing the snow-covered roads in hilly areas? Explain the phenomenon involved in the process.
5. Write the cell reaction of a lead storage battery when it is discharged. How does the density of the electrolyte change when the battery is discharged?

6. Calculate the mass of a non-volatile solute (molar mass  $40 \text{ g mol}^{-1}$ ) which should be dissolved in 114 g octane to reduce its vapour pressure to 80%.
7. If the solubility product of CuS is  $6 \times 10^{-16}$ , calculate the maximum molarity of CuS in aqueous solution.
8. Calculate the amount of benzoic acid ( $\text{C}_6\text{H}_5\text{COOH}$ ) required for preparing 250 mL of 0.15 M solutions in methanol.
9. 19.5 g of  $\text{CH}_2\text{FCOOH}$  is dissolved in 500 g of water. The depression in the freezing point of water observed is 1.00 C. Calculate the van't Hoff factor and dissociation constant of fluoroacetic acid.
10. Vapour pressure of water at 293 K is 17.535 mm Hg. Calculate the vapour pressure of water at 293 K when 25 g of glucose is dissolved in 450 g of water.
11. Given the standard electrode potentials.  
 $\text{K}^+/\text{K} = -2.93\text{V}$  ,  $\text{Ag}^+/\text{Ag} = 0.80\text{V}$  ,  $\text{Hg}^{2+}/\text{Hg} = 0.79\text{V}$      $\text{Mg}^{2+}/\text{Mg} = -2.37\text{V}$   
 $\text{Cr}^{3+}/\text{Cr} = -0.74\text{V}$   
 Arrange these metals in their increasing order of reducing power.
12. Calculate the standard cell potentials of the galvanic cell in which the following reactions take place.  
 (a)  $2\text{Cr}(s) + 3\text{Cd}^{2+}(\text{aq}) \rightarrow 2\text{Cr}^{3+}(\text{aq}) + 3\text{Cd}$   
 (b)  $\text{Fe}^{2+}(\text{aq}) + \text{Ag}^+(\text{aq}) \rightarrow \text{Fe}^{3+}(\text{aq}) + \text{Ag}(s)$   
 Calculate the  $\Delta_rG$  and equilibrium constant of the reactions.
13. Define conductivity and molar conductivity for the solution of an electrolyte. Discuss their variation with concentration.
14. The conductivity of the 0.20 M solution of KCl at 298 K is  $0.0248 \text{ S cm}^{-1}$ . Calculate its molar conductivity.
15. The conductivity of 0.00241 M acetic acid is  $7.896 \times 10^{-5} \text{ S cm}^{-1}$ . Calculate its molar conductivity. If  $\Lambda^0$  m for acetic acid is  $390.5 \text{ S cm}^2 \text{ mol}^{-1}$ , What is its dissociation constant?
16. A reaction is second order with respect to a reactant. How is the rate of reaction affected if the concentration of the reactant is:  
 (i) doubled  
 (ii) reduced to half?
17. The half-life for the radioactive decay of  $^{14}\text{C}$  is 5730 years. An archaeological artefact containing wood had only 80% of the  $^{14}\text{C}$  found in a living tree. Estimate the age of the sample.
18. The rate constant for a first-order reaction is  $60 \text{ s}^{-1}$ . How much time will it take to reduce the initial concentration of the reactant to its  $1/16^{\text{th}}$  value?
19. Define the following terms :  
 (a) Pseudo first order reaction  
 (b) Half-life period of reaction
20. Complete your practical notebook and project work.

### SUBJECT – COMPUTER SCIENCE

1. Write the output of the following Python code :  

```
for i in range(5,20,5):
    print ( i + '-' )
```

2. Write the output of the following Python code :
- ```
x = "aBcdEf123"
for i in x:
    if i.isupper():
        print(i.lower(), end = " ")
    elif i.islower():
        print("#", end = " ")
    else:
        print("0",end=" ")
```
3. What is the output of the following expressions
- 34//3
  - 34/3
4. Evaluate the following expressions:
- $6 + 3 * 4 ** 2 - 5 // 4$
  - $12 > 15$  and  $15 < 12$  or not  $18 > 31$
  - $10 - 2 ** 5 * 4 + 20 / 10$
5. Which is the correct form of declaration of dictionary?
- Day={1:'monday',2:'tuesday',3:'wednesday'}
  - Day=(1;'monday',2;'tuesday',3;'wednesday')
  - Day=[1:'monday',2:'tuesday',3:'wednesday']
  - Day={1'monday',2'tuesday',3'wednesday'}
6. if the following code is executed, what will be the output of the following code?
- s = "This is python language"  
print( s [ 8 : : ] )
  - name="ComputerSciencewithPython"  
print(name[3:10])
  - pride="Today is a great day"  
print(pride[-2:2:-2])
7. Identify the valid declaration of L:
- L = [1, 23, 'hi', 6].
- list
  - dictionary
  - array
  - tuple
8. Which of the options out of (i) to (iv) the correct data type for the variable lst is as defined in the following Python statement?
- ```
lst = ('A', 'E', 'I', 'O', 'U')
```
- List
  - Dictionary
  - Tuple
  - Array
9. A tuple is declared as
- ```
T = (2,5,6,9,8)
```
- What will be the value of sum(T)?

10. Write the output of the code given below:  
`my_dict = {"name": "Aman", "age": 26}  
my_dict['age'] = 27  
my_dict['address'] = "Delhi"  
print(my_dict.items())`
11. Given the following dictionaries  
`dict_exam={"Exam":"AISSCE", "Year":2023}  
dict_result={"Total":500, "Pass_Marks":165}`  
Which statement will merge the contents of both dictionaries?  
a. `dict_exam.update(dict_result)`  
b. `dict_exam + dict_result`  
c. `dict_exam.add(dict_result)`  
d. `dict_exam.merge(dict_result)`
12. Select the correct output of the code:  
`a = "Year 2022 at All the best"  
a = a.split('2')  
b = a[0] + ". " + a[1] + ". " + a[3]  
print (b)`  
(a) Year . 0. at All the best  
(b) Year 0. at All the best  
(c) Year . 022. at All the best  
(d) Year . 0. at all the best
13. `def simple_interest(p, r, t):  
 return (p*r*t)/100  
 print (simple_interest(100,5,2))`  
Identify the formal and actual parameters in the above code snippet. Define formal and actual parameters in a function.
14. What will be the output of the following code:  
`a=10  
def call():  
 global a  
 a=15  
 b=20  
 print(a)  
call()`
15. Write a function `EV_OD()` that enters a number and if the number is odd display its double otherwise display its half.
16. Write a function `show()` that takes a number `n` as argument and display the square of numbers from 1 to `n`.
17. Write a function `cap()` that takes an alphabet as argument and displays whether it's a capital or not.
18. Write a program to create a function `count()` that takes a list as argument and returns the total number of elements that are divisible by 4 and 6.

19. Write a function small() to display all the lower case letters in the text file poem.txt”
20. Write a function disp() that displays ‘\*’ in place of digits in the text file “MATHS.TXT”.
21. Write a function to display the average length of words in the text file “ msg.txt”.
22. Write a program to enter a record in binary file “employee.dat” that contains following data – eno, name, salary, bonus.
  - Write a function to add a new record in the file.
  - Write a function to display all the records.
  - Write a function to display the details of the employee whose name is "Kumar".
  - Write a function to count the number of employee whose salary is greater than 2000.
23. Complete your Programming File

**SUBJECT : MATHEMATICS**

**Do all these activities in your file.**

1. Local Maximum and Local Minimum values of a function.
2. To construct an open box of maximum volume from a given rectangular sheet by cutting equal square pieces from each corner.
3. To understand the concepts of decreasing and increasing functions.
4. To understand the concepts of absolute maximum and minimum values of a function in a given closed interval through its graph.
5. To verify that amongst all the rectangles of the same perimeter, the square has the maximum area.
6. Differentiate w.r.t.  $x$  ;  $y = e^{\sin x}$
7. Prove that  $\tan^{-1} 2 + \tan^{-1} 3 = 3\pi/4$
8. If  $xy + y^2 = y + \tan x$ , find  $dy/dx$
9. Find the value of  $\cos^{-1} (\cos 13\pi/6)$
10. Differentiate the following w.r.t.  $x$  ;  $\cos^{-1} \left\{ \frac{1-x^2}{1+x^2} \right\}$ ;  $0 < x < 1$
11. The total revenue received from the sale of  $x$  units of a product is given by  $R(x) = 13x^2 + 26x + 15$ . Find the marginal revenue when  $x = 7$ .

12. Find k if function is continuous  $f(x) = \begin{cases} \frac{k \cos x}{\pi - 2x}, & x < \pi/2 \\ 3, & x = \pi/2 \end{cases}$

$$\begin{cases} \frac{3 \tan 2x}{2x - \pi} & x > \pi/2 \end{cases}$$

13. Find the intervals in which the function f given by  $f(x) = \sin x + \cos x$ ;

$0 \leq x \leq 2\pi$  is increasing or decreasing.

14. If  $x\sqrt{1+y} + y\sqrt{1+x} = 0$  prove that  $(1+x)^2 \frac{dy}{dx} + 1 = 0$ .

15. Solve for x ;  $2 \tan^{-1}(\cos x) = \tan^{-1}(2 \operatorname{cosec} x)$ .

16. If  $y = (\tan^{-1} x)^2$  then prove that  $(1+x^2)^2 \frac{d^2 y}{dx^2} + 2x(1+x^2) \frac{dy}{dx} = 2$

17. Differentiate  $y = \frac{e^x + \log x}{\sin 3x}$

18. Differentiate  $\tan^{-1} \frac{3x-x^3}{1-3x^2}$  w.r.t. x if  $-1/\sqrt{3} < x < 1/\sqrt{3}$

19. A stone is dropped into a quiet lake and waves move in a circle at a speed of 3.5cm/sec. At the instant when the radius of the circular wave is 7.5cm, how fast is the enclosed area increasing?

20. Find the intervals in which the function  $f(x) = 2x^3 + 9x^2 + 12x + 20$  is

(i) Increasing (ii) decreasing

21. If  $(\cos x)^y = (\sin y)^x$  find  $dy/dx$

22. If  $y = \{x + \sqrt{x^2 + 1}\}^m$  show that  $(x^2 + 1) y_2 + x y_1 - m^2 y = 0$

23. Determine the value of the constant k so that the function

$$f(x) = \begin{cases} \frac{x^2 - 3x + 2}{x - 1}, & \text{if } x \neq 1 \\ k, & \text{if } x = 1 \end{cases} \text{ is continuous at } x=1.$$

### “Application of Derivatives”

24. A stone is dropped into a quiet lake and waves move in circles at the speed of 5 cm/sec. At the instant when the radius of the circular wave is 8 cm, how fast is the enclosed area increasing?

25. Find the intervals in which the function  $f(x) = (x-1)(x-2)^2$  is increasing or decreasing.



## SUBJECT – BIOLOGY

1. If a hybrid expresses a character, it is called \_\_\_\_\_
  1. Epistasis
  2. Dominant
  3. Co-dominant
  4. Recessive
  
2. A plant having the genotype AABbCC will produce \_\_\_\_\_ kinds of gametes
  1. 5
  2. 4
  3. 3
  4. 2
  
3. Colour blindness is an \_\_\_\_\_ linked recessive trait
  1. Z chromosome
  2. Y chromosome
  3. X chromosome
  4. None of the above
  
4. In most species, mitochondrial DNA is passed down from \_\_\_\_\_
  1. DNA
  2. Mother and Father
  3. Father
  4. Mother
  
5. Where are the genes for cytoplasmic male sterility in plants located?
  1. Chloroplast genome
  2. Mitochondrial genome
  3. Cytosome
  4. None of the above
  
6. \_\_\_\_\_ is a type of trait whose phenotype is influenced by more than one gene
  1. Oncogenic Trait
  2. Monogenic trait
  3. Polygenic trait
  4. None of the above
  
7. An individual's collection of genes is called \_\_\_\_\_
  1. Genotype
  2. Phenotype
  3. Trait
  4. None of the above
  
8. A man marries a woman and both do not show any apparent traits of inherited disease. Five sons and two daughters are born, and three of their sons suffer from a disease. However, none of the daughters is affected. The following mode of inheritance for the disease is
  1. Sex-linked recessive
  2. Sex-linked dominant
  3. Autosomal dominant
  4. None of the above
  
9. A trait that “overpowers” and hide another trait is called
  1. Overpowering trait
  2. Complex trait
  3. Recessive trait
  4. Dominant Trait

10. Why is haemophilia a disease that is more commonly seen in males?
  1. Both (2) and (3)
  2. The disease is Y- linked
  3. The disease is X- linked
  4. None of the above
11. Explain the phases of menstrual cycle in detail. Emphasise on role of hormones.
12. Describe types and agents of pollination.
13. Enumerate the post-transcriptional modifications in a eukaryotic mRNA.
14. Explain the process of translation.
15. Explain the process of DNA fingerprinting.
16. What is an operon? Explain an inducible operon.
17. Explain the process of DNA replication.
18. Draw a labeled diagram of Graafian follicle. Write the role of corpus luteum.
19. Explain the process of Artificial hybridization for crop improvement programme.
20. Explain codominance, incomplete dominance, pleiotropy, multiple allelism, chromosomal theory of inheritance, Mendel's law of inheritance, linkage and crossing over and genetic disorder with suitable examples.
21. Explain giving examples i) polyembryony ii) heterogamety iii) apomixis.
22. Explain the difference between oogenesis and spermatogenesis .
23. Describe development of heart shaped embryo from zygote in angiosperms
24. Complete the project record and practical file as instructed by the teacher in the class.
25. Revise I and II Unit and read III unit.

### **SUBJECT – PHYSICAL EDUCATION**

- **Unit 1 Management of sporting events**
  - Q1. Define management and its functions.
  - Q2. Differentiate intramuras and extramurals.
  - Q3. Pen down the various committees and their responsibilities.
  - Q4. Write a short note on specific sports programme.
  - Q5. Draw a fixture of 21 teams on the basis of knockout.
- **Unit 2 Children and Women in sports**
  - Q1. Explain the common postural deformities in details.
  - Q2. Differentiate between anorexia nervosa and bulimia nervosa.
  - Q3. Write a short note on female athlete triad.
  - Q4. Pen down the various causes of less participation of women in sports
  - Q5. Discuss about special consideration in detail
- **Unit 3 Yoga as preventive measures for life style disease**
  - Q1. Define yoga and its importance
  - Q2. Explain asthma and hypertension.
  - Q3. Explain the procedure, benefits and contraindications of bhujangasana.
  - Q4. Write the four benefits of pranayam.

Q5.What is diabetes?Draw a stick diagram of two any asana recommended to control obesity and explain their procedure

- Practical 1 – Fitness Test administration (SAI KHELO INDIA TEST)
- Practical 2 – Procedure for Asanas, Benefits & contraindication for any two asanas for each lifestyle disease
  - Obesity – Procedure, Benefits & contradictions for Tadasana, Pawanmuktasana
  - Diabetes - Procedure, Benefits & contradictions for Bhujangasana, Paschimottasana.
  - Asthma - Procedure, Benefits & contradictions for Gomukhasana, Anulom-viloma
  - Hypertension –Matyasana ,ArdhHalasana.
  - Back pain and Arthritis –Bhadraasana, Makrasana.
- Practical 3 -Labelled diagram of field and equipment , rules, terminologies and skills .Anyone IOA recognised game/sport of your choice.
- Make a First Aid Box with a Red Cross on it having the following First Aid Tools –
  - Boroline or Boroplus ,Soframycin ,Dettol or Savlon ,Neosporin, Crocin, Bandage, Cotton, Band-Aid Strips.

# Be Happy By Doing Good

1. *Spare some time and help your mother in household work, Talk to your parents and elders and learn values.*
2. *Adopt the habit of reading newspaper and learn new words and expressions.*
3. *Read at least two books (Hindi & English) apart from prescribed syllabus.*
4. *Respect flora and fauna (Plants and Animals). Keep your home and surroundings clean. Plant at least 5 saplings.*
5. *Keep water for birds and stray animals outside your house or in balcony.*
6. *Food is equal to God. So avoid wasting of food.*
7. *Try to share your knowledge and donate old books and notebooks to the underprivileged and deprived children of your locality.*
8. *Maintain a diary in English & Hindi and write your experience along with daily routine during summer break. It will help you in enriching your vocabulary and writing skills.*

**ENJOY YOUR SUMMER BREAK.....**

