



## **BRAIN INTERNATIONAL SCHOOL**

**Class: XI (2018-19)**

### **Holiday Homework**

*In our head, we hear a humming,  
Summer, summer, summer's are coming  
Soon we're all going on a vacation  
Gearing up with wonderful sensations.*

Summer Vacation is here and brings new opportunities to visit places, meet new people and make new memories. Here are some suggestions to make your summer unforgettable:

- Wake up early and watch the sunrise often missed in our hurry to get ready for school.
- Use at least one new English word everyday in your spoken conversations.
- Don't just speak; let your words be reflected in your actions.
- Plant a sapling where you can ensure that it is growing well.
- With at least one positive action, make someone's life a little better.
- Dance and sing freely – on a stage, while hanging out with friends or even in your room.
- Express your gratitude to at least one person who has special significance in your life.
- Watch a play instead of a movie and discuss it with family and/or friends.
- Read the newspaper daily, cover to cover.
- Plan a dream and its fulfillment.

### **ENGLISH**

- 1) **Reader's Diary:** Read ANY ONE of the following and write a brief critique in about 200-250 words highlighting your overall opinion of the work, your favourite character and the relevance of the story in modern life.

#### **Plays**

A Doll's House (Henrik Ibsen)  
Look Back in Anger (John Osborne)

#### **Novels**

The Book Thief (Markus Zusak)  
Jonathan Livingston Seagull (Richard Bach)

A Long Walk to Water (Linda Sue Park)  
All the Birds in the Sky (Charlie J. Anders)

### Short Stories Collection

Best Indian Short Stories (Khushwant Singh)  
The Day I Stopped Drinking Milk (Sudha Murthy)

- 2) **Bard of BIS:** Write a poem where each stanza is dedicated to one family member of your immediate and/or extended family. Alternatively, you can write a story based on an interesting incident or event where all of the family members were involved. Include yourself in the poem or story. Paste a picture or draw a caricature of each family member with the stanza / paragraph associated with them.  
**Word limits:** Poem (at least ten stanzas)                      Story (at least 250 words)

3) Watch any of the following movies during this summer break. Now imagine that the same movie is just about to release and you have been asked to design a print advertisement to declare its arrival in cinema halls of your city. Design an attractive and colourful advertisement on an A3 sheet, mentioning the cast, director, producer, star rating etc. Draw images to support the theme of the movie.

- Wall-e (science fiction based on the future of waste management)
- The Boy in Striped Pajamas (historical fiction based on the holocaust)
- A Beautiful Mind (autobiographical movie on Nobel Prize Winner John Nash)
- To Sir, With Love (school-based fiction on apartheid and student-teacher relationships)

### PHYSICS

- 1) State and derive parallelogram law of vector addition.
- 2) Find the resultant of two forces, one 6N due east and other 8N due north.
- 3) An airplane takes off an angle of 30 degree to the horizontal. If the component of its velocity along the horizontal is 250 km/h, what is its actual velocity? Also find the vertical component of its velocity.
- 4) Find a unit vector parallel to the resultant of the vector  $\vec{A} = \mathbf{i} + 4\mathbf{j} - 2\mathbf{k}$  and  $\vec{B} = 3\mathbf{i} - 5\mathbf{j} + \mathbf{k}$ .
- 5) Show that  $(\vec{A} + \vec{B}) \times (\vec{A} - \vec{B}) = 2(\vec{B} \times \vec{A})$
- 6) Find angle between the vectors  $\vec{A} = \mathbf{i} + \mathbf{j} - 2\mathbf{k}$  and  $\vec{B} = -\mathbf{i} + 2\mathbf{j} - \mathbf{k}$ .
- 7) A body covers 4m in 3rd second 12 m in 5th second. If the motion is uniformly accelerated , how far will it travel in the next three second.
- 8) For a projectile motion fired from horizontal making an angle .Derive an expression for its trajectory , time of flight , maximum height and maximum range.

- 9) Prove that maximum horizontal range is four times the maximum height attained by the projectile, when fired at an angle so as to have maximum horizontal range.
- 10) A 40 kg shell is flying at a speed of 72 km/hr. It explodes into two pieces. One of the two pieces of mass 15 kg stops. Calculate the speed of the other.
- 11) Why is it easier to pull a roller than to push it.
- 12) Back exercises of KINEMATICS And LAWS OF MOTION from NCERT text book.

## **CHEMISTRY**

Chapter 3<sup>rd</sup> & 4<sup>th</sup> (Back exercise NCERT)

## **COMPUTER SCIENCE**

1. Write an algorithm to find the sum of two numbers.
2. Write an algorithm to find the area of a triangle.
3. Draw a flowchart to find the sum of all multiples of 5 up to given number.
4. Write an algorithm and a flowchart to find sum of n numbers

# Brain International School

## ASSIGNMENT: CLASS XI, CH: TRIGONOMETRIC FUNCTIONS

### BASED ON RADIAN MEASURE OF AN ANGLE

1. Find the length of an arc of a circle of radius 5 cm subtending a central angle measuring  $15^\circ$ . (Ans:  $\frac{5\pi}{12}$ )
2. Find in degrees the angle subtended at the centre of a circle of diameter 50cm by an arc of length 11 cm. ( Ans:  $25^\circ 12'$  )
3. A horse is tied to a post by a rope. If the horse moves along a circular path always keeping the rope tight and describes 88 meters when it has traced out  $72^\circ$  at the centre, find the length of the rope. ( Ans: 70 meters)
4. A circular wire of radius 7.5cm is cut and bent so as to lie along the circumference of a hoop whose radius is 125 cm. Find in degrees the angle which is subtended at the centre of the hoop. (Ans:  $22^\circ 30'$  )
5. The moon's distance from the earth is 360000kms and its diameter subtends an angle of  $31'$  at the eye of the observer. Find the diameter of the moon. (Ans: 3247.62km)
6. If the angular diameter of the moon be  $30'$ , how far from the eye a coin of diameter 2.2cm be kept to hide the moon?(Ans: 252cm)
7. Assuming that a person of normal sight can read at such a distance that the letters subtended an angle of  $5'$  at his eye, find what is the height of the letters that he can read at a distance of 12 meters.(Ans: 1.7cm)
8. Find the angle between the minute hand of a clock and the hour hand when the time is 7:20 AM (Ans:  $100^\circ$  )
9. Find in degrees and radians the angle between the hour hand and minute hand of a clock at half past three.(Ans:  $\frac{5\pi}{12}$ )
10. A railway train is travelling on a circular curve of 1500 meters radius at the rate of 66 km/hr. Through what angle has it turned in 10 seconds? ( Ans:  $\left(\frac{11}{90}\right)^\circ$  )
11. Find the diameter of the sun in km supposing that it subtends an angle of  $32'$  at the eye of an observer. Given that the distance of the sun is  $91 \times 10^6$  km.(Ans: 847407.4 km)

### BASED ON ALLIED ANGLES

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### EVALUATION OF VALUES AT VARIOUS ANGLES

12. Find the value of the following:  
(i)  $\sin 315^\circ$  (ii)  $\cos 210^\circ$  (iii)  $\cos(-480^\circ)$  (iv)  $\sin(-1125^\circ)$  (v)  $\operatorname{cosec} 390^\circ$  (vi)  $\cot 570^\circ$   
(vii)  $\operatorname{cosec}(-1200^\circ)$  (viii)  $\cos 855^\circ$  (ix)  $\sin 1845^\circ$  (x)  $\cos 1755^\circ$  (xi)  $\sin 4530^\circ$   
(Ans:  $-\frac{1}{\sqrt{2}}, -\frac{\sqrt{3}}{2}, -\frac{1}{2}, -\frac{1}{\sqrt{2}}, 2, \sqrt{3}, -\frac{2}{\sqrt{3}}, -\frac{1}{\sqrt{2}}, \frac{1}{\sqrt{2}}, \frac{1}{\sqrt{2}}, -\frac{1}{2}$ )

13. Prove that  $\tan \frac{11\pi}{3} - 2 \sin \frac{4\pi}{6} - \frac{3}{4} \operatorname{cosec}^2 \frac{\pi}{4} + 4 \cos^2 \frac{17\pi}{6} = \frac{3-4\sqrt{3}}{2}$ .
14. Prove that  $\frac{\operatorname{cosec}(90^\circ + \theta) + \cot(450^\circ + \theta)}{\operatorname{cosec}(90^\circ - \theta) + \tan(180^\circ - \theta)} + \frac{\tan(180^\circ + \theta) + \sec(180^\circ - \theta)}{\tan(360^\circ + \theta) - \sec(-\theta)} = 2$
15. Prove that  $\left\{1 + \cot \theta - \sec\left(\frac{\pi}{2} + \theta\right)\right\} \left\{1 + \cot \theta + \sec\left(\frac{\pi}{2} + \theta\right)\right\} = 2 \cot \theta$ .
16. Prove that  $\frac{\cos(2\pi + \theta) \operatorname{cosec}(2\pi + \theta) \tan(\pi/2 + \theta)}{\sec(\pi/2 + \theta) \cos \theta \cot(\pi + \theta)} = 1$

### BASED ON ANGLE'S SUM FORMULAE

17. If  $\cos(\alpha + \beta) = \frac{4}{5}$ ,  $\sin(\alpha - \beta) = \frac{5}{13}$  and  $\alpha, \beta$  lie between 0 and  $\frac{\pi}{4}$ , prove that  $\tan 2\alpha = \frac{56}{33}$ .
18. Prove that  $\tan 70^\circ = \tan 20^\circ + 2 \tan 50^\circ$ .
19. If  $\tan(\alpha + \theta) = n \tan(\alpha - \theta)$ , show that  $(n+1) \sin 2\theta = (n-1) \sin 2\alpha$ .
20. If  $\sin \alpha + \sin \beta = a$  and  $\cos \alpha + \cos \beta = b$ , show that  
 (i)  $\cos(\alpha + \beta) = \frac{b^2 - a^2}{b^2 + a^2}$       (ii)  $\sin(\alpha - \beta) = \frac{2ab}{a^2 + b^2}$
21. If  $\alpha$  and  $\beta$  are the solutions of the equation  $a \tan \theta + b \sec \theta = c$ , then show that  $\tan(\alpha + \beta) = \frac{2ac}{a^2 - c^2}$ .
22. Prove that  $\frac{\cos 9^\circ + \sin 9^\circ}{\cos 9^\circ - \sin 9^\circ} = \tan 56^\circ$ .
23. If  $\tan A = \frac{5}{6}$  and  $\tan B = \frac{1}{11}$ , prove that  $A + B = \frac{\pi}{4}$ .
24. Prove the following  
 (i)  $\frac{\sin(A-B)}{\sin A \sin B} + \frac{\sin(B-C)}{\sin B \sin C} + \frac{\sin(C-A)}{\sin C \sin A} = 0$   
 (ii)  $\tan 8\theta - \tan 6\theta - \tan 2\theta = \tan 8\theta \tan 6\theta \tan 2\theta$   
 (iii)  $\tan 15^\circ + \tan 30^\circ + \tan 15^\circ \tan 30^\circ = 1$   
 (iv)  $\frac{\tan^2 2\theta - \tan^2 \theta}{1 - \tan^2 2\theta \tan^2 \theta} = \tan 3\theta \tan \theta$
25. If  $\tan A = x \tan B$ , prove that  $\frac{\sin(A-B)}{\sin(A+B)} = \frac{x-1}{x+1}$ .
26. If  $\tan x + \tan\left(x + \frac{\pi}{3}\right) + \tan\left(x + \frac{2\pi}{3}\right) = 3$ , then prove that  $\frac{3 \tan x - \tan^3 x}{1 - 3 \tan^2 x} = 1$

### BASED ON PRODUCT FORMULAE

27. Prove the following:

$$(i) \quad \cos 20^\circ \cos 40^\circ \cos 60^\circ \cos 80^\circ = \frac{1}{16}$$

$$(ii) \quad \sin 10^\circ \sin 30^\circ \sin 50^\circ \sin 70^\circ = \frac{1}{16}$$

$$(iii) \quad \sin 20^\circ \sin 40^\circ \sin 60^\circ \sin 80^\circ = \frac{3}{16}$$

$$(iv) \quad \tan 20^\circ \tan 40^\circ \tan 80^\circ = \tan 60^\circ = \sqrt{3}$$

$$(v) \quad \cos 10^\circ \cos 30^\circ \cos 50^\circ \cos 70^\circ = \frac{3}{16}$$

28. Without calculating the values of  $\cos 75^\circ$  and  $\cos 15^\circ$ , find the value of  $\cos 75^\circ \cos 15^\circ$ .

29. Prove that  $2 \sin \frac{5\pi}{12} \cos \frac{\pi}{12} = \frac{\sqrt{3}+2}{2}$ .

### BASED ON SUM FORMULAE

30. Prove the following:

$$(i) \quad \sin \alpha + \sin(\alpha + 2\pi/3) + \sin(\alpha + 4\pi/3) = 0$$

$$(ii) \quad \cos \alpha + \cos \beta + \cos \gamma + \cos(\alpha + \beta + \gamma) = 4 \cos \frac{\alpha + \beta}{2} \cos \frac{\beta + \gamma}{2} \cos \frac{\gamma + \alpha}{2}$$

$$(iii) \quad \frac{\cos 2A \cos 3A - \cos 2A \cos 7A + \cos A \cos 10A}{\sin 4A \sin 3A - \sin 2A \sin 5A + \sin 4A \sin 7A} = \cot 6A \cot 5A$$

$$(iv) \quad \frac{\sin(A - C) + 2 \sin A + \sin(A + C)}{\sin(B - C) + 2 \sin B + \sin(B + C)} = \frac{\sin A}{\sin B}$$

$$(v) \quad \sin A + \sin 2A + \sin 4A + \sin 5A = 4 \cos \frac{A}{2} \cos \frac{3A}{2} \sin 3A$$

$$(vi) \quad \sin \frac{\theta}{2} \sin \frac{7\theta}{2} + \sin \frac{3\theta}{2} \sin \frac{11\theta}{2} = \sin 2\theta \sin 5\theta$$

31. If  $\sin 2A = \lambda \sin 2B$ , prove that:  $\frac{\tan(A + B)}{\tan(A - B)} = \frac{\lambda + 1}{\lambda - 1}$

32. If  $\frac{\sin(\theta + \alpha)}{\cos(\theta - \alpha)} = \frac{1 - m}{1 + m}$ , prove that:  $\tan\left(\frac{\pi}{4} - \theta\right) \tan\left(\frac{\pi}{4} - \alpha\right) = m$ .

### BASED ON DOUBLE, TRIPPLE, HALF ANGLE FORMULA

33. Prove the following:

$$(i) \quad \frac{\sin 2\theta}{1 - \cos 2\theta} = \cot \theta$$

- (ii)  $\frac{1 + \sin \theta - \cos \theta}{1 + \sin \theta + \cos \theta} = \tan \frac{\theta}{2}$
- (iii)  $\frac{\cos \theta}{1 + \sin \theta} = \tan \left( \frac{\pi}{4} - \frac{\theta}{2} \right)$
- (iv)  $\sqrt{2 + \sqrt{2 + \sqrt{2 + 2 \cos 8\theta}}} = 2 \cos \theta$
- (v)  $\frac{\sec 8\theta - 1}{\sec 4\theta - 1} = \frac{\tan 8\theta}{\tan 2\theta}$
- (vi)  $\left(1 + \cos \frac{\pi}{8}\right) \left(1 + \cos \frac{3\pi}{8}\right) \left(1 + \cos \frac{5\pi}{8}\right) \left(1 + \cos \frac{7\pi}{8}\right) = \frac{1}{8}$
- (vii)  $\cos 5A = 16 \cos^5 A - 20 \cos^3 A + 5 \cos A$
- (viii)  $\cos^3 A + \cos^3 (120^\circ + A) + \cos^3 (240^\circ + A) = \frac{3}{4} \cos 3A$

34. Find the value of  $\cos \left( 22 \frac{1}{2} \right)^\circ$ ,  $\sin \left( 22 \frac{1}{2} \right)^\circ$ ,  $\tan \left( 22 \frac{1}{2} \right)^\circ$ ,  $\sin \left( 7 \frac{1}{2} \right)^\circ$ ,  $\cos \left( 7 \frac{1}{2} \right)^\circ$

(Ans:  $\sqrt{\frac{\sqrt{2}+1}{2\sqrt{2}}}$ ,  $\sqrt{\frac{\sqrt{2}-1}{2\sqrt{2}}}$ ,  $\sqrt{2}-1$ ,  $\frac{\sqrt{4-\sqrt{6}-\sqrt{2}}}{2\sqrt{2}}$ ,  $\frac{\sqrt{4+\sqrt{6}+\sqrt{2}}}{2\sqrt{2}}$ )

### BASED ON GENERAL SOLUTION OF TRIGONOMETRICAL EQUATIONS

35. Solve the following trigonometric equations:

- (i)  $\sin \theta + \sin 3\theta + \sin 5\theta = 0$  (Ans:  $\theta = \frac{n\pi}{3}$  or  $\theta = m\pi \pm \frac{\pi}{3}$ , where,  $m, n \in \mathbb{Z}$ )
- (ii)  $\sin m\theta + \sin n\theta = 0$  (Ans:  $\theta = \frac{2r\pi}{m+n}$  or  $\theta = \frac{(2s+1)\pi}{m-n}$ , where,  $r, s \in \mathbb{Z}$ )
- (iii)  $2 \tan \theta - \cot \theta = -1$  (Ans:  $\theta = n\pi - \frac{\pi}{4}$  or  $\theta = m\pi + \alpha$ , where  $m, n \in \mathbb{Z}$  and  $\tan \alpha = \frac{1}{2}$ )
- (iv)  $\cot^2 \theta + \frac{3}{\sin \theta} + 3 = 0$  (Ans:  $\theta = n\pi + (-1)^{n+1} \frac{\pi}{6}$  or,  $\theta = m\pi + (-1)^{m+1} \frac{\pi}{2}$ ,  $m, n \in \mathbb{Z}$ )
- (v)  $\tan \theta + \tan 2\theta + \tan 3\theta = \tan \theta \tan 2\theta \tan 3\theta$  (Ans:  $\theta = \frac{n\pi}{3}$ ,  $n \in \mathbb{Z}$ )
- (vi)  $\tan \theta + \tan 2\theta + \sqrt{3} \tan \theta \tan 2\theta = \sqrt{3}$  (Ans:  $\theta = \frac{n\pi}{3} + \frac{\pi}{9}$ ,  $n \in \mathbb{Z}$ )
- (vii)  $2 \sin^2 x + \sin^2 2x = 2$  (Ans:  $x = n\pi \pm \frac{\pi}{2}$  or  $x = m\pi \pm \frac{\pi}{4}$ , where  $m, n \in \mathbb{Z}$ )
- (viii)  $\cot \theta + \operatorname{cosec} \theta = \sqrt{3}$  (Ans:  $\theta = 2n\pi + \frac{\pi}{3}$ ,  $n \in \mathbb{Z}$  and  $\theta \neq (2n-1)\pi$ ,  $n \in \mathbb{Z}$  as it makes  $\sin \theta = 0$ )

# BRAIN INTERNATIONAL SCHOOL

**Biology Holiday HW**

**Class XI**

**Jun'18**

## **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 a jellyfish and a starfish?
26. Earthworm is an 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.