



Brain International School

Vikas Puri, New Delhi

Honoured with

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Class-XI A

Session 2017-18

Summer is the time to have a respite from heat

Let's do something creative for intellectual treat

So, balance your study and rest hours,

Help your mom - dad and add more power.

With your values and discipline explore new heights,

Let you and us be glad that *you are a BRAINITE.*

Wish you all happy and healthy holidays!

GENERAL INSTRUCTIONS

Holidays Homework is an interesting way of utilizing time and energy and it maintains the learners' academic connect. It must be submitted to the respective teachers before the deadline given by them.

All files, scrap books, projects etc. should be well labelled with the clear mention of **Name, Class and Section** of the student.

The parents are suggested to help their children to take up any one drive out of the following and help their children (uptil class V) to maintain a journal of the work done (minimum 2 pages), preferably with pictures. Also, make your child write why he/ she chose a particular drive.

1. Education Drive: Donate book(s) and/ or stationery to underprivileged children and give them basic education/ help them understand the key concepts like reading time from a wall clock. Make this memory last long by clicking your pic with the child and adding to your journal.
2. Help Drive: Help any family member in his or her work and maintain a journal of the work done like helping mother in the kitchen, father to wash the car, grandfather to water the plants or grandmother to organize her things etc. Capturing one or two moments for your journal would be exciting.
3. Paint Drive: Make a painting using things other than paint brush like lady finger (cut from top), onions, thumb prints, cotton swabs, match sticks etc. (You may get it framed). You can take help of one of the family members to click you, while you are at work.
4. Best out of waste Drive: Make two things that could be an artifact or utility oriented object, with waste material for instance newspaper holder with foil roll, wall hanging using egg shells or pencil shavings, pen holders using empty cans or tetra packs etc. You can take help of any of the family members to click you, while you are at work.
5. Cleanliness Drive: Along with your neighbourhood friends or school mates (living in the same locality), conduct awareness programme on cleanliness in your society. You can capture the major shots and paste them in your journal.
6. Adopt a plant Drive: Adopt a plant and take proper care of it like watering it daily, providing manure etc. and also run a small campaign encouraging your friends and neighbours to go green and adopt at least one plant. You can click the respective shots and paste them in your journal.

ENGLISH

Instructions:

1. Create a file and use A4 size sheets to do your work.
2. Attempt the questions yourself and avoid copying answers from internet.

I. Read the novel, “The Canterville Ghost” by Oscar Wilde and write the

- a) summary of the novel
- b) character sketch of all major and minor characters.

II. Cut and paste two advertisements from the newspaper under each of the following headings:

- a) To Let
- b) Lost and Found
- c) Missing
- d) Matrimonial
- e) Sale and purchase
- f) Situation vacant
- g) Change of name

III. **“Unleashing the Poet in Me” OR “Unleashing the Writer in Me”**

Write a poem (more than 3 stanzas, preferably with a refrain)- **“I have a Dream”**.

OR

Write an article (in about 200-250 words) on the given topic: **“Non -negotiable disciplines to be Successful”**.

PHYSICS

1. Convert 9.8 m / s^2 into Km/h^2 .

Ans: $1.27 \times 10^5 \text{ Km/h}^2$

2. Find the value of force 100 dyne on a system based on a metre, kilogram and minute as fundamental units.

Ans: 3.6

3. In the equation $y = A \sin (\omega t - kx)$, obtain the dimension formula of ω and k . Given x is distance and t is time.
4. If velocity, time and force were chosen as basic quantities, find the dimension of mass.
5. Explain parallax method.
6. The velocity v of transverse waves on a string may depend upon
 (i) length (ii) tension of string (iii) mass per unit length (μ) of the string. Derive the formula dimensionally.
 Ans: $v = k\sqrt{\frac{T}{\mu}}$
7. If two resistors of resistances, $R_1 = (4 \pm 0.5) \Omega$ and $R_2 = (16 \pm 0.5) \Omega$ are connected
 (i) in series and (ii) in the parallel; find the equivalent resistance in each case with limits of percentage error.
8. A particle travels 10m in first 5 sec and 10m in next 3 sec. Assuming constant acceleration what is the distance travelled in next 2 sec ... Ans: 8.3m
9. A particle is dropped under gravity from rest from a height h and it travels a distance $9h/25$ in the last second, the height h is.. Ans: 122.5m
10. The displacement x of a particle moving in one dimension is related to time by the equation $10t = \sqrt{x} + 3$ where x is in metre and t is in second. What will be the displacement when its velocity is zero?
 Ans: 0
11. A bus starts moving with acceleration 2m/s^2 . A cyclist 96 m behind the bus starts simultaneously towards the bus at 20m/s . After what time will he be able to overtake the bus?
 Ans: 8s
12. A ball is thrown vertically upwards with a velocity of 20 m s^{-1} from the top of a multistory building. The height of the point from where the ball is thrown is 25.0 m from the ground.
 (a) How high will the ball rise?
 (b) How long will it be before the ball hits the ground? Ans: 20m, 5s
13. A balloon is ascending at the rate of 14 m s^{-1} at a height of 98 m above the ground, when a packet is dropped from the balloon. After how much time and with what velocity does it reach the ground?
 Ans: 6.1s, 46 m s^{-1}
14. Derive an expression for (i) time of flight (ii) maximum height (iii) equation of trajectory for a projectile fired from ground at an angle θ .
15. Derive an expression for (i) time of flight (ii) maximum height (iii) equation of trajectory for projectile given horizontal projection.
16. Derive $v = r\omega$ and $a = r\alpha$.
17. Derive an expression for centripetal acceleration.

18. A shot is fired at a distance of 39.2 m from the foot of pole 19.6 m high so that it just passes over it. Find the magnitude and direction of the velocity of the shot.
19. State the laws of limiting friction.
20. A man jumping out of a moving train falls with his head forward. Why?
21. Why do the blades of an electric fan continue to rotate for some time after the current is switched off?
22. We beat a blanket with stick to remove dust particles. Why?
23. Why does a heavy rifle not kick as strongly as a light rifle using the same cartridge?
24. Why does a cyclist bend inwards while riding along a curved road?
25. What is angle of repose?
26. Explain the banking of roads. Derive an expression for velocity of a car going along a curved path of radius r and friction μ
27. An insect crawling up a fixed hemispherical bowl of radius R . if the coefficient of friction is $\frac{1}{\sqrt{3}}$, then the insect can only crawl up to a height of

CHEMISTRY

- Do NCERT back exercise of chapter 1 to 4 in assignment notebook.

MATHEMATICS

1. Do the following worksheet in the assignment notebook.

SETS

1. If $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9\}$, $A = \{1, 2, 3, 4\}$, $B = \{2, 4, 6, 8\}$. Find $(A - B)'$.
2. Describe the following set in set builder form: $A = \{6, 10, 14, 18, 22\}$.
3. In a survey of 25 students, it was found that 15 had taken mathematics, 12 had taken physics and 11 had taken chemistry, 5 had taken mathematics and chemistry, 9 had taken mathematics and physics, 4 had taken physics and chemistry and 3 had taken all the three subjects. Find the number of students that had (i) only chemistry. (ii) only mathematics. (iii) only physics. (iv) physics and chemistry but not mathematics. (v) mathematics and physics but not chemistry. (vi) only one of the subjects.
4. Write the power set of the set $A = \{a, b, c\}$.
5. A survey shows that 63% of the Americans like Cheese whereas 76% like Apples. If $x\%$ of the Americans like both Cheese and Apples, find the value of x .
6. In a survey it was found that 21 persons liked product P_1 , 26 liked product P_2 and 29 liked

product P_3 . If 14 persons liked products P_1 and P_2 ; 12 persons liked product P_3 and P_1 ; 14 persons liked products P_2 and P_3 and 8 liked all the three products. Find how many liked product P_3 only.

7. In a survey of 60 people, it was found that 25 people read newspaper H, 26 read newspaper T, 26 read newspaper I, 9 read both H and I, 11 read both H and T, 8 read both T and I, 3 read all the 3 newspapers, Find :

- (a) the number of people who read at least one of the newspapers
- (b) the number of people who read exactly one newspaper. Write the name of any 3 newspapers.

8. If $U = \{1, 2, 3, 4, \dots, 10\}$ is the universal set for the sets $A = \{2, 3, 4, 5\}$ and $B = \{1, 2, 3, 4, 5, 6\}$, then verify that $(A \cup B)' = A' \cap B'$.

9. In an examination, 80% students passed in Mathematics, 72% passed in Science and 13% failed in both the subjects. If 312 students passed in both the subjects, find the total number of students who appeared in the examination.

10. There are 200 individuals with a skin disorder, 120 had been exposed to the chemical C_1 , 50 to chemical C_2 and 30 to both the chemicals C_1 and C_2 . Find the number of individuals exposed to

- (i) Chemical C_2 but not chemical C_1 .
- (ii) Chemical C_1 or chemical C_2 .

What is the effect of using wrong chemicals on skin?

PRINCIPAL OF MATHEMATICAL INDUCTION

1. By using principle of mathematical induction prove the following for all $n \in \mathbb{N}$.

$$1^2 + 3^2 + 5^2 + \dots + (2n-1)^2 = \frac{n(2n-1)(2n+1)}{3}.$$

2. Prove that $2 \cdot 7^n + 3 \cdot 5^n - 5$ is divisible by 24 by using mathematical induction .

3. Prove that $1 \cdot 3 + 3 \cdot 5 + 5 \cdot 7 + \dots + (2n-1)(2n+1) = \frac{n(4n^2+6n-1)}{3}$ for all $n \in \mathbb{N}$.

4. Prove the following by the principle of mathematical induction : $n(n+1)(n+5)$ is
a multiple of 3 for all $n \in \mathbb{N}$

5. By using principle of mathematical induction prove the following for all $n \in \mathbb{N}$.

$$\frac{1}{2.5} + \frac{1}{5.8} + \frac{1}{8.11} + \dots + \frac{1}{(3n-1)(3n+2)} = \frac{n}{6n+4}.$$

6. Using principle of mathematical induction, prove that

$$\left(1 - \frac{1}{2^2}\right) \left(1 - \frac{1}{3^2}\right) \left(1 - \frac{1}{4^2}\right) \dots \left(1 - \frac{1}{n^2}\right) = \frac{n+1}{2n}, \forall n \geq 2 \text{ where } n \text{ is a natural number.}$$

7. Prove the following by using the principle of mathematical induction :

$$10^{2n-1} + 1 \text{ is divisible by } 11.$$

8. Prove that for $n \in \mathbb{N}$, $10^n + 3 \cdot 4^{n+2} + 5$ is divisible by 9.

9. Prove the following by the Principle of Mathematical induction for all $n \in \mathbb{N}$.

$$\frac{1}{1 \cdot 2 \cdot 3} + \frac{1}{2 \cdot 3 \cdot 4} + \frac{1}{3 \cdot 4 \cdot 5} + \dots + \frac{1}{n(n+1)(n+2)} = \frac{n(n+3)}{4(n+1)(n+2)}$$

10. By using Principle of Mathematical Induction, prove that $n(n + 1)(2n + 1)$ is divisible by 6 for all $n \in \mathbb{N}$.

LINEAR INEQUALITIES

1. Solve : $\frac{5-2x}{3} \leq \frac{x}{6} - 5$.

2. Draw the graphical solution of the following inequations:

$$x \geq 2, x \leq 8, y \leq x + 3, 2x + y \leq 10, y \geq 4.$$

3. Solve : $|3x - 5| \leq 7$.

4. Solve the inequalities graphically:

$3x + 2y \geq 24$, $3x + y \leq 15$, $x - 6y \geq 3$, $x \geq 4$ & Also find all points where inequalities intersects x & y axes.

5. Solve : $-(x - 3) + 4 < 5 - 2x$

6. Exhibit graphically the solution set of the linear in equations

$$x + y \leq 5, 4x + y \geq 4, x + 5y \geq 5, x \leq 4, y \geq 3$$

7. A manufacturer has 600 litres of a 12% acid solution .How many litres of a 30% acid solution must be added to it so that acid content in the resultant mixture will be more than 15% but less than 18%.

8. Solve the given system of inequalities graphically:

$$x + 2y \leq 10$$

$$x + y \geq 1$$

$$x - y \leq 0$$

$$x \geq 0, y \geq 0$$

9. Solve the following system of in equations graphically

$$x \geq 0, y \geq 0$$

$$x + 2y \leq 8$$

$$x + y \geq 4$$

$$x - y \leq 0$$

Name the common region and write down its vertices.

10. A solution of 8% boric acid is to be diluted by adding a 2% boric acid solution to it. The resulting mixture is to be more than 4% but less than 6% boric acid. If we have 640 L of the 8% solution, then how many liters of the 2% solution will have to be added?

TRIGONOMETRY

1. Evaluate: (i) $\tan\left(\frac{16\pi}{3}\right)$ (ii) $\operatorname{cosec}\left(-\frac{33\pi}{4}\right)$.

2. Simplify: $\frac{\cos(\pi+x)\cos(-x)}{\sin(\pi-x)\cos\left(\frac{\pi}{2}+x\right)}$.

3. Prove that: $\frac{\cos 11 + \sin 11}{\cos 11 - \sin 11} = \tan 56$.

4. Find the general solution of the equation: $\sin 2x + \cos x = 0$.

5. If $\sec x = -\frac{13}{12}$, x lies in 2nd quadrant, find the value of $\sin 2x$ and $\tan 2x$.

6. In any ΔABC prove that: $a(\sin B - \sin C) + b(\sin C - \sin A) + c(\sin A - \sin B) = 0$.

7. Prove that: $\cos^2 x + \cos^2(x + \frac{2\pi}{3}) + \cos^2(x + \frac{4\pi}{3}) = \frac{3}{2}$.

8. Find the value of $\cot \frac{\pi}{24}$ and $\tan \frac{\pi}{24}$.

9. Prove that $\sin 10^\circ \sin 50^\circ \sin 60^\circ \sin 70^\circ = \frac{\sqrt{3}}{16}$.

10. Prove that $(1 + \cos \frac{\pi}{8})(1 + \cos \frac{3\pi}{8})(1 + \cos \frac{5\pi}{8})(1 + \cos \frac{7\pi}{8}) = \frac{1}{16}$.

11. Evaluate: $\sin(\frac{\pi}{8})$.

12. Evaluate: $\sec(\frac{19\pi}{3})$.

13. Prove that: $\tan 70^\circ = \tan 20^\circ + 2\tan 50^\circ$.

14. Prove that: $2\cos \frac{\pi}{13} \cos \frac{9\pi}{13} + \cos \frac{3\pi}{13} + \cos \frac{5\pi}{13} = 0$.

15. Prove that: $\sin 3x + \sin 2x - \sin x = 4\sin x \cos \frac{x}{2} \cos \frac{3x}{2}$

16. If x and y are acute angles such that $\sin x = \frac{1}{\sqrt{5}}$ and $\sin y = \frac{1}{\sqrt{10}}$, prove that $x + y = \frac{\pi}{4}$.

17. Find the general solution of the equation: $\cos 3x + \cos x - \cos 2x = 0$.

18. find $\sin \frac{x}{2}$, $\cos \frac{x}{2}$ and $\tan \frac{x}{2}$ if $\tan x = -\frac{3}{4}$, and x lies in 3rd quadrant.

19. Prove that: $\cos 2x \cdot \cos \frac{x}{2} - \cos 3x \cdot \cos \frac{9x}{2} = \sin 5x \sin \frac{5x}{2}$.

20. ABC, prove that $\frac{b^2 - c^2}{a^2} = \frac{\sin(B - C)}{\sin(B + C)}$

21. Prove that : $(1 + \cos \frac{\pi}{8})(1 + \cos \frac{3\pi}{8})(1 + \cos \frac{5\pi}{8})(1 + \cos \frac{7\pi}{8}) = \frac{1}{8}$.

22. Prove that: $\tan 20^\circ \tan 40^\circ \tan 60^\circ \tan 80^\circ = 3$.

23. In any triangle ABC prove that : $a \sin(\frac{A}{2} + B) = (b + c) \sin \frac{A}{2}$.

24. Prove that : $\cos^2 x + \cos^2(x + \frac{\pi}{3}) + \cos^2(x - \frac{\pi}{3}) = \frac{3}{2}$.

25. Find the value of $\tan 105^\circ$.

26. If $x \cos \theta = y \cos(\theta + \frac{2\pi}{3}) = z \cos(\theta + \frac{4\pi}{3})$ then find the value of $xy + yz + zx$.

27. (i) In any ΔABC , prove that $\frac{a^2 + b^2}{a^2 + c^2} = \frac{1 + \cos(A - B)\cos C}{1 + \cos(A - C)\cos B}$

(ii) Find the general solution of the equation : $\sin 3\theta + \cos 2\theta = 0$

28. Show that $(1 + \cos \frac{\pi}{8})(1 + \cos \frac{3\pi}{8})(1 + \cos \frac{5\pi}{8})(1 + \cos \frac{7\pi}{8}) = \frac{1}{8}$

29. Solve the equation : $\sin x - 3 \sin 2x + \sin 3x = \cos x - 3 \cos 2x + \cos 3x$.

30. If $\tan \alpha = 3 \tan \beta$, prove that $\tan(\alpha - \beta) = \frac{\sin 2\beta}{5 - \cos 2\beta}$

31. If $A + B = 45^\circ$, Prove that $(1 + \tan A)(1 + \tan B) = 2$

32. **Show that :**

$$\frac{1 - \cos 2\theta + \sin 2\theta}{1 + \cos 2\theta + \sin 2\theta} = \tan \theta$$

33. Evaluate : $\frac{1}{\tan 3\alpha + \tan \alpha} - \frac{1}{\cot 3\alpha + \cot \alpha}$

34. Solve the following equation : $2 \tan \theta - \cot \theta = -1$

35. Find the general solutions of the equation : $\sin x + \sin 3x + \sin 5x = 0$

36. If $\cot A = \tan (n - 1)A$, then what is the value of A?

37. If $\sin x = \frac{3}{5}$, $\cos y = -\frac{12}{13}$ where x and y both lie in second quadrant, find the value of $\sin (x + y)$.

38. Show that $\sqrt{2 + \sqrt{2 + \sqrt{2 + 2 \cos 8\theta}}} = 2 \cos \theta$.

39. show that : $\cos 20^\circ \cos 40^\circ \cos 80^\circ = \frac{1}{8}$.

40. In any ΔABC prove that: $a(\sin B - \sin C) + b(\sin C - \sin A) + c(\sin A - \sin B) = 0$.

PHYSICAL EDUCATION

Write the following related to Athletics in your Practical File:-

1. History of the game.
2. Latest general rules.
3. Specifications of play fields.
4. Important tournaments.
5. Sports personalities
6. Fundamental skills.
7. Related sports terminology

8. Sports award winning personalities.
(Arjun award, Dronacharya Award, Rajiv Gandhi Khel Ratan Award)
9. Draw an athletics track.

BIOLOGY

CH: The Living World

1. Botanical gardens are living in herbaria. Comment.
2. Write the full form of ICBN.
3. What are the advantages of giving scientific names to organisms?
4. Define the term species and genus.
5. How are museums and zoological parks used in taxonomic work?
6. Write the taxonomical hierarchy of Tiger, Cat, and Rice.

CH: Biological Classification

7. Write notes on Monera and Protista.
8. Draw a well labelled diagram of Bacteriophage and Nostoc.
9. What are bacteriophages?
10. Name the major group of protists.
11. Write the economic importance of lichens.
12. What are heterocysts?

CH: Plant Kingdom

13. Distinguish between cryptogamae and phanerogamae.
14. Compare green algae with red algae.
15. What are the basis of classification of algae?
16. Explain briefly alternation of generation in bryophytes.
17. Why are some bryophytes called Liverworts?
18. Explain the nature of sporophylls in pteridophytes.
19. Why are mosses and ferns called amphibians of plant kingdom?
20. Distinguish between gametophyte and sporophyte.

CH: Animal Kingdom

21. Define metamerism.
22. How is radial symmetry different from bilateral symmetry?
23. Bat and whales are mammals. Comment.
24. Write any four aerial adaptations in birds.
25. How do you distinguish between a jellyfish and starfish?
26. Earthworm is annelid and not a nematode. Justify.
27. List three important characteristics of arthropods, reptiles and mammals.

CH: Cell: The Unit of Life

28. What is plasmalemma?

29. What is passive transport?
30. What are polysomes?
31. Differentiate between a prokaryotic and eukaryotic cell.
32. Describe the ultrastructural functions of a nucleus, mitochondria and plastid.
33. What is the difference between gram positive and gram negative bacteria?
34. What structural and functional characteristics do cilia, flagella and centrioles have in common?
35. Distinguish between chromatin and chromosome.

CH: Cell Cycle and Cell Division

36. Define the following- homologous chromosomes, synapses and crossing over.
37. Who coined the term 'mitosis'?
38. Write the significance of mitosis.
39. Differentiate between Anaphase- I and II of meiosis.
40. List the difference between mitosis and meiosis.
41. Classify the chromosomes based on position of centromere.
42. Draw and label the different stages of Meiosis-I.

COMPUTER SCIENCE

- i) Write an algorithm and draw the flowchart in the note book for the following tasks:-
 - a) To find maximum and minimum number in a list of numbers.
 - b) To calculate Simple Interest
 - c) To find the average age of males and females in a class.
 - d) To compute sum of the square of N numbers.
 - e) To print the series 0, 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, 144.
- ii) Revise Ch-1,Ch-3,Ch-6,Ch-14 for Periodic Test-I to be held in the month of July.

NOTE: Revise PT 1 Syllabus of all the subjects.