ST. JOSEPH'S ACADEMY CLASS XI

A&B (2025-2026)

Holiday Homework

PHYSICS

1. Two forces equal to P and 2P newton act on a particle. If the first be doubled and the second be increased by 20 Newton, the direction of the resultant is unaltered. Find the value of P.

2. Find angle between P vector and Q vector if resultant is given by $R^2 = P^2 + Q^2$

3. If force $\vec{F} = 4\hat{\imath} + \hat{\jmath} + 3\hat{k}$ newton acts on a particle and displaces it through displacement $\vec{S} = 11\hat{\imath} + 11\hat{\jmath} + 15\hat{k}$ metre. Calculate work done by the force

4. Find the dimension of Y, where Y is a constant. Magnitude of force F experienced by a certain object moving with speed V is given by $F = YV^2$.

5. What are the dimensions of a and b in the relation F=a+bx , where F is force and x is distance?

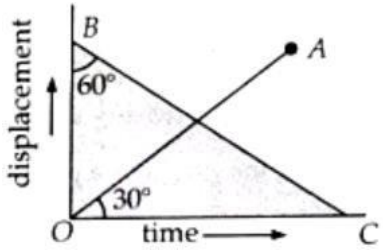
6. What should be the angle between two vectors $\vec{A}$ and $\vec{B}$ for their resultant $\vec{R}$ to be minimum?

7. Obtain the dimensional equation of universal gas constant.

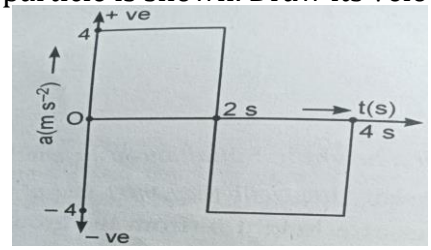
8. U- tube of uniform cross section contains mercury up to a height h in either limb. The mercury in one limb is depressed a little and then released. Obtain an expression for the time period of oscillation assuming that T depends on height, density and acceleration due to gravity by the method of dimensions.

9. By the method of dimensions express surface tension of water 72 dyne/cm in SI units.

10. The displacement-time graph of two bodies P and Q are represented by OA and BC respectively. What is the ratio of velocities P and Q? ∠OBC = 60º and ∠AOC = 30º.



11. A particle starts from rest and moves along a straight line positive X direction, acceleration time graph of particle is shown. Draw its velocity time graph .



12. With what speed must be a ball be thrown upward if it is to return to the throwers hands in 5 seconds?

13. A particle is moving along a straight line and its position is given by the relation: X=t^3-6t^2-15t+40.Find the a) time at which the velocity is zero, b) position and displacement c) acceleration at that point.

14. A body is projected with a velocity of 40 m/s. After 2sec it just crosses a vertical pole of height 20cm. Calculate the angle of projection and horizontal range.

15. Can two vectors of different magnitudes give zero resultant? Why?

16. Are the magnitudes of ($\vec{A}$ - $\vec{B}$) same as that of ($\vec{B}$ - $\vec{A}$)?

17. Under what conditions will the sum and difference of two vectors be same?

18. What is $\hat{\imath}$.($\hat{\jmath}$ x $\hat{k}$) ?

19. A force is inclined at 30° to the horizontal. If its rectangular component in the horizontal direction is 50N, find the magnitude of the force and its vertical component.

20. A force of $7\,\hat{\imath} + 6\hat{k}$ newton makes a body move on a rough plane with a velocity of $3\hat{\jmath} + 4\hat{k}$ m/s . Calculate the power in watts.

21. Find the angle between the vectors $\vec{A} = \hat{\imath}+\hat{\jmath}+\hat{k}$, $\vec{B} = -\hat{\imath} -\hat{\jmath}+2\hat{k}$.

22. If $\vec{A}= \hat{\imath} + 3\hat{\jmath} +2\hat{k}$ and $\vec{B} =3\hat{\imath} + \hat{\jmath} +2\hat{k}$ then find the vector product $\vec{A}$ x $\vec{B}$.

23. Prove that the maximum horizontal range is four times the maximum height attained by the projectile when fired at an angle of inclination so as to have maximum horizontal range.

24. A plane is flying at a height of 1000m and with velocity 100m/s when a packet is dropped. What is the (i)velocity with which it hits the ground (ii) time taken to reach the ground and (iii) distance of the target.

25. Prepare a chart about a scientist's short interesting fact about his/her's childhood or about any incidents during the discovery/invention. Paste a pic of scientist and write also about their birth and demise year, interesting life incident, contribution/discovery in physics and special awards received.

CHEMISTRY

I. COMPLETE THE FOLLOWING QUESTIONS IN RULE SHEET

1. Define photoelectric effect.

2. A. How does the intensity of light effect photoelectrons?
B. Which of the following has the smallest de-Broglie wavelength? O_2, H_2, a proton, an electron.
C. Calculate energy of 2 mole of photons of radiation whose frequency is 5×10^{14} Hz.

3. Find the radius of Be^{3+} when n=2.

4. What is the main difference between electro magnetic waves theory and Planck's quantum theory.

5. Which of the transition will have minimum wavelength and why?
n4 → n1 , n4 → n2

6. To particles A and B are in motion. The momentum of particle B is half of A. If the wavelength associated with the particle A is 5×10^{8} m. Calculate the wavelength associated with the particle B.

7. Calculate the wave number of radiations having a frequency of 4×10^{14} Hz.

8. The Kinetic energy of an electron is 4.55×10^{-25} J. The mass of electron is 9.1×10^{-31} kg. Calculate velocity, momentum and the wavelength of the electron.

9. Table-tennis ball has a mass of 10 g and a speed of 90 m/s. If speed can be measured with an accuracy of 4% what will be the uncertainty in speed and position?

10. When a photon of frequency 1.0×10^{15} s^{-1} was allowed to hit a metal surface, an electron having 1.988×10^{-19} J of kinetic energy was emitted. Calculate the threshold frequency of this metal.

11. We don't see a car moving as a wave on the road why?

12. An element with mass number 81 contains 31.7% more neutrons than protons write its atomic symbol.

13. Electrons are emitted with zero velocity from a metal surface when it is exposed to radiation of wavelength 6800 A^{o}. Calculate the threshold frequency and work function of the metal.

14. How many molecules you expect to be present in a small sugar crystal which weighs 10mg

15. Ratio of masses of O2 and N2 is 1:4 . Find the ratio of their molecules.

16. How are 0.05 m KOH and 0.05 M different from each other?

17. In a reaction A + B2 →AB2. Identify the limiting reagent when two moles of A are mixed with 3 moles of B2.

18. In a sample of sulphuric acid % composition of H, S and O are 2.04% 32.65% and 65.31% respectively. What weight of sulphur is present in 15 gram of sulphuric acid?

19. A sample of NaOH weighing 0.38 gram is dissolved in water and the solution is made to 50 ml in a volumetric flask. What is a molarity of the resulting solution?

20. How many grams of chlorine are required to complete the react with 0.4 gram of hydrogen to yield HCl. Also calculate the amount of HCl formed.

II. Prepare an innovative chart based on any topic in the field of chemistry.

BIOLOGY

- **Prepare an investigatory project on the topic of your choice (after being confirmed by the subject teacher)**
    - Complete the Investigatory project and compile it according to the prescribed format.
        - Cover page
        - Certificate
        - Acknowledgment
        - Index
        - Introduction
        - Content (including pictures/graphs/tables/survey report etc.)
        - Case Study (in case of disease)
        - Bibliography
- **Revise for UT1**

Note:-

- Topics can be taken from practical book of biology (comprehensive) or any other topic.
- Get the confirmation from the subject teacher before starting the work.

MATHS

1. Do the following activities in Maths Practical File:
    - Activity 1: To find the number of subsets of a given set and verify that if a set has n number of elements, then the total number of subsets is 2^n.
    - Activity 2: To verify that for two sets A and B, n(A×B) = pq and the total number of relations from A to B is 2^{pq}, where n(A)=p and n(B)= q.
    - Activity 3: To represent set theoretic operations using Venn Diagrams.
    - Activity 4: To distinguish between a Relation and a Function.
    - Activity 5: To verify the relation between the degree measure and the radian measure of an angle.
    - Activity 6: To interpret geometrically the meaning of i = $\sqrt{-1}$ and its integral powers.
    - Activity 7: To verify that the graph of a given inequality, say 5x+4y-40<0, a,b>0, c<0 represents only one of the two half planes.
    - Activity 8: To find the number of ways in which three cards can be selected from given five cards.
    - Activity 9: To construct a Pascal's Triangle and to write binomial expansion for a given positive integral exponent.
    - Activity 10: To construct different types of conic sections.
    - Activity 11: To construct a parabola.
    - Activity 12: To explain the concept of octants by three mutually perpendicular planes in space.
    - Activity 13: To write the sample space, when a coin is tossed once, two times, three times, four times.
    - Activity 14: To find analytically $\lim_{x \to c} f(x) = \frac{x^2 - c^2}{x - c}$.
2. Draw Chart or make model on any of the topics given in the activities.
3. Learn Trigonometric Identities from Ch-3 thoroughly.
4. Practice questions from NCERT exemplar for Chapters done in class.

ENGLISH

NOTE:

- Use A4 size sheets coloured or designer paper sheets for the project.
- Use sketch pens for heading and coloured pens for content.
- Make a creative cover page.
- Handwriting should be neat and tidy.
- Paste suitable pictures wherever possible.
- After compiling it should be submitted in spiral binding.

ACTIVITY- 1

Project -Portfolio

Read the lesson Discovering Tut- The Saga continues and prepare a Portfolio on the events related to it.

- Cover page, with title of project and details of students
- Information about the author
- Period in which the story was written and its relevance in relation with those times
- Events
- Plot
- Theme
- Characteristics
- Message
- Central Idea

ACTIVITY 2

POSTER DESIGNING

Design a poster on any 1 topic on A4 size sheet.

You are making an effort to spread the message of Communal Harmony. Prepare a poster with catchy slogans to be displayed in prominent places. You are a member of Lions Club, Green Gardens, New Delhi-5

OR

Design a poster urging the youngsters to join Defense Services / Indian Army.

ACTIVITY 3
STORY REVIEW

Write a book review on any Novel/Drama/Story

ACTIVITY 4
ASL
Elevator Pitch

- Like advertisement activity, this project also focuses on commercial communication.
- You have to pitch for a startup business which you want to promote and advertise
- Detail the necessary information and persuasive tactics.
- You can create your own business model or take any one from the vast market
- Advertise and present the whole concept in 3 minutes.
- You may introduce your advertisement through PPT.

ACTIVITY 5

Read all the lessons done in class and complete the notes, assignments related to them in English Register.
Read newspaper everyday. Develop reading and writing habit.

PHYSICAL EDUCATION

PRACTICAL FILE / PROJECT WORK

Instructions:

- - All work is to be done in the Physical Education Practical File only.
- - Paste relevant pictures wherever necessary.
- - Ensure the explanation is clear, neat, and topic-based.
- - The completed practical file must be submitted on the first day after the school reopens.

PRACTICAL WORK TOPICS:

1. Practical – 1:

Draw and label the 400 M Track & Field diagram with proper computations. Include lane markings, starting positions, and radius calculations.

2. Practical – 2:

Write a descriptive note on Changing Trends in Sports & Games. Include changes in:

- - Playing surfaces
- - Wearable gears
- - Equipment
- - Technological advancements (like VAR, Hawk-Eye, fitness trackers, etc.)

3. Practical – 3:

Draw a labelled diagram of the field & equipment of any one IOA recognized Sport/Game of your choice. Paste relevant pictures.

4. Practical – 4:

Choose any one IOA recognized Sport/Game (can be the same or different from Practical 3). Include the following:

- - Labelled diagram of field & equipment
- - Basic rules of the game
- - Common terminologies used
- - Fundamental skills required to play

COMPUTER SCIENCE

Instructions –
*Do all the questions in the subject notebook .
*Complete your Note book work and submit your registers with this work on the assigned day after reopening.
*Make a presentation (ppt) on the topic allotted to your group .
*submission date for the register/notebook will be on 4-7-25(Friday)

Q1. Create a presentation to show different types of operators/ different types of core data types/ different types of tokens

Q2. Do the following assignment questions in notebook.

2.1) Evaluate the following expressions:

a) 8/4+4**2//5%2-8

b) 10 >= 5 and 7 < 12 or not 13 == 3

c) 6 * 3 + 4**2 // 5 – 8

d) 10 > 5 and 7 > 12 or not 18 > 3

e) 18 % 4 ** 3 // 7 + 9

f) 2 > 5 or 5 == 5 and not 12 <= 9

g) 6 * 3 + 4**2 // 5 – 8

h) 10 > 5 and 7 > 12 or not 18 > 3

i) 51+4-3**3//19-3

j) 1718 and not 19==0

k) 8 * 3 + 2**3 // 9 – 4

l) 12 > 15 and 8 > 12 or not 19 > 4

m) not(20>6) or (19>7)and(20==20)

n) 17%20

o) 2 ** 3 ** 2

p) 7 // 5 + 8 * 2 / 4 – 3

2.2) **If x = 2 Indicate what each of the following Python statements would print.**

i) print("x") ii)print('x') iii)print(x) iv)print("x + 1") v) print('x' + 1) vi) print(x + 1)

2.3) Predict the output:

```
>>>35 < 6
>>>5 > 2**2
>>>7 != 3.5 *2
>>>7 == 3.5 ** 2
>>> "Anil" > "Anita"
```

```
>>>eval('15')
>>>eval("6")
>>>eval(7)
>>>eval("5 + 8 * 6)
```

2.4) Identify the invalid variable name, specify reason.

```
a) m_n
b) unit_day
c) 24Apple
d) #sum
e) for
f) s name
```

2.5)

Write the output of the following:

```
print("hello * 5")
print("hello" * 5)
print("***" * 5)
print("Hello", "how", "R", "U")
print("Hello" + "how" + "R" + "U")
print("Amit" + "Sethi")
print(23 + 9)
print ("7 + 9")
print(7/6)
print(7//6)
print(8 % 2)
print(3 % 7)
print(4 ** 3)
print (7 * 5)
print (8 - 16 )
```

2.6) Write the python expression.

```
z = u/5
z = 9ab + d
z = x+4/j + 7
```

Q3. Create following programs related to python fundamentals and data handling for report file.

1. Write a program to show working of all arithmetic operator
2. Write a program to show Area of rectangle, square, circle.
3. Write a program to print your name, school name.
4. Write a program to input a number and find its 5 multiples in different lines.
5. Write program to show the working of escape sequences.
6. Write a program to convert Fahrenheit to Celsius and Celsius to Fahrenheit
7. Write a program to show swapping of number using temporary or without variable
8. Write a program to show convert height , in centimeter, convert it in feet and inches
9. Write a program to input principle, rate, time and find simple interest and compound interest.
10. Write a program to enter number of days and convert it into years, months, weeks and remaining days.
11. Write a program to enter n and print n2,n3,n4.
12. Write a program to enter two numbers and find its quotient and remainder.
13. Write a program to show the working of sep and end arguments of print operator.
14. Declare different types of variables and print their values, types and ids.