BRAIN INTERNATIONAL SCHOOL

Class: XI-B (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.
- Distribute water bottles amongst the poor.
- Feed the birds.

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	**Novels**
A Doll's House (Henrik Ibsen)	The Book Thief (Markus Zusak)

Look Back in Anger (John Osborne)

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 a 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. Try to make the poem or story highlight the importance of family, relationships and acceptance of differences.
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 future of waste management)
- The Boy in Striped Pajamas (historical fiction based on the holocaust)
- A Beautiful Mind (autobiographical on Nobel Prize Winner John Nash)
- To Sir, With Love (school fiction on apartheid and student-teacher relationships)

Accounts:

Prepare a project on sole proprietor business having 25-30 transactions and pass necessary journal entries.

Business Studies:

Divide the students into group of 2 and allot the topics to the groups.

Prepare working model on:
1. G.S.T on Transportation/logistics
2. G.S.T on Clothes
3. A.T.M

Prepare non working model on :
1. G.S.T

2. Demonitization
3. Different services provided by banks
4. E-commerce
5. Difference b/w Traditional business n e-business.

Economics:

Prepare questionnaire to conduct a survey on demographic features of your locality. Collect information from 20 houses using various methods of data collection discussed in class.

Hint: Include questions related to no. of male and female members; working and non working members; educational qualifications; No. of dependents in the family etc

Informatics Practices:

Following practicals to be performed and submitted as hard copy after summer vacations:

- To display a message using Label, TextBox, MessageDialog using simple GUI applications.
- To concatenate two text entries and display using simple GUI application.
- To perform a simple arithmetic operation (+,-,*,/) and display the result in MessageDialog or TextBox using simple GUI application.
- To perform simple arithmetic operation (+,-,*,/) and display the result in TextBox using simple GUI application.
- To make simple decision making (if statement) solution and display relevant message using GUI application (Example - Problems related to Eligibility for a given value of Age, "Profit" or "Loss" messages for given values of Cost Price and Sale Price, Grade Display for given values of Marks of students etc.).

Physical Education:

1. History of the athletic game.
2. Latest general rules of athletic game.
3. Labelled diagram of 400 M Track and field with computations
4. Computation of BMI from family or neighbourhood and graphical representation of the data on ten members.
5. Labelled diagram of field and equipment of any one game of your choice out of the list below.
    - History of the game of your choice.
    - Latest general rules of your choice.

Note: Games are (Badminton, Tennis, Table Tennis and Taekwondo)

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°. *(Ans:* $5\pi/12$*)*
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° *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° *)*
9. *Find in degrees and radians the angle between the hour hand and minute hand of a clock at half past three.(Ans:* $5\pi/12$*)*
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:* $\left(\frac{11}{90}\right)^c$ *)*
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* 91×10^6 *km.(Ans: 847407.4 km)*

BASED ON ALLIED ANGLES
&
EVALUATION OF VALUES AT VARIOUS ANGLES

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

13. *Prove that* $\tan\frac{11\pi}{3}-2\sin\frac{4\pi}{6}-\frac{3}{4}\cos ec^2\frac{\pi}{4}+4\cos^2\frac{17\pi}{6}=\frac{3-4\sqrt{3}}{2}$.

14. *Prove that* $\frac{\cos ec\left(90^\circ+\theta\right)+\cot\left(450^\circ+\theta\right)}{\cos ec\left(90^\circ-\theta\right)+\tan\left(180^\circ-\theta\right)}+\frac{\tan\left(180^\circ+\theta\right)+\sec\left(180^\circ-\theta\right)}{\tan\left(360^\circ+\theta\right)-\sec\left(-\theta\right)}=2$

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* $\frac{\cos\left(2\pi+\theta\right)\cos ec\left(2\pi+\theta\right)\tan\left(\pi/2+\theta\right)}{\sec\left(\pi/2+\theta\right)\cos\theta\cot\left(\pi+\theta\right)}=1$

BASED ON ANGLE'S SUM FORMULAE

17. *If* $\cos\left(\alpha+\beta\right)=\frac{4}{5},\sin\left(\alpha-\beta\right)=\frac{5}{13}$ *and* α , β *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* $\tan\left(\alpha+\theta\right)=n\tan\left(\alpha-\theta\right)$, *show that* $\left(n+1\right)\sin 2\theta=\left(n-1\right)\sin 2\alpha$.

20. *If* $\sin\alpha+\sin\beta=a$ *and* $\cos\alpha+\cos\beta=b$, *show that*

(i) $\cos\left(\alpha+\beta\right)=\frac{b^2-a^2}{b^2+a^2}$ *(ii)* $\sin\left(\alpha-\beta\right)=\frac{2ab}{a^2+b^2}$

21. *If* α *and* β *are the solutions of the equation* $a\tan\theta+b\sec\theta=c$ *,then show that* $\tan\left(\alpha+\beta\right)=\frac{2ac}{a^2-c^2}$.

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) $\frac{\sin\left(A-B\right)}{\sin A\sin B}+\frac{\sin\left(B-C\right)}{\sin B\sin C}+\frac{\sin\left(C-A\right)}{\sin C\sin A}=0$

(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* $\frac{\sin\left(A-B\right)}{\sin\left(A+B\right)}=\frac{x-1}{x+1}$.

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

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

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

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

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

28. Without calculating the values of cos75^{O}and cos15^O, 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) $\sin\alpha + \sin\left(\alpha + 2\pi/3\right) + \sin\left(\alpha + 4\pi/3\right) = 0$

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

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

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

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

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

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

32. If $\frac{\sin\left(\theta+\alpha\right)}{\cos\left(\theta-\alpha\right)} = \frac{1-m}{1+m}$ *, 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) $\frac{\sin 2\theta}{1-\cos 2\theta} = \cot\theta$

(ii) $\dfrac{1+\sin\theta-\cos\theta}{1+\sin\theta+\cos\theta}=\tan\dfrac{\theta}{2}$

(iii) $\dfrac{\cos\theta}{1+\sin\theta}=\tan\left(\dfrac{\pi}{4}-\dfrac{\theta}{2}\right)$

(iv) $\sqrt{2+\sqrt{2+\sqrt{2+2\cos 8\theta}}}=2\cos\theta$

(v) $\dfrac{\sec 8\theta-1}{\sec 4\theta-1}=\dfrac{\tan 8\theta}{\tan 2\theta}$

(vi) $\left(1+\cos\dfrac{\pi}{8}\right)\left(1+\cos\dfrac{3\pi}{8}\right)\left(1+\cos\dfrac{5\pi}{8}\right)\left(1+\cos\dfrac{7\pi}{8}\right)=\dfrac{1}{8}$

(vii) $\cos 5A=16\cos^5 A-20\cos^3 A+5\cos A$

(viii) $\cos^3 A+\cos^3\left(120^\circ+A\right)+\cos^3\left(240^\circ+A\right)=\dfrac{3}{4}\cos 3A$

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

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

BASED ON GENERAL SOLUTION OF TRIGONOMETRICAL EQUATIONS

35. Solve the following trigonometric equations:

(i) $\sin\theta+\sin 3\theta+\sin 5\theta=0$ *(Ans:* $\theta=\dfrac{n\pi}{3}$ *or* $\theta=m\pi\pm\dfrac{\pi}{3}$ *, where,* $m,n\in Z$ *)*

(ii) $\sin m\theta+\sin n\theta=0$ *(Ans:* $\theta=\dfrac{2r\pi}{m+n}$ *or* $\theta=\dfrac{(2s+1)\pi}{m-n}$ *, where,* $r,s\in Z$ *)*

(iii) $2\tan\theta-\cot\theta=-1$ *(Ans:* $\theta=n\pi-\dfrac{\pi}{4}$ *or* $\theta=m\pi+\alpha$ *, where* $m,n\in Z$ *and* $\tan\alpha=\dfrac{1}{2}$ *)*

(iv) $\cot^2\theta+\dfrac{3}{\sin\theta}+3=0$ *(Ans:* $\theta=n\pi+(-1)^{n+1}\dfrac{\pi}{6}$ *or,* $\theta=m\pi+(-1)^{m+1}\dfrac{\pi}{2}$ *,* $m,n\in Z$ *)*

(v) $\tan\theta+\tan 2\theta+\tan 3\theta=\tan\theta\tan 2\theta\tan 3\theta$ *(Ans:* $\theta=\dfrac{n\pi}{3}, n\in Z$ *)*

(vi) $\tan\theta+\tan 2\theta+\sqrt{3}\tan\theta\tan 2\theta=\sqrt{3}$ *(Ans:* $\theta=\dfrac{n\pi}{3}+\dfrac{\pi}{9}, n\in Z$ *)*

(vii) $2\sin^2 x+\sin^2 2x=2$ *(Ans:* $x=n\pi\pm\dfrac{\pi}{2}$ *or* $x=m\pi\pm\dfrac{\pi}{4}$ *, where* $m,n\in Z$ *)*

(viii) $\cot\theta+\operatorname{cosec}\theta=\sqrt{3}$ *(Ans:* $\theta=2n\pi+\dfrac{\pi}{3}$ *,* $n\in Z$ *and* $\theta\neq(2n-1)\pi, n\in Z$ *as it makes* $\sin\theta=0$ *)*