

आचार्यकुलम्

वैदिक समाहित वी.एस.बी. आवासीय शिक्षण संस्थानम्

शिक्षा  
संस्कारः



अभ्युदयः  
निःश्रेयसः

Acharyakulam

A Vaidic Integrated BSB affiliated Residential (Co-ed) Educational Institute

# SUMMER HOLIDAY HOMEWORK (2026-2027)

ENGLISH

HISTORY

GEOGRAPHY

POLITICAL SCIENCE

MATHS

A. I.

SANSKRIT

XII



# **Class: XII (HUMANITIES)**

## **Session: 2026 – 2027**

### **SUBJECT – ENGLISH**

Dear Students,

As summer break begins, take this time to relax, reflect, and recharge. Alongside rest and recreation, let this be an opportunity to grow intellectually, creatively, and personally.

Your holiday homework is designed to enrich your learning beyond the classroom. Approach it with sincerity and originality. Ensure your work is neat, well-organized, and aligns with the subject-specific guidelines.

In addition, we encourage you to:

- Read newspapers to stay informed about current affairs.
- Improve handwriting by writing a page in English and Hindi daily.
- Read at least two meaningful books and create a personal word journal.
- Be proactive and responsible—support your family and community in small but meaningful ways.

"Let summer light your inner flame,  
Seek new knowledge, rise to fame.  
Pause, reflect, explore, and read—  
This season, plant your learning seed."

Wishing you a productive, joyful, and refreshing holiday!

#### **TASK 1:** **Podcast Summaries and Thematic Analysis**

A Project Report is a compilation of the work that you produce during the process of working on a project. You are required to prepare a Project Report, based on the guidelines given, and submit the project, having minimum 8-10 pages, to your respective English teacher for evaluation.

#### **Directions:**

1. Choose **\*\*any three themes\*\*** from the suggested list below, ensuring that each theme is from a different chapter.
2. For each chosen theme, listen to **\*\*two podcasts\*\*** that relate to it.

3. Write a **summary of each podcast** in approximately **250 words**. In your summary, address the following:

- The main ideas presented in the podcast.
- How the content of the podcast relates to the corresponding chapter and its themes.

### **Project Guidelines:**

- You may use any medium: pencil, watercolours, pastels, digital tools, etc.
- Use A4 size coloured / designer paper sheets for the project.
- Neatness, originality, and relevance to the theme will be assessed.
- Submit the assignments in a file /folder labelled with your name, class, and section.
- Parameters for Assessment: - Content, language and accuracy.
- Use as many pictures /photographs as you require.
- Use coloured sketch pens for headings and content.
- The project should be hand-written and spiral bound
- Completed project file is to be submitted along with holiday homework.
- Originality of the work will be appreciated.

### **Suggested Themes:**

#### **\*\*Prose from Flamingo:**

1. **The Last Lesson**: Nostalgia, loss of freedom, importance of language and culture.
2. **Lost Spring**: Child labour, loss of childhood, struggle for education.

#### **\*\*Poetry from Flamingo:**

1. **My Mother at Sixty-Six**: Aging, mortality, mother-child relationship.
2. **Keeping Quiet**: Reflection, introspection, importance of silence.
3. **A Thing of Beauty**: Beauty, truth, enduring power of art.
4. **Aunt Jennifer's Tigers**: Female empowerment, creativity, patriarchy.

#### **\*\*Supplementary Reader (from Vistas):**

1. **The Third Level**: Time travel, escapism, fantasy, longing for simpler times.
2. **On the Face of it**: Appearance vs. reality, empathy, and understanding.

The Project must include the following compulsory pages:

1. Title Page
2. Index Page
3. Acknowledgement

### ACKNOWLEDGEMENT

I would like to extend my sincere and heartfelt obligation towards all those who have helped me in making this project. Without their active guidance, help, cooperation and encouragement, I would not have been able to present the project on time.

I am extremely thankful and pay my sincere gratitude to my teacher \_\_\_\_\_ for his/ her valuable guidance and support for completion of this project.

I also acknowledge with a deep sense of reverence, my gratitude towards my parents, other faculty members of the school and friends for their valuable suggestions given to me in completing the project.

(Signature of the Student)

**Date:**

**Place:**

#### 4. Certificate of Completion

### CERTIFICATE

This is to certify that the project work on \_\_\_\_\_ based on the curriculum of BSB has been completed by \_\_\_\_\_ of Class XII Section \_\_\_\_\_ of Acharyakulam, Patanjali Yogpeeth, Haridwar, and Uttarakhand.

The above-mentioned project work has been completed under my guidance during the academic year 2026-27.

Signature of Teacher

#### 6. Objective

#### 5. Bibliography / References

### Task 2:

### **(Competency Based Questions)**

**Direction:** Write the answers of the following competency-based questions in not more than 120 words in your holiday notebook.

### The Last Lesson

**Q1.** The Last Lesson: Create an illustrated diary entry of Franz capturing his emotions on the last day of French lessons. Add symbolic visuals (e.g., a fading clock, a withering flower) to depict the loss of language and culture.

**Q2.** Flamingo: Prose and Poetry (Alphonse Daudet): The Last Lesson (Analytical Thinking) – Franz realizes the value of his mother tongue only when it is being taken away. If a similar decree were passed in your region, how would the youth react? Reflect on the importance of linguistic identity in a globalized world.

**Q3.** M. Hamel wears his fine Sunday clothes on the last day. Evaluate how this act transforms him from a strict taskmaster into a symbol profound patriotism and grief.

### **The Lost Spring**

**Q4.** Lost Spring (Anees Jung) (Thematic Analysis): The bangle-makers of Ferozabad and the rag-pickers of Seemapuri are trapped in a vicious circle of poverty and tradition. Compare their plights and evaluate how systemic apathy contributes to their loss of childhood.

### **A Thing of Beauty...**

**Q5.** A Thing of Beauty (John Keats) (Poetic Analysis): Keats suggests that a thing of beauty provides eternal joy and acts as a “bower quiet for us” against life’s hardships. Identify any three everyday objects around you that serve as your personal “thing of beauty” and explain why?

### **The Third Level**

**Q6.** The Third Level (Jack Finney) Hypothetical Inquiry: Charley escapes into an 1894 world to escape the insecurities, and stress of the modern world. If you were to build up your own “third level” to escape modern pressures, what era or place would it transport you to and why?

### **The Last Lesson and The Third Level**

**Q7.** Character Social Media Profile: Choose two characters from your syllabus (e.g. M. Hamel and Charley) and draft creative, detailed social media profiles (e.g., Facebook or Instagram bios, recent posts and comments) that reflect their personalities, struggles and character.

### **Keeping Quiet**

**Q8.** Rohan is a tech -entrepreneur who works 18 hours a day. He constantly feels burnt out, isolated from his family, and anxious about his company’s growth. If Pablo Neruda were to evaluate Rohan’s lifestyle, what advice would the poet give him based on the poem “Keeping Quiet”?

### **Aunt Jennifer’s Tigers**

**Q9.** Adrienne Rich’s poem is a critique of a society that binds women socially, emotionally, and physically. Based on your reading of the poem, evaluate how the symbols of “uncle’s wedding band” and the “tigers” encapsulate the conflict between oppression and liberation.

### **My Mother at Sixty-six**

**Q10.** “My Mother at Sixty-six” by Kamla Das is a poignant poem that explores the themes of aging, mortality, and the enduring love between a mother and child. Substantiate the statement.

### **Task 3:**

Revise and practice all the work done in the class (Reference Books, Notebooks, Assignments and Worksheets)

# SUBJECT: HISTORY

## Instructions:

- Fill important Mature Harappan sites in Map.
- Mark Mahajanpadas and cities: Vajji, Magadha, Kosala, Panchala, Gandhara, Avanti, Rajgir, Ujjain, Taxila, Varanasi.
- Mark the important palaces related Asoka's inscriptions.
- Buddhist sites -Sanchi, Bodh Gaya, Amaravati, Bharhut, Naganjunakonda.
- Make any project from your history syllabus of any choice.

## Answer the following questions

1. 'Early Harappan archaeologists thought that certain objects which seem unusual and unfamiliar may have had a religious significance'. Substantiate.
2. Who was John Marshall? How did he mark a change in the Indian archaeology?
3. How were Harappa seals and sealings used to facilitate long distance
4. Describe the opinions of the archaeologists over the central authority of the Harappan Civilisation.
5. What factors in your opinion are responsible for the collapse of a mature Harapan Civilisation by 1800 BCE
6. What does Asokan inscriptions talk about the Mauryas? Describe the limitations of the inscriptional evidences
7. Explain why patriliney may have been particularly important among the elite families.
8. Why Mahabharat is called dynamic text? Explain with suitable examples.
9. Discuss how and why stupas were built.
10. Explain the growth puranic Hinduism.

## Competencies Based Questions

Q-1 Quit India Struggles was started in the year.

- (A) 1942                      (B) 1944                      (C) 1945                      (D) 1940

Q-2 Who among the following was the President of the constituent Assembly?

- (A) Jawahar lal Nehru    (B) B R Ambedkar    (C) Rajendra Prasad    (D) Vallabhbai Patel

Q-3 What was the main demand of the Khilafat movement?

(A) Dominion status for India (B) Self rule to India

(C) Restoration of Caliphate of Turkey (D) Revival of orthodox culture of Islam

Q-4 In Bihar, who led the flag of revolt against British?

(A) Nana Sahib (B) Maulvi Ahmadullah (C) Kanwar Singh (D) Birjis Qadr

Q-5 In 1856, the kingdom which was formally annexed to the British empire was \_\_\_\_\_

(A) Awadh (B) Satara (C) Mysore (D) Jhansi

Q-6 When was the Fifth Report submitted?

(A) 1810 (B) 1811 (C) 1815 (D) 1813

Q-7 Chanhudaro was a tiny settlement almost exclusively devoted to craft production, which included making.

(A) Beads (B) Seals (C) Weight (D) All of these

Q-8 Who among the following is often known as the Father of Indian Archaeology?

(A) Daya Ram Sahni (B) Alexander Cunningham (C) Rakhhal Das Banerji (D) R.E.M Wheeler

Q-9 **Assertion (A)** Sangama dynasty was the first dynasty, exercised control till 1400.

**Reason (R)** Krishnadeva Raya belonged to the Tuluva dynasty.

- (A) Both A and R are true and R is the correct explanation of A
- (B) Both A and R are true, but R is not the correct explanation of A.
- (C) A is true, but R is false
- (D) A is false, but R is true

Q10. Choose the correct option from the following statements with reference to the Vaishnavism.

- A. Vaishnavism developed around various avatars of Vishnu and Shiva.
- B. Ten avatars are recognized within this tradition.
- C. The Ten forms are assumed as Brahma.
- D. The different forms of deity are not represented in sculpture

# SUBJECT: POLITICAL SCIENCE

## Instructions

- Write answers in essay form (120–150 words each) for all 10 questions.
- Use Political Science Notebook; add charts/diagrams if relevant.
- Submit neatly written work on the first day after vacation; late submissions not accepted.
- Show originality, use real-life examples, and add creative elements where possible.

**Task 1: PREPARE A PROJECT ON THE TOPIC AS DISCUSSED IN THE CLASS.**

**Task 2: WORKSHEET: Answer the following questions-**

### Q1. Source-Based Question

Read the statement carefully:

“The disintegration of the Soviet Union changed the world from a bipolar structure to a unipolar one dominated by the United States.”

Based on the statement, answer the following:

- a) Explain what is meant by a “bipolar world.”
- b) How did the end of the Soviet Union affect global politics?
- c) Mention one positive and one negative impact of unipolarity.

### Q2. Case Study Question

After the collapse of the USSR, many newly independent republics faced economic instability, ethnic conflicts, and political uncertainty.

If you were a policy advisor to one of these republics:

- a) What two immediate steps would you suggest for political stability?
- b) Why is economic reform important in nation-building?
- c) What lessons can modern nations learn from the Soviet disintegration?

### Q3. Comparative Thinking Question

Compare the role of the following centres of power in world politics:

Centre of Power	Main Strength
European Union	Economic Integration
China	Manufacturing and Trade

Russia

Military Power

**Based on the table:**

- a) Which power do you think has the greatest global influence today? Give reasons.
- b) Why do countries develop different kinds of strengths?
- c) How does this diversity affect global politics?

**Q4. Assertion–Reason Type**

Assertion (A): The European Union acts as an important contemporary centre of power.

Reason (R): The EU has strong economic cooperation among member countries.

Choose the correct option:

- a) Both A and R are true and R is the correct explanation of A.
- b) Both A and R are true but R is not the correct explanation of A.
- c) A is true but R is false.
- d) A is false but R is true.

Also justify your answer in 2–3 lines.

**Q5. Cartoon Interpretation Question**

A political cartoon shows one large country sitting on a globe while several smaller countries are trying to balance the globe together.

- a) What does the large country symbolize?
- b) What idea about world politics is the cartoon trying to convey?
- c) Why is balancing power important in international relations?

**Q6. Situation-Based Question**

Imagine a country is economically weak but militarily strong.

- a) Can it become a major centre of power? Why or why not?
- b) Which is more important in modern global politics—economic strength or military strength?
- c) Support your answer with one real-world example.

**Q7. Analytical Question**

The rise of China has changed global trade patterns significantly.

- a) Mention two reasons behind China's rapid economic growth.
- b) How has China influenced developing countries?
- c) Do you think China's rise challenges the dominance of the United States? Explain logically.

### Q8. Decision-Making Question

Suppose India has to choose between strengthening relations with the USA or maintaining balanced relations with all major powers.

- a) Which option would you recommend and why?
- b) How can balanced diplomacy benefit India?
- c) Which policy approach reflects India's traditional foreign policy values?

### Q9. Data Interpretation Question

Year	Number of Superpowers
1985	2
1995.	1
2025	Several influential powers

Study the table and answer:

- a) What major global change took place between 1985 and 1995?
- b) Why is the world in 2026 considered multipolar?
- c) How can multipolarity contribute to global stability?

### Q10. Higher-Order Thinking Question

“The end of bipolarity did not end global conflicts; it only changed their nature.”

Do you agree with the statement? Give arguments related to:

terrorism

- regional conflicts
- economic competition
- rise of new powers

# SUBJECT: GEOGRAPHY

## SECTION – A

Areas of subsistence gathering **Fundamentals of Human Geography**

Map Items for identification only on outline political map of the World.

Unit-3 Ch. 5 Primary Activities

- a) Major areas of nomadic herding of the world
- b) Major areas of commercial livestock rearing
- c) Major areas of extensive commercial grain farming
- d) Major areas of mixed farming of the World

## SECTION – B

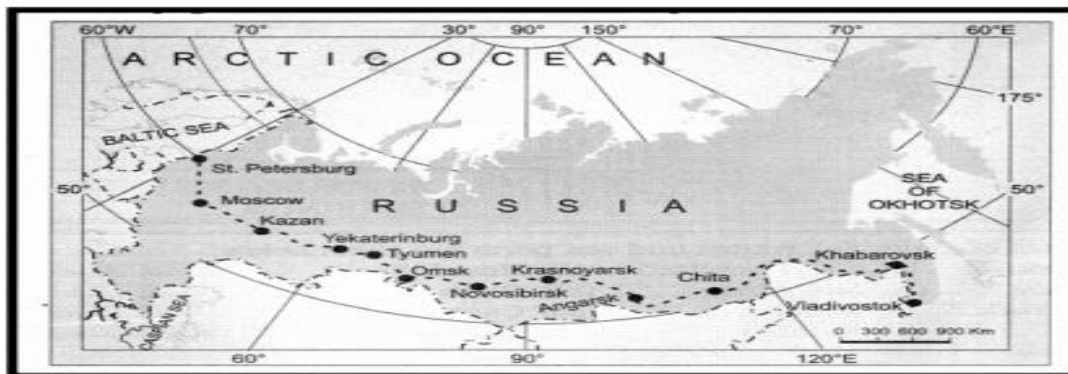
### **India - People and Economy**

1. Map Items for locating and labeling only on the outline political map of India Ch. 1 to 4
2. State with highest level of urbanization and lowest level of urbanization
3. State with higher level of population density & one state with lowest level of population density (2011)
4. Leading producing states of the following crops:
  - (a) Rice (b) Wheat (c) Cotton (d) Jute (e) Sugarcane (f) Tea and (g) Coffee
5. Learn any five countries from the world and locate them in the world (can be a hand drawn
6. map too) everyday
7. Learn any five cities of the world in the same pattern on daily basis.
8. Learn any five cities from India and practice to locate them each day.
9. Learn the question answers of the chapters taught.

Q3. Read the chapters and revise the question answers.

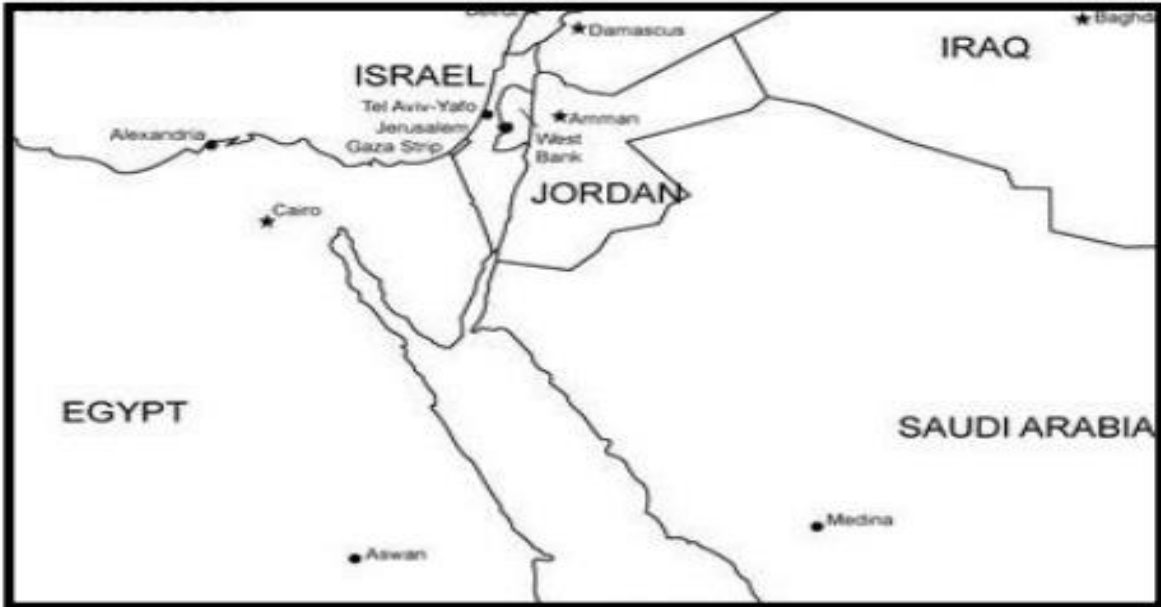
## SECTION – C

Q1. Study the map carefully and answer the questions that follow: -



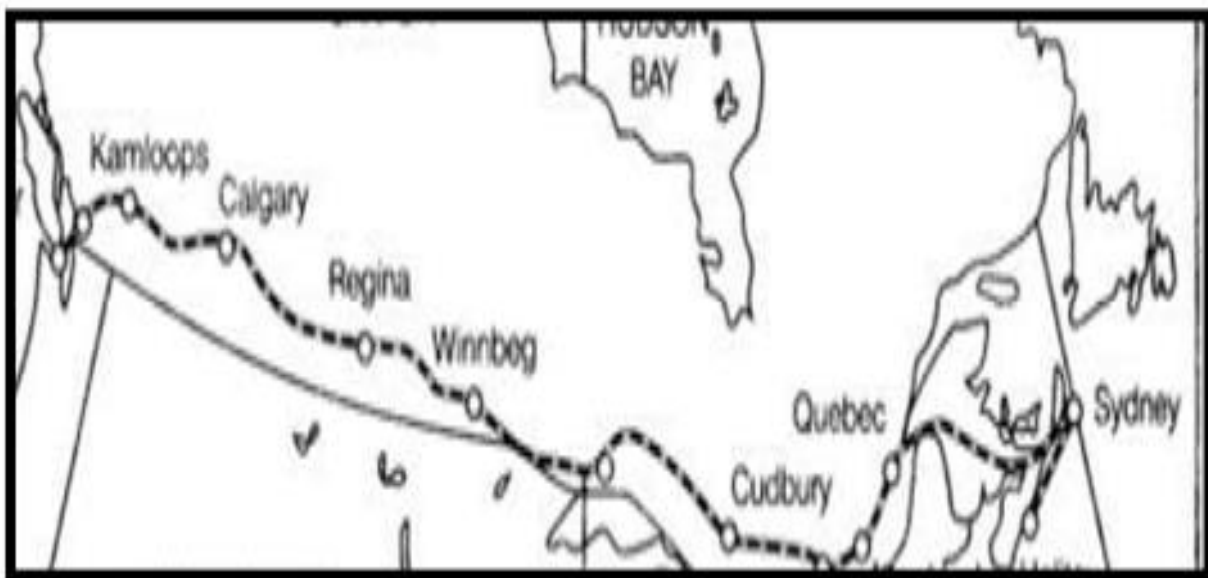
- a) Identify the railway line shown in the map.
- b) Name two ocean coasts which are being connected by this line.
- c) Write significance of this railway line.

Q2. Study the map carefully and answer the questions that follow



- a) Identify the type of waterway (1)
- b) Name the seas connected through this waterway (1)
- c) Name the end ports of this waterway (2)

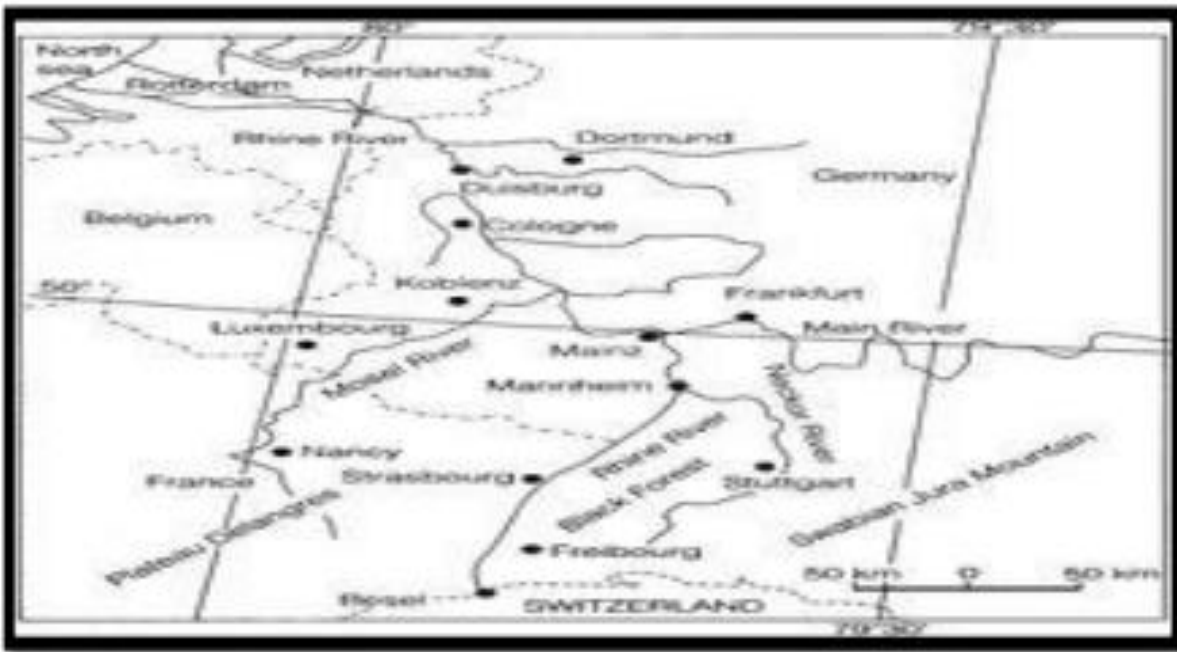
Q3. Study the given map carefully and answer the questions that follows: -



- a) Identify the railway line in the given map. (1)
- b) Name the terminal station to east and the west coast (1)

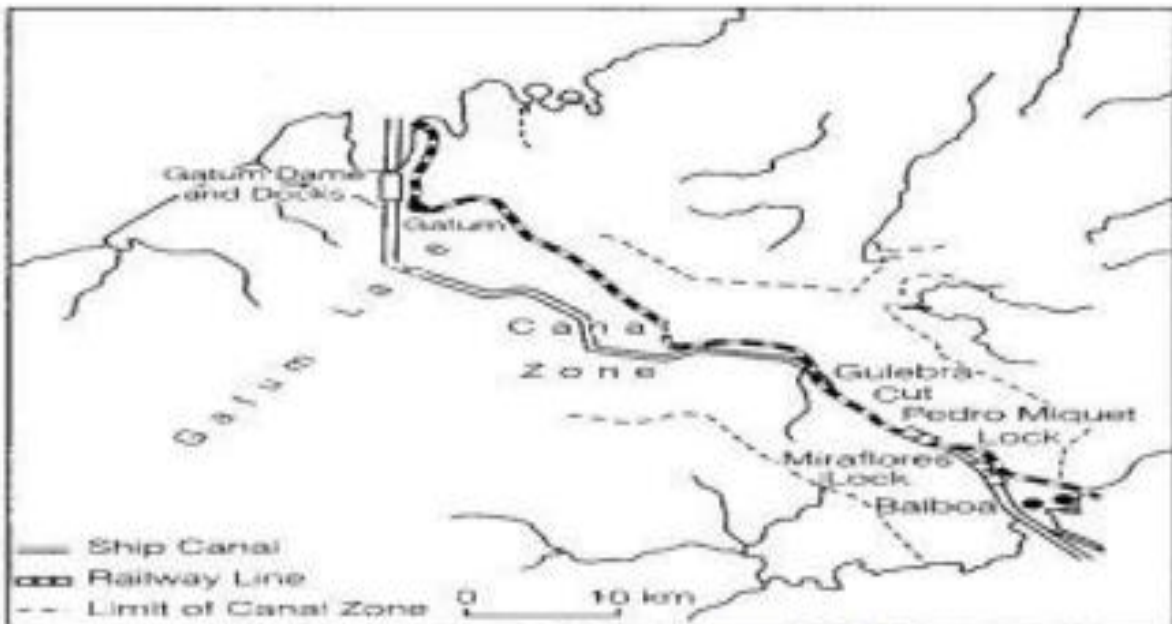
c) Mark the oceans lying to the east and west of the terminal station

Q4. Study the given map and answer the questions: -



- a) Name the type of waterway and name the countries served by this waterway. (1)
- b) Why it is considered important for Europe. (1)

Q5. Study the map carefully and answer the questions: -



- a) Identify the canal Zone and write its importance. (1)
- b) Name the terminal points of this canal zone and the connecting seas. (1)

c) Explain is the lock system of this canal. (1)

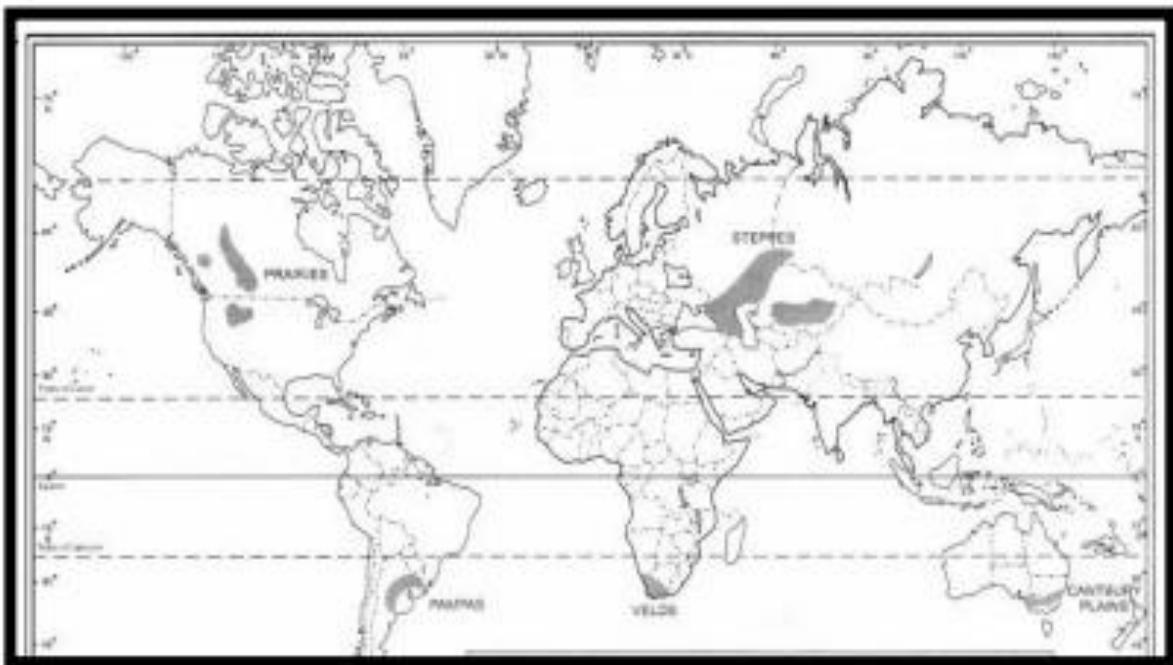
Q6. Study the given map and answer the questions that follows



a) Identify the type of agriculture practiced in the shaded areas (1)

b) Write 5 characteristics associated with this type of practice (2)

Q7. Study the given map carefully and answer the questions that follows

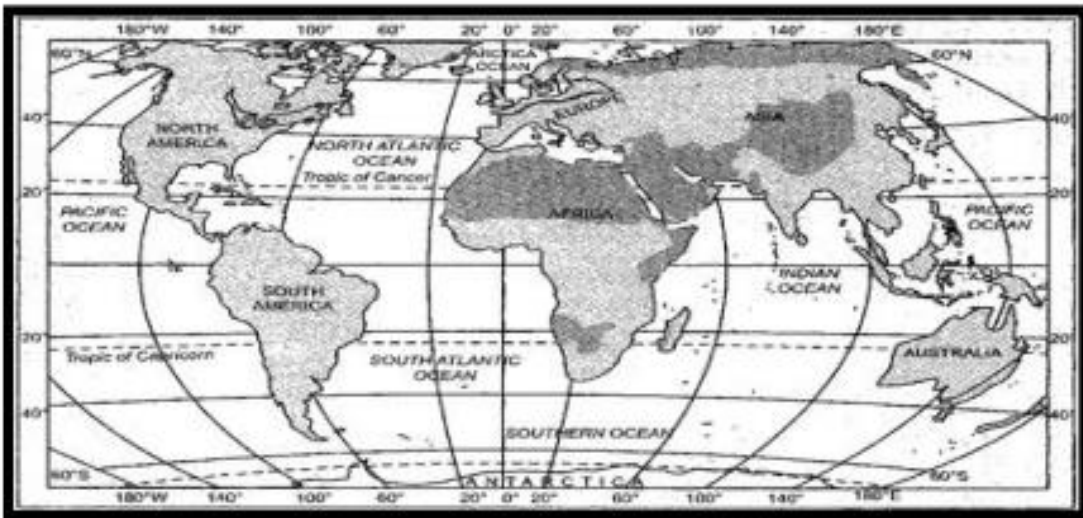


a) Identify the type of cultivation (1)

b) Name the major crops cultivated in these areas. (1)

c) 'Low yield per acre but high yield per person' justify the statement. (2)

Q8. Identify the region where this type of agriculture is practiced. Give reason for its decreasing trend. (2)



Q9. Look at the map given below and identify the type of activity is practiced and write important characteristic of this type of cultivation



Q10. Identify and write the characteristics of this type of economic activity.



# SUBJECT: MATHEMATICS

## General Instructions:

- (i) Homework is divided in two sections A and B. Section A is related the subjective competency based, source integrated and critical thinking-based questions and section B is related the lab activity in Mathematics for file record.
- (ii) Complete the homework in separate note book for section A and activities are complete in Maths Lab Activity file, if graph or colored paper or any relevant material required then first make and paste it on with respective activity.
- (iii) Write your name, class, section, subject, date of submission and roll number on cover page of homework.
- (iv) Write the all steps, formula and explanation with solutions of questions.
- (v) Try to keep the work neat, clean and decorative and answer the questions exactly as asked.

## SECTION-A

1. To simplify Inverse trigonometric expression, following substitution table can use

If use see	use the sub	so that	and
$\sqrt{a^2 - x^2}$	$x = a \sin \theta$	$dx = a \cos \theta d\theta$	$\sqrt{a^2 - x^2} = a \cos \theta$
$\sqrt{a^2 + x^2}$	$x = a \tan \theta$	$dx = a \sec^2 \theta d\theta$	$\sqrt{a^2 + x^2} = a \sec \theta$
$\sqrt{x^2 - a^2}$	$x = a \sec \theta$	$dx = a \sec \theta \tan \theta d\theta$	$\sqrt{x^2 - a^2} = a \tan \theta$

Based on the above information, answer the following question.

- (i) Prove that:  $\tan^{-1} \frac{\sqrt{1+\cos x} + \sqrt{1-\cos x}}{\sqrt{1+\cos x} - \sqrt{1-\cos x}} = \frac{\pi}{4} - \frac{x}{2}$ ,  $\pi < x < \frac{3\pi}{2}$
- (ii) Prove that:  $\cos^{-1} x + \cos^{-1} \left\{ \frac{x}{2} + \frac{\sqrt{3-3x^2}}{2} \right\} = \frac{\pi}{2}$ ,  $\frac{1}{2} \leq x \leq 1$
- (iii) Find derivative of  $\tan^{-1} \frac{\sqrt{1+x^2}-1}{x}$  w. r. t. x after simplification. ( $x \neq 0$ )
- (iv) Simplify and verified:  $\tan^{-1} \left( \frac{\sqrt{1+\cos x} + \sqrt{1-\cos x}}{\sqrt{1+\cos x} - \sqrt{1-\cos x}} \right)$ .  $\pi < x < \frac{3\pi}{2}$

2. A student of class XII, multiplies the two matrices A and B where,

$$A = \begin{bmatrix} 1 & -1 & 2 \\ 0 & 2 & -3 \\ 3 & -2 & 4 \end{bmatrix} \text{ and } B = \begin{bmatrix} -2 & 0 & 1 \\ 9 & 2 & -3 \\ 6 & 1 & -2 \end{bmatrix} \text{ later on be uses the product } AB \text{ in solving the system of equations}$$

$$x - y + 2z = 1, 2y - 3z = 1 \text{ and } 3x - 2y + 4z = 2$$

- (i) Find the product AB
- (ii) Find the value of  $A^{-1}$  by use the product of AB.
- (iii) Write the solution of given system of equations by using the product AB.
- (iv) Find the value of  $x + y + z$ .

3. Sumit has a doubt in the continuity and differentiability problem, but due to COVID-19 he is unable to meet with his teachers or friends. So he decided to ask his doubt with his friends Sunita and Vikram with the help of video call. Sunita said that the given function is continuous for all the real value of  $x$  while Vikram said that the function is continuous for all the real value of  $x$  except at  $x = 3$ .

The given function is  $f(x) = \frac{x^2-9}{x-3}$

Based on the above information, answer the following questions:

- (a) Whose answer is correct?
  - (b) Find the derivative of the given function with respect to  $x$ .
  - (c) Find the value of  $f'(3)$ .
  - (d) Find the second differentiation of the given function with respect to  $x$ .
5. A potter made a mud vessel, where the shape of the pot is based on  $f(x) = |x - 3| + |x - 2|$ , where  $f(x)$  represents the height of the pot.



- (a) When  $x > 4$  What will be the height in terms of  $x$ ?
- (b) What is  $dy/dx$  at  $x = 3$ ?
- (c) When the  $x$  value lies between  $(2, 3)$  then the function is \_\_\_\_\_
- (d) If the potter is trying to make a pot using the function  $f(x) = [x]$ , will he get a pot or not? Why?

6. Two schools A and B want to award their selected students on the values of Honesty, Hard work and Punctuality. The school A wants to award ₹  $x$  each, ₹  $y$  each and ₹  $z$  each for the three respective values to its 3, 2 and 1 students respectively with a total award money of ₹ 2200. School B wants to spend ₹ 3100 to award its 4, 1 and 3 students on the respective values (by giving the same award money to the three values as school A). The total amount of award for one prize on each value is ₹ 1200.



Using the concept of matrices and determinants, answer the following questions.

- (a) What is the award money for Honesty?
- (b) What is the award money for Punctuality?

- (c) What is the award money for Hard work?  
 (d) If a matrix P is both symmetric and skew-symmetric, then find  $|P|$ .

7. To promote the usage of house toilets in villages, especially for women, are organisations tried to generate awareness among the villagers through (i) house calls (ii) letters, and (iii) announcements.



The cost for each mode per attempt is given below.

- (i) ₹ 50 (ii) ₹ 20 (iii) ₹ 40 The number of attempts made in villages X, Y, and Z is given below:

	(i)	(ii)	(iii)
X	400	300	100
Y	300	250	75
Z	500	400	150

Also, the chance of making toilets corresponding to one attempt of given modes is:

- (i) 2% (ii) 4% (iii) 20% Let A, B, and C be the cost incurred by organisation in three villages respectively.

**Based on the above information answer the following questions:**

- (i) Form a required matrix on the basis of the given information.  
 (ii) From a matrix, related to the number of toilets expected in villagers X, Y, and Z after the promotion campaign.  
 (iii) What is the total amount spent by the organisation in all three villages X, Y, and Z?

**Or**

What is the total no.of toilets expected after the promotion campaign?

8. Sherlin and Danju are playing Ludo at home during Covid-19. While rolling the dice, Sherlin's sister Raji observed and noted that possible outcomes of the throw every time belongs to set  $\{1, 2, 3, 4, 5, 6\}$ . Let A be the set of players while B be the set of all possible outcomes.



$$A = \{S, D\}, B = \{1, 2, 3, 4, 5, 6\}$$

- (i) Let  $R : B \rightarrow B$  be defined by  $R = \{(x, y) : y \text{ is divisible by } x\}$ . Show that relation  $R$  is reflexive and transitive but not symmetric.
- (ii) Let  $R$  be a relation on  $B$  defined by  $R = \{(1, 2), (2, 2), (1, 3), (3, 4), (3, 1), (4, 3), (5, 5)\}$ . Then check whether  $R$  is an equivalence relation.
- (iii) Raji wants to know the number of functions from  $A$  to  $B$ . How many number of functions are possible?

**OR**

(iii) Raji wants to know the number of relations possible from  $A$  to  $B$ . How many numbers of relations are possible?

9. Students of Grade 9, planned to plant saplings along straight lines, parallel to each other to one side of the playground ensuring that they had enough play area. Let us assume that they planted one of the rows of the saplings along the line  $y = x - 4$ . Let  $L$  be the set of all lines which are parallel on the ground and  $R$  be a relation on  $L$ .

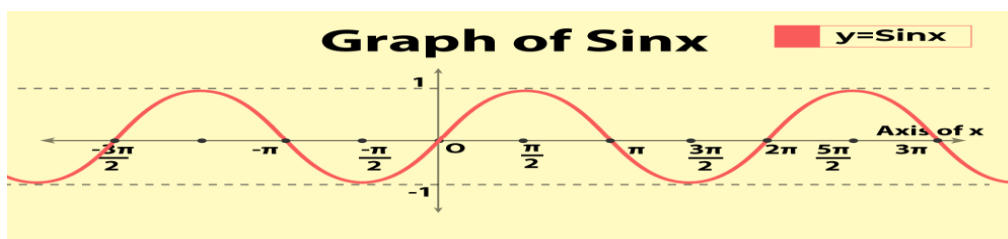


- I. Let relation  $R$  be defined by  $R = \{(L1, L2) : L1 \parallel L2 \text{ where } L1, L2 \in L\}$ . What is the type of relation  $R$ ?
- II. (a) Check whether the function  $f : R \rightarrow R$  defined by  $f(x) = x - 4$  is bijective or not.

**OR**

(b) Consider  $f: R^+ \rightarrow [-5, \infty)$  given by  $f(x) = 9x^2 + 6x - 5$ . find range and show that  $f$  is invertible.

10. If a function  $f : X \rightarrow Y$  defined as  $f(x) = y$  is one-one and onto, then we can define a unique function  $g : Y \rightarrow X$  such that  $g(y) = x$ , where  $x \in X$  and  $y = f(x)$ ,  $y \in Y$ . Function  $g$  is called the inverse of  $f$ . The domain of sine function is  $R$  and function sine:  $R \rightarrow R$  is neither one-one nor onto. The following graph shows the sine function.



Let sine function be defined from set A to  $[-1, 1]$  such that inverse of sine function exists, i.e.,  $\sin^{-1} x$  is defined from  $[-1, 1]$  to A.

On the basis of above information, answer the following questions.

- (i) If A is the interval other than principal value branch, give an example of one such interval.
- (ii) If  $\sin^{-1} x$  is defined from  $[-1, 1]$  to its principal value branch, find the value of  $\sin^{-1}(-1/2) - \sin^{-1}(-1)$
- (iii) Draw the graph of  $\cos^{-1} x$  from  $[-1, 1]$  to its principal value branch  $[0, \pi]$ .
- (iv) Find the domain and range of
  - (a)  $f(x) = 2\sin^{-1}(1-x)$  .(b)  $f(x) = \sin^{-1} x + \tan^{-1} x + \sec^{-1} x$

**DOWNLOAD THE SQP & QP OF PREVIOUS YEAR 2026 OF YOUR REGION AND SOLVE THE QUESTIONS OF FOLLOWING TOPICS:**

1. Continuity and Differentiability
2. Application on Derivatives
3. Sets, Relation and Function
4. Inverse Trigonometric Function
5. Matrix and Determinants

## SECTION-B

**Complete the following lab activities:**

**A1:** To verify the relation R in the set L of all lines in a plane, defined as  $\{(l,m): l \perp m \text{ and } l,m \in L\}$  is symmetric but neither reflexive nor transitive.

**A2:** To demonstrate a function which is not one-one but is onto?

**A3:** To draw the graph of  $\sin^{-1} x$ , using the graph of  $\sin x$  and demonstrate the concept of mirror reflection about  $y=x$

**A4:** To draw the graph of  $\sec^{-1} x$ , using the graph of  $\sec x$  and demonstrate the concept of mirror reflection about  $y=x$

**A4:** To find analytically the limit of a function at  $x = 5$ ,  $f(x) = \frac{x^2-25}{x-5}$  when  $x \neq 5$  and  $f(x) = 10$  when  $x = 5$  and also to check the continuity of the function at that point.

**A5:** To sketch the graphs of  $2^x$  and  $\log_2 x$  and to examine that they are mirror images of each other.

**A6:** To construct an open box of maximum volume from a given rectangular sheet by cutting equal squares pieces squares pieces from each corner.

## विषय – संस्कृत

1. सामूहिकं यज्ञं कृत्वा सामूहिकं योगप्रशिक्षणं च दत्त्वा तस्य सामूहिकछायाचित्रम् एकस्मिन् A4 sheet कर्गदि संश्लेश्य तस्य विवरणं संस्कृतेन लिखत।
2. स्व-पाकशालायाम् उपलब्ध-खाद्य-वस्तूनां नामानि तेषां पात्रेषु संस्कृते विलिख्य छायाचित्राणि A4 sheet कर्गदि संश्लेश्य आनयन्तु।
3. 'अनुशासनम्' इति पाठं स्मृत्वा तद्विषयाधारितं सार्द्धं द्विपृष्ठात्मकं निबन्धं एकस्यां संचिकायां (FILE) संस्कृतेन लिखत।
4. प्रथम, द्वितीय एवं तृतीय पाठेषु आगतानां समस्त सन्धि-समास-प्रत्यय-शब्दानां चयनं कृत्वा एकस्यां लघु-टिप्पणीपुस्तिकायां विलिख्य आनयन्तु।
5. क्रियाकलाप

क्रम.सं.	दिनाङ्कः	अभिवादनम्	योगः	यज्ञः	भोजनमन्त्रः	संस्कृतवाक्यम्	शयनमन्त्रः	अभिभावक-हस्ताक्षरम्
1.	27.05.26							
2.	28.05.26							
3.	29.05.26							
4.	30.05.26							
5.	31.05.26							
6.	1.06.26							
7.	2.06.26							
8.	3.06.26							
9.	4.06.26							
10.	5.06.26							
11.	6.06.26							

12.	7.06.26							
13.	8.06.26							
14.	9.06.26							
15.	10.06.26							
16.	11.06.26							
17.	12.06.26							
18.	13.06.26							
19.	14.06.26							
20.	15.06.26							
21.	16.06.26							
22.	17.06.26							
23.	18.06.26							
24.	19.06.26							
25.	20.06.26							
26.	21.06.26							
27.	22.06.26							
28.	23.06.26							
29.	24.06.26							
30.	25.06.26							

**धातव्य-**

1. भो छात्र ! प्रतिदिन आपको उपरोक्त क्रिया कलाप अवश्य करने हैं और प्रतिनित्य अपने अभिभावकों के हस्ताक्षर इस आशय से कराने हैं कि आपने उनके समक्ष किया है।

2. प्रतिदिन किये गये क्रिया कलाप को चित्र के माध्यम से प्रमाण सहित उपस्थित करना अनिवार्य है।
3. **संस्कृत वाक्य** में प्रतिदिन अपने अभिभावकों को एक-एक संस्कृत का वाक्य सिखाना है।
4. इस गृहकार्य के अंक आपके आंतरिक मूल्यांकन (Internal Assessment) के क्रियाकलाप (Activity) में जोड़े जायेंगे।

## SUBJECT: ARTIFICIAL INTELLIGENCE

1. Prepare a **Capstone Project**, identifying a real-world problem, using the Design Thinking (DT) framework to solve it, and documenting the AI Project Cycle.
2. Prepare a Practical File (hard bound practical book) - Python & Data Handling

This requires you to document core Python and data manipulation programs.

You should write the Question, Code, and Output on A4 sheets (or prepare a digital document):

**Basic Data Frames:** Write a program to create a Pandas Data Frame using a sequence (dictionary) and display the first 5 records.

**CSV Operations:** Write a script to read data from a .csv file, convert it into a Pandas Data Frame, and perform operations on it.