Einstein
PUBLIC SCHOOL
Nurturing a better tomorrow

SUMMER Holidays

HOMEWORK

CLASS XII

Hindi

नोट -

- सभी कार्य A4 शीट एवं प्रोजेक्ट फाइल में साफ़-सुथरे ढंग से करें तथा आवश्यक चित्र भी बनाएं।
- सुंदर एवं साफ-सुथरे लेख में कार्य पूर्ण कीजिए।

[1] बाजार दर्शन' पाठ का विश्लेषण करते हुए उपभोक्तावाद के प्रभाव को स्पष्ट कीजिए।

अथवा

'भक्तिन' रेखाचित्र का चरित्र-चित्रण करते हुए उसके संघर्षमय जीवन का वर्णन कीजिए।

[2] पतंग' कविता में बच्चों की भावनाओं और उत्साह का वर्णन कीजिए।

अथवा

कैमरे में बंद अपाहिज' कविता के माध्यम से समाज पर किए गए व्यंग्य का विश्लेषण कीजिए।

[3] जूझ' पाठ के आधार पर शिक्षा और संघर्ष के महत्व को स्पष्ट कीजिए।

अथवा

'सिल्वर वेडिंग' कहानी में पारिवारिक संबंधों का विश्लेषण कीजिए।

[4] अपना पोर्टफोलियो तैयार कीजिए, जिसमें अपना परिचय, शैक्षिक विवरण, रुचियाँ, उपलब्धियाँ तथा लक्ष्य का उल्लेख कीजिए।

[5] सोशल मीडिया के सकारात्मक एवं नकारात्मक प्रभावों का वर्णन कीजिए।

अथवा

मुद्रित एवं इलेक्ट्रॉनिक मीडिया में अंतर स्पष्ट कीजिए।

English

Total Questions: 40

Section A – MCQs (10 × 1 = 10)

1. Who is the author of The Last Lesson?

a) Jack Finney b) Alphonse Daudet c) Kalki d) Kamala Das

2. Why were the students quiet in M. Hamel's class?

a) They were afraid b) Inspector was coming

c) It was the last French lesson d) They were tired

3. In My Mother at Sixty-Six, the mother's face is compared to:

- a) A flower
- b) The moon
- c) A corpse
- d) Winter landscape

4. Who wrote The Third Level?

- a) Jack Finney
- b) Daudet
- c) Shakespeare
- d) Browning

5. The third level at Grand Central Station symbolizes:

- a) Adventure
- b) Escape from modern life
- c) Wealth
- d) Fear

6. What prediction was made about the Tiger King?

- a) He would become rich
- b) He would die at the age of thirty
- c) A tiger would cause his death
- d) He would become a saint

7. How many tigers did the Tiger King kill?

- a) 50
- b) 99
- c) 100
- d) 101

8. Kamala Das's poem expresses:

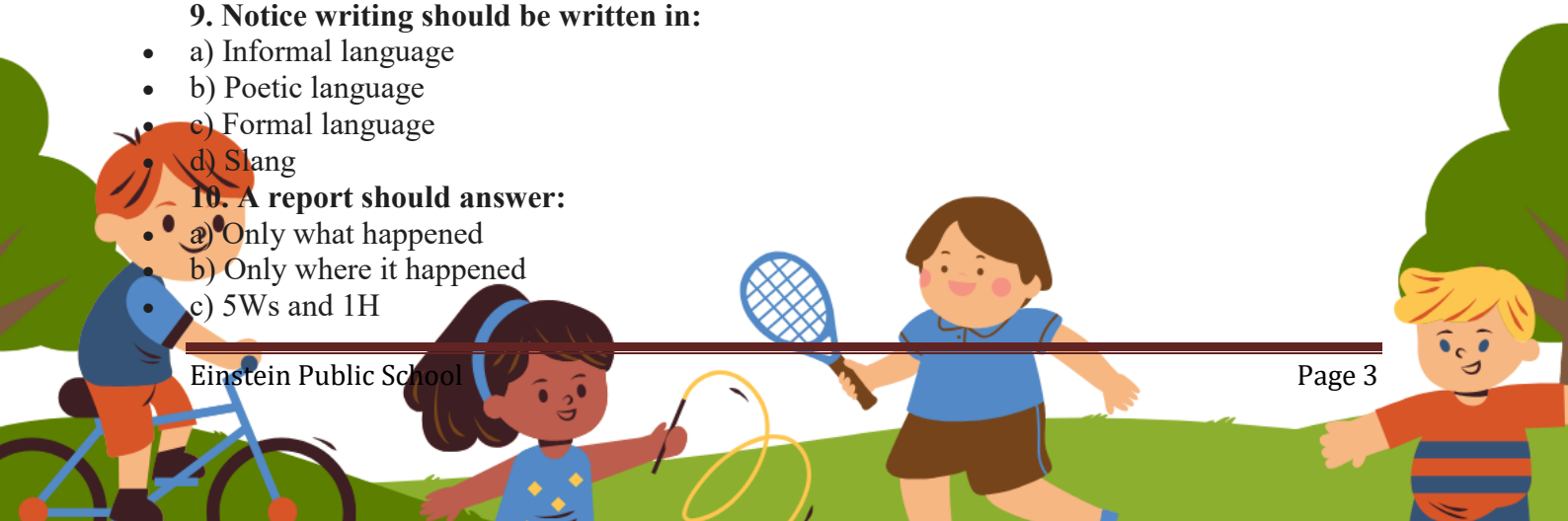
- a) Patriotism
- b) Fear of separation and ageing
- c) Joy of childhood
- d) Humour

9. Notice writing should be written in:

- a) Informal language
- b) Poetic language
- c) Formal language
- d) Slang

10. A report should answer:

- a) Only what happened
- b) Only where it happened
- c) 5Ws and 1H



- d) Only who was present

Section B – Assertion & Reason (5 × 1 = 5)

11. Assertion: Franz regretted not learning his lessons.
Reason: It was the last French lesson in Alsace.

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

12. Assertion: The poet smiled and said goodbye in My Mother at Sixty-Six.
Reason: She wanted to hide her fear and sadness.

- a) Both true and R explains A
- b) Both true but R does not explain A
- c) A true, R false
- d) A false, R true

13. Assertion: Charley believed in the existence of the third level.
Reason: Sam confirmed it through his letter.

- a) Both true and R explains A
- b) Both true but R does not explain A
- c) A true, R false
- d) A false, R true

14. Assertion: The Tiger King feared tigers throughout his life.
Reason: Astrologers predicted that a tiger would kill him.

- a) Both true and R explains A
- b) Both true but R does not explain A
- c) A true, R false
- d) A false, R true

15. Assertion: Report writing requires factual details.
Reason: Reports are written to entertain readers only.

- a) Both true and R explains A
- b) Both true but R does not explain A
- c) A true, R false
- d) A false, R true

Section C – Short Answer Questions (10 × 2 = 20)

- **16.** Why was Franz afraid of going to school?
- **17.** What did M. Hamel blame himself for?
- **18.** What does the phrase “last lesson” symbolize?
- **19.** Why does the poet compare her mother’s face to a corpse?
- **20.** What were the poet’s childhood fears?
- **21.** What is the “Third Level”?
- **22.** Why did Charley want to escape to Galesburg?
- **23.** Why did the Tiger King decide to kill all the tigers?
- **24.** How did the Tiger King meet his end?
- **25.** Mention any two features of a good notice.

Section D – Long Answer Questions (10 × 4 = 40)

- **26.** Describe Franz’s feelings during the last lesson.
- **27.** Write a character sketch of M. Hamel.
- **28.** Explain the theme of language and patriotism in The Last Lesson.
- **29.** Discuss the theme of ageing and separation in My Mother at Sixty-Six.
- **30.** Explain the significance of the title My Mother at Sixty-Six.

- **31.** Describe Charley's experience at the third level.
- **32.** How does The Third Level mix fantasy with reality?
- **33.** Give a character sketch of the Tiger King.
- **34.** Discuss the irony in The Tiger King.
- **35.** "The Tiger King is a satire on kings and astrology." Explain.

Section E – Notice Writing & Report Writing (5 × 5 = 25)

- **36.** You are the Cultural Secretary of your school. Draft a notice informing students about an Inter-School Debate Competition.
- **37.** Write a notice about a lost school bag found in the library.
- **38.** Your school celebrated Independence Day. Write a report for the school magazine.
- **39.** Write a report on a Tree Plantation Drive organized by your school.
- **40.** Draft a notice informing students about winter vacation homework submission dates.

Maths

Section A MCQ and Reason Assertion

1. A matrix has 18 elements, then possible number of orders of a matrix are

(a) 3 (b) 4 (c) 6 (d) 5

2. The diagonal elements of a skew symmetric matrix are

(a) all zeroes (b) are all equal to some scalar k(≠ 0)

(c) can be any number (d) none of these

3. If a matrix A is both symmetric and skew symmetric then matrix A is

(a) a scalar matrix (b) a diagonal matrix

(c) a zero matrix of order n × n (d) a rectangular matrix.

4. If A is a skew symmetric matrix then A2 is a

(a) square matrix (b) diagonal matrix

(c) symmetric matrix (d) skew symmetric matrix

5. A matrix $A = [a_{ij}]_{3\times3}$ is defined by $a_{ij} = \begin{cases} 2ij + 3j, i < j \\ 5, \quad i = j \\ 3i - 2j, i > j \end{cases}$ The number of elements in A which are more than 5 is

(a) 3 (b) 4 (c) 5 (d) 6

6. If $A = \begin{bmatrix} 0 & 0 & 1 \\ 0 & 1 & 0 \\ 1 & 0 & 0 \end{bmatrix}$ then A^6 is equal to

(a) zero matrix (b) A (c) I (d) none of these

7. If $A = \begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix}$, then $A^2 - 5A - 7I$ is

(a) a zero matrix (b) an identity matrix

(c) diagonal matrix (d) none of these

8. Principal value of $\sin^{-1}\left(-\frac{1}{2}\right)$ is

(a) $\frac{\pi}{3}$ (b) $-\frac{\pi}{3}$ (c) $\frac{5\pi}{6}$ (d) $-\frac{\pi}{6}$

9. $\tan^{-1}\left\{\sin\left(-\frac{\pi}{2}\right)\right\}$ is equal to

(a) -1 (b) 1 (c) $\frac{\pi}{2}$ (d) $-\frac{\pi}{4}$

10. $\sec\left\{\tan^{-1}\left(\frac{y}{3}\right)\right\}$ is equal to

(a) $\frac{\sqrt{9+y^2}}{9}$ (b) $\frac{\sqrt{9+y^2}}{3}$ (c) $\frac{3}{\sqrt{9+y^2}}$ (d) $\frac{9}{\sqrt{9+y^2}}$

11. Principal value of the expression $\cos^{-1}[\cos(-680°)]$ is

(a) $\frac{2\pi}{9}$ (b) $-\frac{2\pi}{9}$ (c) $\frac{34\pi}{9}$ (d) $\frac{\pi}{9}$

12. The domain of $y = \cos^{-1}(x^2 - 4)$ is

(a) $[3, 5]$ (b) $[0, \pi]$

(c) $[-\sqrt{5} - \sqrt{3}] \cap [-\sqrt{5}, \sqrt{3}]$ (d) $[-\sqrt{5} - \sqrt{3}] \cup [\sqrt{3}, \sqrt{5}]$

13. Let R be a relation on the set L of lines defined by $l_1 R\, l_2$ if l_1 is perpendicular to l_2, then relation R is

(a) reflexive and symmetric (b) symmetric and transitive

(c) equivalence relation (d) symmetric

14. Given set $A = \{a, b, c\}$. An identity relation in set A is

(a) $R = \{(a, b), (a, c)\}$ (b) $R = \{(a, a), (b, b), (c, c)\}$

(c) $R = \{(a, a), (b, b), (c, c), (a, c)\}$ (d) $R = \{(c, a), (b, a), (a, a)\}$

15. Let the function 'f' : $N \to N$ be defined by $f(x) = 2x + 3$, $\forall\, x \in N$. Then 'f' is

(a) not onto

(b) bijective function

(c) many-one, into function

(d) none of these

16. A relation defined in a non-empty set A, having n elements, has

(a) n relations (b) 2 relations (c) n^2 relations (d) $2n^2$ relations

17. If $f(x) = x^3$ and $g(x) = \cos 3x$, then fog is

(a) $x^3 . \cos 3x$ (b) $\cos 3x^3$ (c) $\cos^3 3x$ (d) $3 \cos x^3$

18. Let 'f' : $R - \{2\} \to R - \{1\}$ be a function defined by $f(x) = \frac{x-1}{x-2}$, then 'f' is

(a) into function

(b) many one function

(c) bijective function

(d) many one, into function.

19. In the following questions, a statement of assertion (A) is followed by a statement of reason (R). Choose the correct answer out of the following choices.

Assertion (A): In set $A = \{1, 2, 3\}$ a relation R defined as $R = \{(1, 1), (2, 2)\}$ is reflexive.

Reason (R): A relation R is reflexive in set A if $(a, a) \in R$ for all $a \in A$.

(i) Both A and R are true and R is the correct explanation of A.

(ii) Both A and R are true but R is not the correct explanation of A.

(iii) A is true but R is false.

(iv) A is false but R is true.

20. In the following questions, a statement of assertion (A) is followed by a statement of reason (R). Choose the correct answer out of the following choices.

Assertion (A): In set $A = \{a, b, c\}$ relation R in set A, given as $R = \{(a, c)\}$ is transitive.

Reason (R): A singleton relation is transitive.

(i) Both A and R are true and R is the correct explanation of A.

(ii) Both A and R are true but R is not the correct explanation of A.

(iii) A is true but R is false.

(iv) A is false but R is true.

21. In the following questions, a statement of assertion (A) is followed by a statement of reason (R). Choose the correct answer out of the following choices.

Assertion (*A*): Given set $A = \{1, 2, 3, \ldots 9\}$ and relation R in set $A \times A$ defined by $(a, b)\ R\ (c, d)$ if $a + d = b + c$, be an equivalence relation. The ordered pair (1, 3) belongs to equivalence class related to [(5, 3)]

Reason (*R*): Any ordered pair of $A \times A$ belongs to equivalence class [(5, 3)] if $(x, y)R\ (5, 3)\ \forall\ (x, y) \in A \times A$.

(i) Both *A* and *R* are true and *R* is the correct explanation of *A*.

(ii) Both *A* and *R* are true but *R* is not the correct explanation of *A*.

(iii) *A* is true but *R* is false.

(iv) *A* is false but *R* is true.

Short type question

22. Give an example of a skew symmetric matrix of order 3.

23. If a matrix has 28 elements, what are the possible orders it can have? What if it has 13 elements?

24. For the set A = {1, 2, 3}, define a relation R in the set A as follows:
R = {(1, 1), (2, 2), (3, 3), (1, 3)}. Write the ordered pairs to be added to R to make it the smallest equivalence relation.

25. Let set $A = \{1, 2, 3\}$, define relation R on A as $R = \{(a, b) \in A \times A : a + b < 6\}$. Show that R is a universal relation.

26. Let $f(x) = \frac{ax}{x+1}, x \neq -1$, then find the value(s) of α for which *fof* is identity function $\alpha \in \{\sqrt{2}, -\sqrt{2}, 1, -1\}$.

27. Let f and g be two real functions defined as $f(x) = 2x - 3$; $g(x) = \frac{3+x}{2}$. Find *fog* and *gof*. Can you say one is inverse of the other?

29. Let be a binary operation on Q^+, the set of all positive integers, defined by $a \times b = \frac{ab}{100}$, for $a, b \in Q^+$. Find the inverse of 0.1.

34. Write the inverse relation corresponding to the relation $R = \{(x, y) : x \in N, x < 5, y = 3\}$.

35. Consider function $f: \left[0, \frac{\pi}{2}\right] \longrightarrow R$, given by $f(x) = \sin x$ and $g: \left[0, \frac{\pi}{2}\right] \longrightarrow R$, given by $g(x) = \cos x$. Show that f and g are one-one but $f + g$ is not one-one.

36. Show that $f: [-1, 1] \longrightarrow R$, given by $f(x) = \frac{x}{(x+2)}$ is one-one. Find the inverse of the function $f: [-1, 1] \longrightarrow$ Range *f*.

37. Construct a 3×3 matrix $[a_{ij}]$, whose elements are given by $a_{ij} = 2i - 3j$.

38. Find $3x - 5y$, if $\begin{bmatrix} 2x & 1 & 2y \\ x-y & 0 & 3y \end{bmatrix} = \begin{bmatrix} 12 & 1 & 6-y \\ x-2 & 0 & 6 \end{bmatrix}$

39. Find a, b, c and d if $\begin{bmatrix} 3a+4b & 2 \\ c+d & 2c-d \\ a-2b & 1 \end{bmatrix} = \begin{bmatrix} 2 & 2 \\ 5 & -5 \\ 4 & 1 \end{bmatrix}$

40. If $\begin{bmatrix} a+4 & 3b \\ 8 & -6 \end{bmatrix} = \begin{bmatrix} 2a+2 & b+2 \\ 8 & a-8b \end{bmatrix}$, write the value of $a - 2b$.

41. If $\begin{bmatrix} x & 3x-y \\ 2x+z & 3y-w \end{bmatrix} = \begin{bmatrix} 3 & 2 \\ 4 & 7 \end{bmatrix}$, find the values of x, y, z and w.

42. If $A = \begin{bmatrix} 1 & 0 \\ -1 & 7 \end{bmatrix}$, find k so that $A^2 = 8A + kI$.

43. For the matrix $A = \begin{bmatrix} 3 & 1 \\ 7 & 5 \end{bmatrix}$, find a and b such that $A^2 + aI = bA$, where I is a 2×2 identity matrix.

44. Find the matrix X so that $= \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \end{bmatrix} = \begin{bmatrix} -7 & -8 & -9 \\ 2 & 4 & 6 \end{bmatrix}$.

45. Find non-zero values of x satisfying the matrix equation:

$$x \begin{bmatrix} 2x & 2 \\ 3 & x \end{bmatrix} + 2 \begin{bmatrix} 8 & 5x \\ 4 & 4x \end{bmatrix} = 2 \begin{bmatrix} x^2+8 & 24 \\ 10 & 6x \end{bmatrix}$$

46. Let $= \begin{bmatrix} 2 & 3 \\ -1 & 2 \end{bmatrix}$, then show that $A^2 - 4A + 7I = O$. Using this result, calculate A^5 also.

47. Using elementary transformations, find the inverse of the matrix, if it exists $\begin{bmatrix} 1 & 2 \\ 2 & -1 \end{bmatrix}$.

48. Using elementary transformations, find the inverse of the matrix, if it exists $\begin{bmatrix} 6 & -3 \\ -2 & 1 \end{bmatrix}$.

49. There are 3 families A, B and C. The number of men, women and children in these families are as under:

	Men	Women	Children
Family A	2	3	1
Family B	2	1	3
Family C	4	2	6

Daily expenses of men, women and children are ₹ 200, ₹ 150 and ₹ 200 respectively. Only men and women earn and children do not. Using matrix multiplication, calculate the daily expenses of each family.

50. A trust caring for handicapped children gets ₹ 30,000 every month from its donors. The trust spends half of the funds received for medical and educational care of the children and for that it charges 2% of the spent amount from them and deposits the balance amount in a private bank to get the money multiplied so that in future the trust goes on functioning regularly. What per cent of interest should the trust get from the bank to get a total of ₹ 1,800 every month? Use matrix method, to find the rate of interest.

51. Three schools *A*, *B* and *C* want to award their selected students for the values of Honesty, Regularity and Hard work. Each school decided to award a sum of ₹ 2,500, ₹ 3,100, ₹ 5,100 per student for the respective values. The number of students to be awarded by the three schools is given below in the table:

School / Values	*A*	*B*	*C*
Honesty	3	4	6
Regularity	4	5	2
Hard work	6	3	4

Find the total money given in awards by the three schools separately, using matrices.

52. Three schools *X*, *Y* and *Z* organised a fete(mela) for collecting funds for flood victims in which they sold hand-held fans, mats and toys made from recycled material, the sale price of each being ₹ 25, ₹ 100 and ₹ 50 respectively. The following table shows the number of articles of each type sold:

School / Articles	*X*	*Y*	*Z*
Hand-held fans	30	40	35
Mats	12	15	20
Toys	70	55	75

Using matrices, find the funds collected by each school by selling the above articles and the total funds collected.

53. There are 2 families A and B. There are 4 men, 6 women and 2 children in family A, and 2 men, 2 women and 4 children in family B. The recommended daily amount of calories is 2400 for men, 1900 for women, 1800 for children and 45 grams of proteins for men, 55 grams for women and 33 grams for children. Represent the above information using matrices. Using matrix multiplication, calculate the total requirement of calories and proteins for each of the 2 families.

54. If $A = \begin{bmatrix} 1 & 3 & 5 \\ -2 & 5 & 7 \end{bmatrix}$ and $2A - 3B = \begin{bmatrix} 4 & 5 & -9 \\ 1 & 2 & 3 \end{bmatrix}$, find B.

55. Find x, if $\begin{bmatrix} x & 1 \end{bmatrix} \begin{bmatrix} 1 & 0 \\ -2 & -3 \end{bmatrix} \begin{bmatrix} x \\ 3 \end{bmatrix} = 0$.

56. If $= \begin{bmatrix} 2 & 0 & 1 \\ 2 & 1 & 3 \\ 1 & -1 & 0 \end{bmatrix}$, find $A^2 - 5A + 16I$.

57. If $f(x) = x^2 - 4x + 1$, find $f(A)$, when $A = \begin{bmatrix} 2 & 3 \\ 1 & 2 \end{bmatrix}$.

58. If A is a square matrix such that $A^2 = A$, show that $(I + A)^3 = 7A + I$.

59. Find x, if $\begin{bmatrix} x & -5 & -1 \end{bmatrix} \begin{bmatrix} 1 & 0 & 2 \\ 0 & 2 & 1 \\ 2 & 0 & 3 \end{bmatrix} \begin{bmatrix} x \\ 4 \\ 1 \end{bmatrix} = 0$

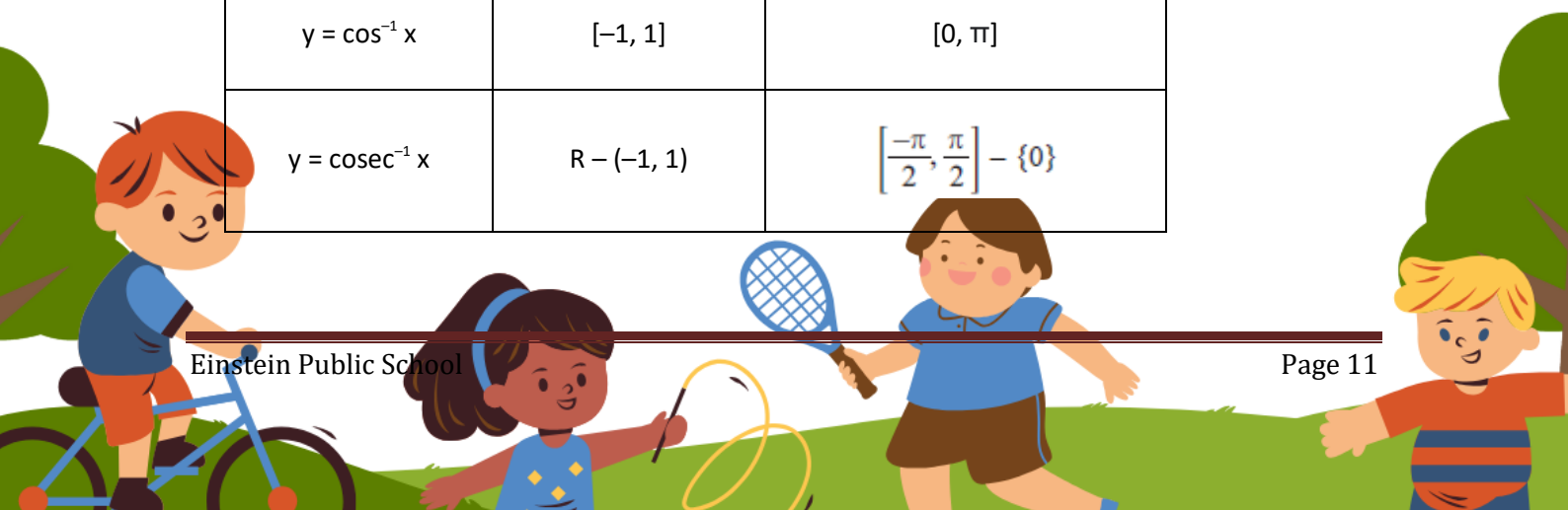
60. If $= \begin{bmatrix} 2 & 0 & 1 \\ 2 & 1 & 3 \\ 1 & -1 & 0 \end{bmatrix}$, find $A^2 - 5A + 4I$ and hence find a matrix X such that $A^2 - 5A + 4I + X = O$.

Case base type question

61. A teacher gives a table of the domain and range of inverse trigonometric functions to the students and told them that when we dealing with the inverse trigonometric functions, we need to careful about their range, which is defined from restricted domain of trigonometric functions.

The table is given as:

Functions	Domains	Ranges
$y = \sin^{-1} x$	$[-1, 1]$	$\left[\frac{-\pi}{2}, \frac{\pi}{2}\right]$
$y = \cos^{-1} x$	$[-1, 1]$	$[0, \pi]$
$y = \text{cosec}^{-1} x$	$R - (-1, 1)$	$\left[\frac{-\pi}{2}, \frac{\pi}{2}\right] - \{0\}$



$y = \sec^{-1} x$	$R - (-1, 1)$	$[0, \pi] - \left\{\frac{\pi}{2}\right\}$
$y = \tan^{-1} x$	R	$\left(\frac{-\pi}{2}, \frac{\pi}{2}\right)$
$y = \cot^{-1} x$	R	$(0, \pi)$

Based on the above information answer the following:

(a) The value of x, when $\cos^{-1}\left(\frac{-5}{13}\right) = \tan^{-1}(x)$ is

(i) $\frac{12}{5}$ (ii) $\frac{-12}{5}$

(iii) $\frac{-5}{12}$ (iv) No solution

(b) Let $x < 0$, then $\tan^{-1}(x) + \tan^{-1}\left(\frac{1}{x}\right) =$

(i) $\frac{\pi}{2}$ (ii) $\frac{-\pi}{2}$

(iii) π (iv) $-\pi$

(c) The value of x, when $\sin^{-1}\left(\frac{-3}{5}\right) = \tan^{-1} x$ is

(i) $\frac{-3}{4}$ (ii) $\frac{3}{4}$

(iii) $\frac{4}{3}$ (iv) $\frac{-4}{3}$

(d) The value of $\tan\left[\frac{1}{2}\cos^{-1}\left(\frac{2}{\sqrt{5}}\right)\right]$ is

(i) $2+\sqrt{5}$ (ii) $\sqrt{5}-2$

(iii) $\frac{\sqrt{5}+2}{2}$ (iv) $5+\sqrt{2}$

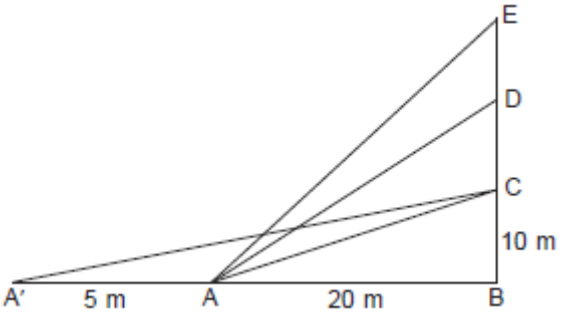
(e) The value of x, when $\cos\left[\sin^{-1}\left(\frac{2}{5}\right)+\cos^{-1}(x)\right] = 0$

(i) $\frac{1}{5}$ (ii) $\frac{2}{5}$

(iii) 0 (iv) 1

62. The Government of India is planning to fix a hoarding board at the face of a building on the road of a busy market for awareness on COVID-19 protocol. Ram, Robert and Rahim are the three engineers who are working on this project. "A" is considered to be a person viewing the hoarding board 20 metres away from the building, standing at the edge of a pathway nearby. Ram, Robert and Rahim suggested to the firm to place the hoarding board at three different locations namely C, D and E. "C" is at the height of 10

metres from the ground level. For the viewer A, the angle of elevation of "D" is double the angle of elevation of "C" The angle of elevation of "E" is triple the angle of elevation of "C" for the same viewer. Look at the figure given and based on the above information answer the following:



(a) Determine ∠CAB in terms of tan^{-1}.

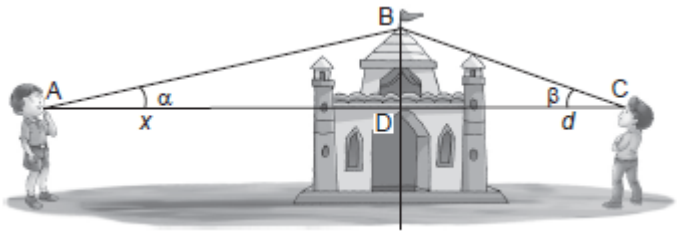
(b) Determine ∠DAB in terms of tan^{-1}.

(c) Determine ∠EAB in terms of tan^{-1}.

(d) A′ Is another viewer standing on the same line of observation across the road. If the width of the road is 5 metres, then find the difference between ∠CAB and ∠CA′B.

(e) Find domain and range of tan^{-1} x

63. Two men on either side of a temple of 30 metres high from the level of eye observe its top at the angles of elevation α and β respectively. (as shown in the figure above). The distance between the two men is 40 $\sqrt{3}$metres and the distance between the first person A and thetemple is 30 $\sqrt{3}$ metres. Based on the above information answer the following:



(i) Find ∠CAB and ∠ACB (ii) Find ∠ABC

(iii) Find the principal value of $\sin^{-1}\left\{\sin\left(\alpha+\frac{2\pi}{3}\right)\right\}$

OR

Find the principal value of $\cos^{-1}\left\{\cos\left(\beta+\frac{\pi}{3}\right)\right\}$

Physics

MCQ-:

1. Equipotentials at a great distance from a collection of charges whose total sum is not zero are approximately.
(a) spheres (b) planes (c) paraboloids (d) ellipsoids

2. The electric potential V at any point O (x, y, z all in metres) in space is given by $V = 4x^2$ volt. The electric field at the point (1 m, 0, 2 m) in volt/metre is
(a) 8 along negative x–axis
(b) 8 along positive x–axis
(c) 16 along negative x–axis
(d) 16 along positive z–axis

3. If a unit positive charge is taken from one point to another over an equipotential surface, then
(a) work is done on the charge.
(b) work is done by the charge.
(c) work done is constant.
(d) no work is done.

4. A hollow metal sphere of radius 5 cm is charged so that the potential on its surface is 10 V. The potential at the centre of the sphere is
(a) 0 V
(b) 10 V
(c) Same as at point 5 cm away from the surface
(d) Same as at point 25 cm away from the surface

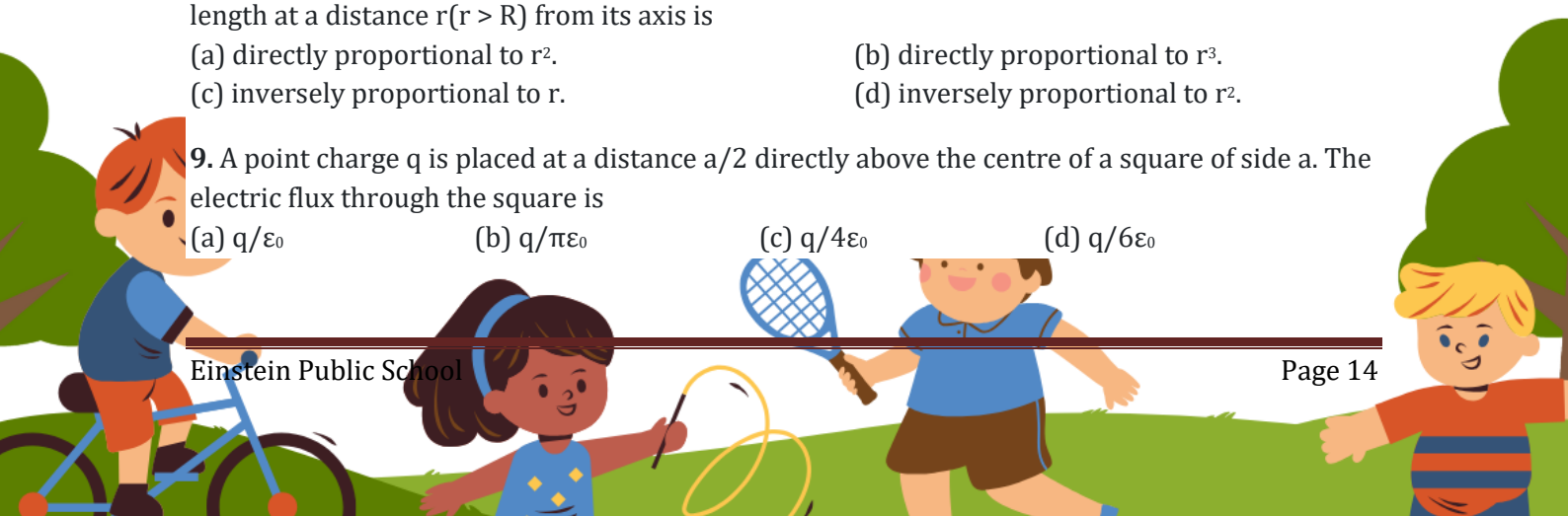
5. When a glass rod is rubbed with silk, it
(a) gains electrons from silk.
(b) gives electrons to silk.
(c) gains protons from silk.
(d) gives protons to silk.

6. The electric field inside a spherical shell of uniform surface charge density is
(a) zero.
(b) constant, less than zero.
(c) directly proportional to the distance from the centre.
(d) none of the these

7. Electric field at a point varies as r^0 for
(a) an electric dipole
(b) a point charge
(c) a plane infinite sheet of charge
(d) a line charge of infinite length

8. The electric field intensity due to an infinite cylinder of radius R and having charge q per unit length at a distance r(r > R) from its axis is
(a) directly proportional to r^2.
(b) directly proportional to r^3.
(c) inversely proportional to r.
(d) inversely proportional to r^2.

9. A point charge q is placed at a distance a/2 directly above the centre of a square of side a. The electric flux through the square is
(a) q/ε_0 (b) $q/\pi\varepsilon_0$ (c) $q/4\varepsilon_0$ (d) $q/6\varepsilon_0$



10. The magnitude of electric field intensity E is such that, an electron placed in it would experience an electrical force equal to its weight is given by
(a) mge (b) mg/e (c) e/mg (d) e^2g/m^2

Assertion/Reason

11. For the following question, two statements are given-one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below.

(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 and R is also false.

Assertion: The electrostatic potential energy of the system increases if a proton is brought near to another proton.

Reason: Potential energy increases when work is done against electrostatic force.

12. For the following question, two statements are given-one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below.

(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 and R is also false.

Assertion: Work done in moving a charge around a closed path, in an electric field is always zero.

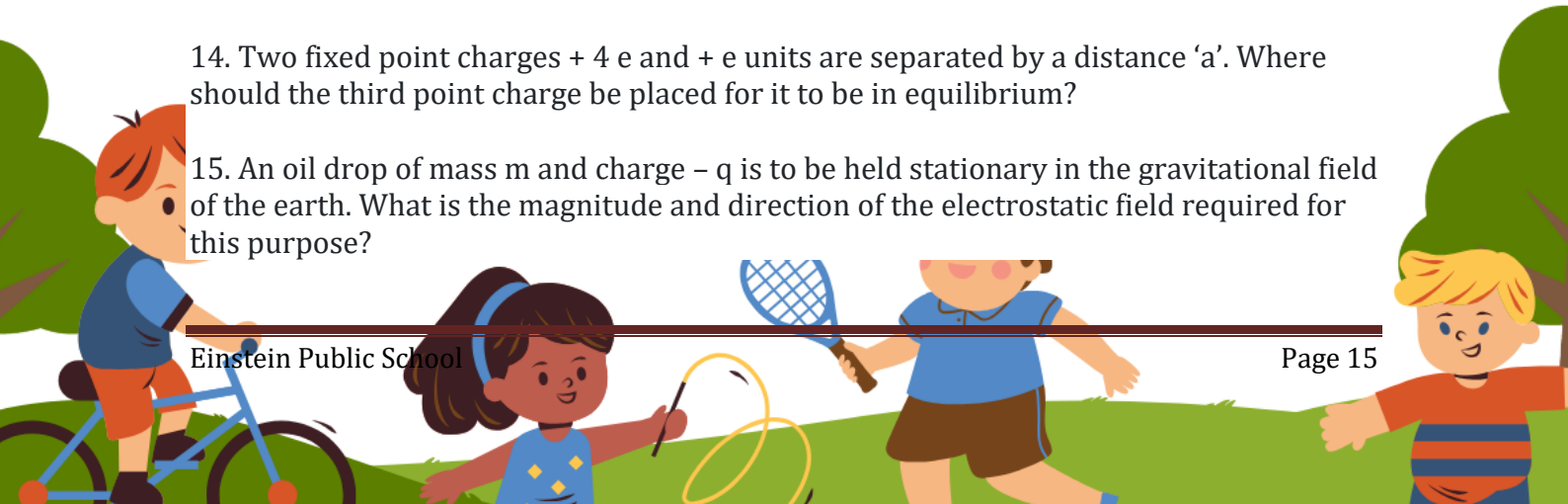
Reason: Electrostatic force is a conservative force.

Very Short Answer Type Questions -:

13. A charge q is placed at the centre of the line joining two equal charges Q. Show that the system of three charges will be in equilibrium if q = – Q/4.

14. Two fixed point charges + 4 e and + e units are separated by a distance 'a'. Where should the third point charge be placed for it to be in equilibrium?

15. An oil drop of mass m and charge – q is to be held stationary in the gravitational field of the earth. What is the magnitude and direction of the electrostatic field required for this purpose?



16. Two point electric charges of unknown magnitude and sign are placed at a distance d apart. The electric field intensity is zero at a point, not between the charges but on the line joining them. Write two essential conditions for this to happen.

17. Define electric field intensity. Write its SI unit. Write the magnitude and direction of electric field intensity due to an electric dipole of length 2a at the mid-point of the line joining the two charges.

18. How much work is required in turning an electric dipole of dipole moment from its position of stable equilibrium to its position of unstable equilibrium in a uniform electrostatic field ?

19. Two point charges 2μC and −2μC are placed at points A and B, 6 cm apart.

(i) Draw the equipotential surfaces of the system.
(ii) Why do the equipotential surfaces get closer to each other near the point charges?

20. Two uniformly large parallel thin plates having charge densities +σ and −σ are kept in the X-Z plane at a distance d apart. Sketch an equipotential surface due to electric field between the plates. If a particle of mass m and charge −q remains stationary between the plates, what is the magnitude and direction of this field?

21. Draw three equipotential surfaces corresponding to a field that uniformly increases in magnitude but remains constant along z-direction. How are these surfaces different from that of a constant electric field along z-direction?

22. Can we create an electric field in which all the lines of force are parallel but their density increases continuously in a direction perpendicular to the lines of force?

Short Answer Type Questions -:

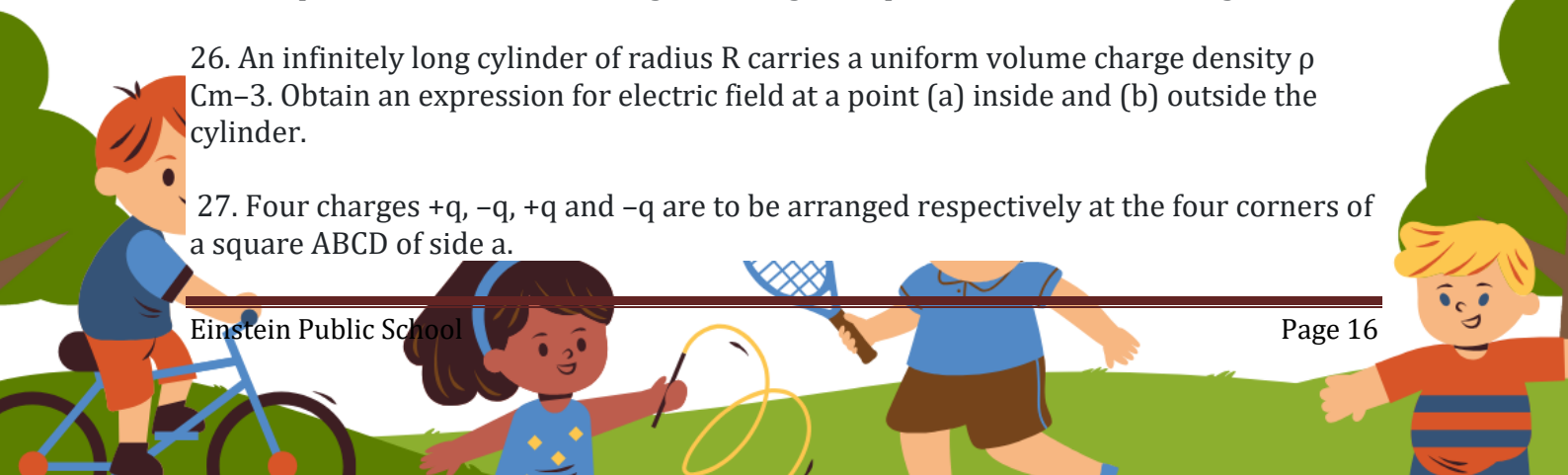
23. State Gauss's theorem in electrostatics. Prove that no electric field exists inside a hollow charged sphere.

24. Use the Gauss's law to derive an expression for the electric field between two uniformly charged large parallel sheets with surface charge densities σ and – σ respectively.

25. Two identical point charges Q are kept at a distance r from each other. A third point charge is placed on the line joining the above two charges such that all the three charges are in equilibrium. What is the magnitude, sign and position of the third charge?

26. An infinitely long cylinder of radius R carries a uniform volume charge density ρ Cm−3. Obtain an expression for electric field at a point (a) inside and (b) outside the cylinder.

27. Four charges +q, −q, +q and −q are to be arranged respectively at the four corners of a square ABCD of side a.



(a) Find the work required to put together this arrangement.
(b) A charge q0 is bought to the centre of the square, the four charges being held fixed. How much extra work is needed to do this?

28. Calculate the electrostatic potential energy of a system of three point charges q1, q2 and q3 located respectively at with respect to a common origin O.

29. A conducting slab of thickness t is introduced without touching between the plates of a parallel plate capacitor, separated by a distance d (t < d). Derive an expression for the capacitance of the capacitor.

30. Find the ratio of the potential differences that must be applied across the parallel and the series combination of two capacitors C1 and C2 with their capacitances in the ratio 1 : 2 so that the energy stored in the two cases, becomes the same.

Long Answer Type Questions -:

31. (a) State Gauss's law. Use it to deduce the expression for the electric field due to a uniformly charged thin spherical shell at points (i) inside and (ii) outside the shell.

(b) Two identical metallic spheres A and B having charges +4Q and −10Q are kept a certain distance apart. A third identical uncharged sphere C is first placed in contact with sphere A and then with sphere B.

Spheres A and B are then brought in contact and then separated. Find the charges on the spheres A and B.

32. Using Gauss's law deduce the expression for the electric field due to a uniformly charged spherical conducting shell of radius R at a point (i) outside and (ii) inside the shell.

Plot a graph showing variation of electric field as a function of r > R and r < R. (r being the distance from the centre of the shell)

33. (a) Using Gauss's law, derive an expression for the electric field intensity at any point outside a uniformly charged thin spherical shell of radius R and charge density σ C/m2. Draw the field lines when the charge density of the sphere is (i) positive, (ii) negative.

(b) A uniformly charged conducting sphere of 2.5 m in diameter has a surface charge density of 100 μC/m2. Calculate the (i) charge on the sphere, and (ii) total electric flux passing through the sphere.

Make a project file and write a project work from above

... the given set of lenses.

Suggested Investigatory Projects

1. To study various factors on which the internal resistance/EMF of a cell depends.
2. To study the variations in current flowing in a circuit containing an LDR because of a variation in
   (a) the power of the incandescent lamp, used to 'illuminate' the LDR (keeping all the lamps at a fixed distance).
   (b) the distance of a incandescent lamp (of fixed power) used to 'illuminate' the LDR.
3. To find the refractive indices of (a) water (b) oil (transparent) using a plane mirror, an equi convex lens (made from a glass of known refractive index) and an adjustable object needle.
4. To investigate the relation between the ratio of (i) output and input voltage and (ii) number of turns in the secondary coil and primary coil of a self-designed transformer.
5. To investigate the dependence of the angle of deviation on the angle of incidence using a hollow prism filled one by one, with different transparent fluids.
6. To estimate the charge induced on each one of the two identical styrofoam (or pith) balls suspended in a vertical plane by making use of Coulomb's law.
7. To study the factor on which the self-inductance of a coil depends by observing the effect of this coil, when put in series with a resistor/(bulb) in a circuit fed up by an A.C. source of adjustable frequency.
8. To study the earth's magnetic field using a compass needle-bar magnet by plotting magnetic field lines and tangent galvanometer.

INVESTIGATORY PROJECTS 107-138

1. To study various factors on which the internal resistance of a cell depends.
2. To study the variations in current flowing in a circuit containing L.D.R. because of a variation:
   (a) in the power of an incandescent lamp (of fixed power), used to illuminate the L.D.R. (keeping all the lamps at a fixed distance).
   (b) in the distance of an incandescent lamp (of fixed power) used to illuminate the L.D.R.

3. To find the refractive indices of (a) water (b) oil (transparent) using a plane mirror, an equiconvex lens (made from a glass of a known refractive index) and an adjustable object needle.
4. To design an appropriate logic gate combination for a given truth table.
5. To investigate the relation between the ratio of:
   (i) output and input voltage and
   (ii) number of turns in the secondary coil and primary coil of a self-designed transformer.
6. To investigate the dependence of angle of deviation on the angle of incidence using a hollow prism filled one by one with different transparent fluids.
7. To estimate the charge induced on each one of the two identical styrofoam (or pith) balls suspended in a vertical plane by making use of Coulomb's law.
8. To study the factors, on which the self-inductance of a coil depends, by observing the effect of this coil, when put in series with a resistor/bulb in a circuit fed up by an a.c. source of adjustable frequency.
9. To set up a common base transistor circuit and to study its input and output characteristics and to calculate its current gain.
10. To construct a switch using a transistor and to draw a graph between input and output voltage and mark the cut-off, saturation and active regions.
11. To study earth's magnetic field (horizontal component of earth's magnetic field) using a tangent galvanometer.
12. To study the earth's magnetic field using a compass needle-bar magnet by plotting magnetic field lines.

Biology

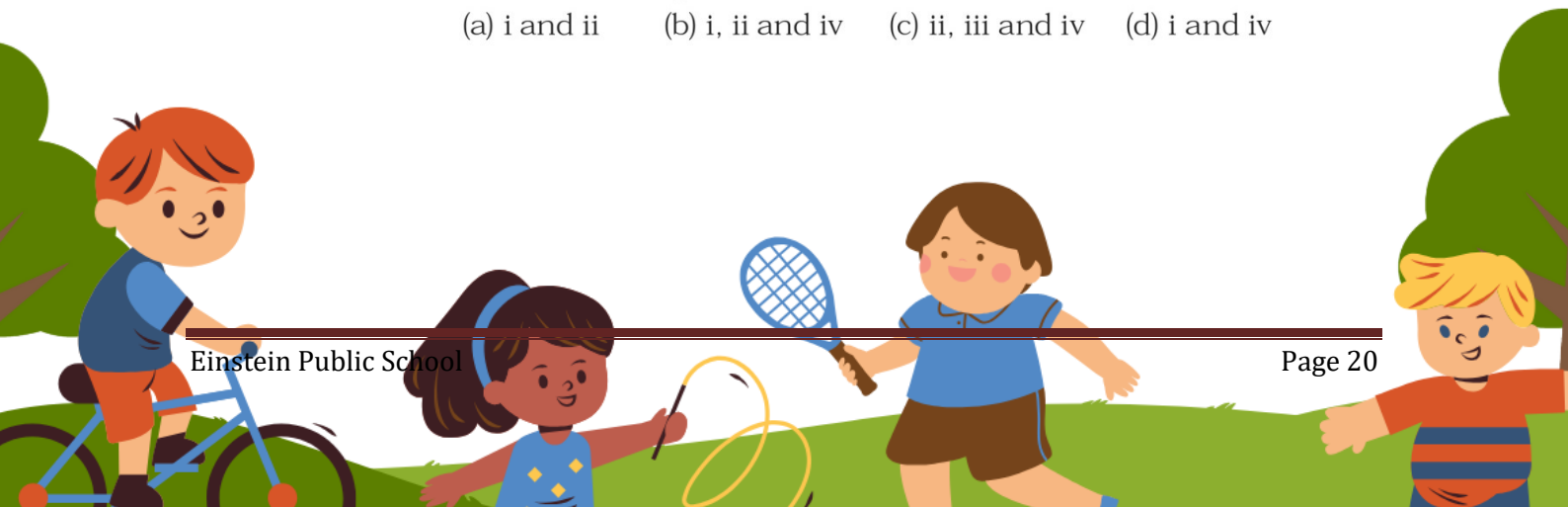
MULTIPLE-CHOICE QUESTIONS

1. Choose the incorrect statement from the following:
   a. In birds and mammals internal fertilisation takes place
   b. Colostrum contains antibodies and nutrients
   c. Polyspermy is prevented by the chemical changes in the egg surface
   d. In the human female implantation occurs almost seven days after fertilisation

2. Identify the wrong statement from the following:
   a. High levels of estrogen triggers the ovulatory surge.
   b. Orgonial cells start to proliferate and give rise to functional ova in regular cycles from puberty onwards.
   c. Sperms released from seminiferous tubules are poorly motile / non-motile.
   d. Progesterone level is high during the post ovulatory phase of menstrual cycle.

3. Spot the odd one out from the following structures with reference to the male reproductive system:
   a. Ret testis
   b. Epididymis
   c. Vasa efferentia
   d. Isthmus

4. Seminal plasma, the fluid part of semen, is contributed by.
   i. Seminal vesicle
   ii. Prostate
   iii. Urethra
   iv. Bulbourethral gland
   (a) i and ii (b) i, ii and iv (c) ii, iii and iv (d) i and iv



5. Spermiation is the process of the release of sperms from:
   a. Seminiferous tubules
   b. Vas deferens
   c. Epididymis
   d. Prostate gland

6. Mature Graafian follicle is generally present in the ovary of a healthy human female around stet:
   a. 5 – 8 day of menstrual cycle
   b. 11 – 17 day of menstrual cycle
   c. 18 – 23 day of menstrual cycle
   d. 24 – 28 day of menstrual cycle

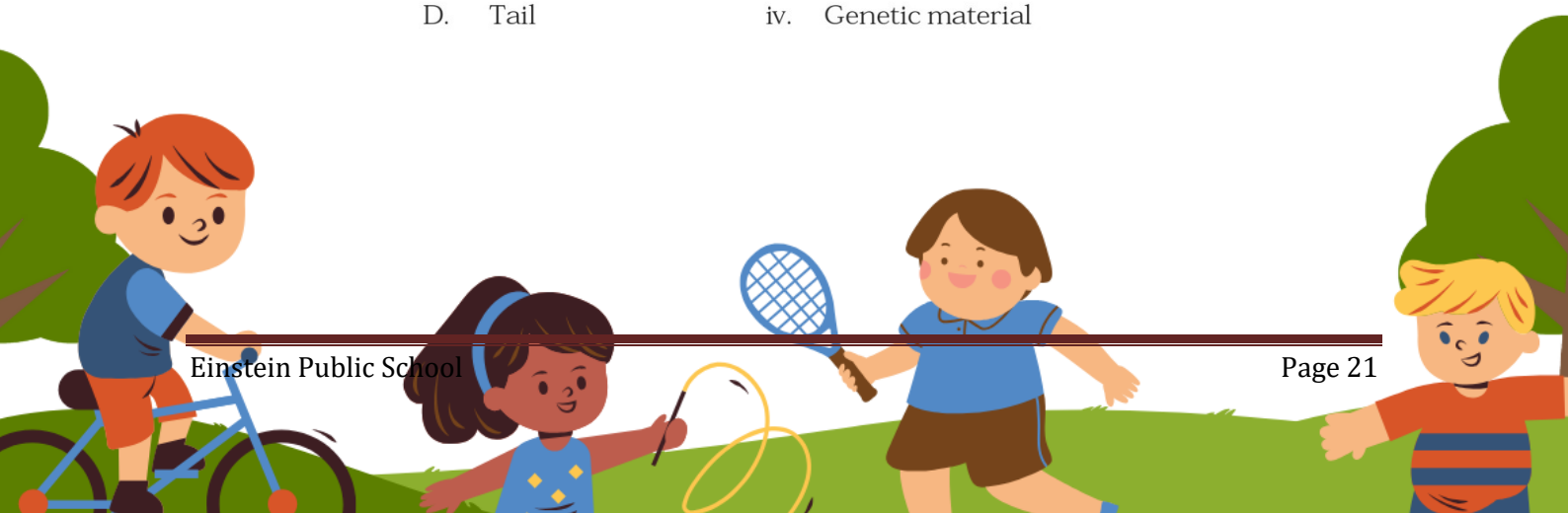
7. Acrosomal reaction of the sperm occurs due to:
   a. Its contact with zona pellucida of the ova
   b. Reactions within the uterine environment of the female
   c. Reactions within the epididymal environment of the male
   d. Androgens produced in the uterus

8. Which one of the following is not a male accessory gland?
   a. Seminal vesicle
   b. Ampulla
   c. Prostate
   d. Bulbourethral gland

9. The immature male germ cell undergo division to produce sperms by the process of spermatogenesis. Choose the correct one with reference to above.
   a. Spermatogonia have 46 chromosomes and always undergo meiotic cell division
   b. Primary spermatocytes divide by mitotic cell division
   c. Secondary spermatocytes have 23 chromosomes and undergo second meiotic division
   d. Spermatozoa are transformed into spermatids

10. Match between the following representing parts of the sperm and their functions and choose the correct option.

	Col. A		Col. B
A.	Head	i.	Enzymes
B.	Middle piece	ii.	Sperm motility
C.	Acrosome	iii.	Energy
D.	Tail	iv.	Genetic material



options:

a. A-ii, B-iv, C-i, D-iii
b. A-iv, B-iii, C-i, D-ii
c. A-iv, B-i, C-ii, D-iii
d. A-ii, B-i, C-iii, D-iv

11. Which among the following has 23 chromosomes?

a. Spermatogonia
b. Zygote
c. Secondary oöcyte
d. Oögonia

12. Match the following and choose the correct options:

A.	Trophoblast	i.	Embedding of blastocyst in the endometrium
B.	Cleavage	ii.	Group of cells that would differentiate as embryo
C.	Inner cell mass	iii.	Outer layer of blastocyst attached to the endometrium
D.	Implantation	iv.	Mitotic division of zygote

Options:

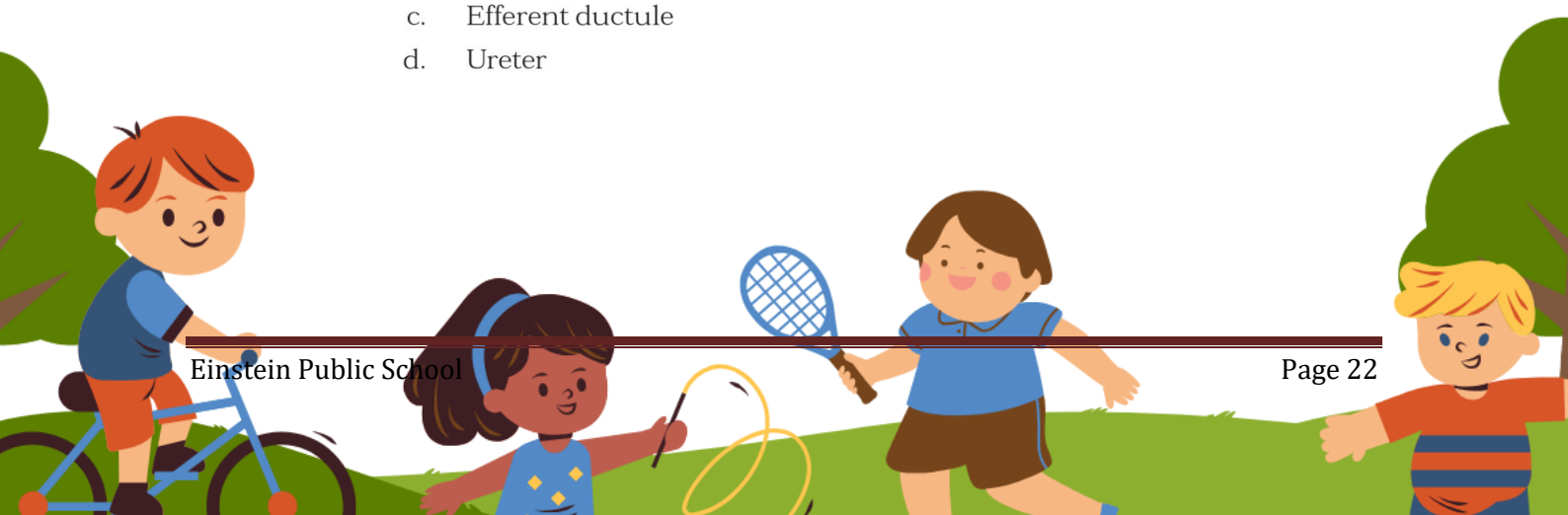
a. A-ii, B-i, C-iii, D-iv
b. A-iii, B-iv, C-ii, D-i
c. A-iii, B-i, C-ii, D-iv
d. A-ii, B-iv, C-iii, D-i

13. Which of the following hormones is not secreted by human placenta?

a. hCG
b. Estrogens
c. Progesterone
d. LH

14. The vas deferens receives duct from the seminal vesicle and opens into urethra as:

a. Epididymis
b. Ejaculatory duct
c. Efferent ductule
d. Ureter



15. Urethral meatus refers to the:
    a. Urinogenital duct
    b. Opening of vas deferens into urethra
    c. External opening of the urinogenital duct
    d. Muscles surrounding the urinogenial duct

16. Morula is a developmental stage:
    a. Between the zygote and blastocyst
    b. Between the blastocyst and gastrula
    c. After the implantation
    d. Between implantation and parturition

17. The membranous cover of the ovum at ovulation is:
    a. Corona radiata
    b. Zona radiata
    c. Zona pellucida
    d. Chorion

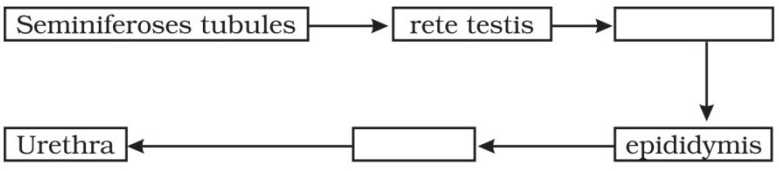
18. Identify the odd one from the following:
    a. Labia minora
    b. Fimbriae
    c. Infundibulum
    d. Isthmus

VERY SHORT ANSWER TYPE QUESTIONS

1. Given below are the events in human reproduction. Write them in correct sequential order.

   Insemination, gametogenesis, fertilisation, parturition, gestation, implantation

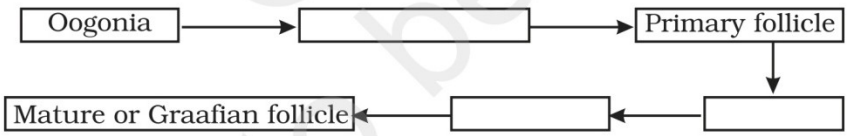
2. The path of sperm transport is given below. Provide the missing steps in blank boxes.



3. What is the role of cervix in the human female reproductive system?
4. Why are menstrual cycles absent during pregnancy.
5. Female reproductive organs and associated functions are given below in column A and B. Fill the blank boxes.

Column A	Column B
Ovaries	Ovulation
Oviduct	a
b	Pregnancy
Vagina	Birth

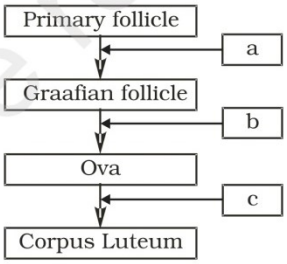
6. From where the parturition signals arise-mother or foetus? Mention the main hormone involved in parturition.
7. What is the significance of epididymis in male fertility?
8. Give the names and functions of the hormones involved in the process of spermatogenesis. Write the names of the endocrine glands from where they are released.
9. The mother germ cells are transformed into a mature follicle through series of steps. Provide the missing steps in the blank boxes.



10. During reproduction, the chromosome number (2n) reduces to half (n) in the gametes and again the original number (2n) is restored in the offspring, What are the processes through which these events take place?
11. What is the difference between a primary oöcyte and a secondary oöcyte?
12. What is the significance of ampullary–isthmic junction in the female reproductive tract?
13. How does zona pellucida of ovum help in preventing polyspermy?
14. Mention the importance of LH surge during menstrual cycle.
15. Which type of cell division forms spermatids from the secondary spermatocytes?

SHORT ANSWER TYPE QUESTIONS

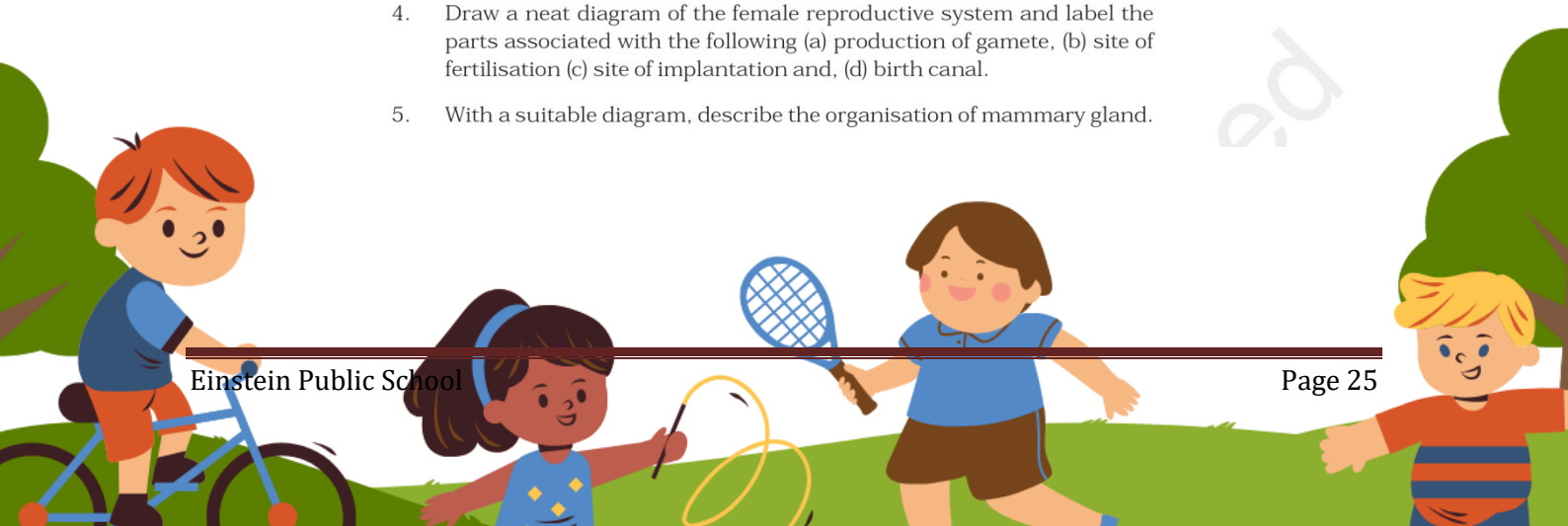
1. A human female experiences two major changes, menarche and menopause during her life. Mention the significance of both the events.
2. a. How many spermatozoa are formed from one secondary spermatocyte?
   b. Where does the first cleavage division of zygote take place?
3. Corpus luteum in pregnancy has a long life. However, if fertilisation does not take place, it remains active only for 10-12 days. Explain.
4. What is foetal ejection reflex? Explain how it leads to parturition?
5. Except endocrine function, what are the other functions of placenta.
6. Why doctors recommend breast feeding during initial period of infant growth?
7. What are the events that take place in the ovary and uterus during follicular phase of the menstrual cycle.
8. Given below is a flow chart showing ovarian changes during menstrual cycle. Fill in the spaces giving the name of the hormones responsible for the events shown.



9. Give a schematic labelled diagram to represent oögenesis (without descriptions)
10. What are the changes in the oogonia during the transition of a primary follicle to Graafian follicle?

LONG ANSWER QUESTIONS

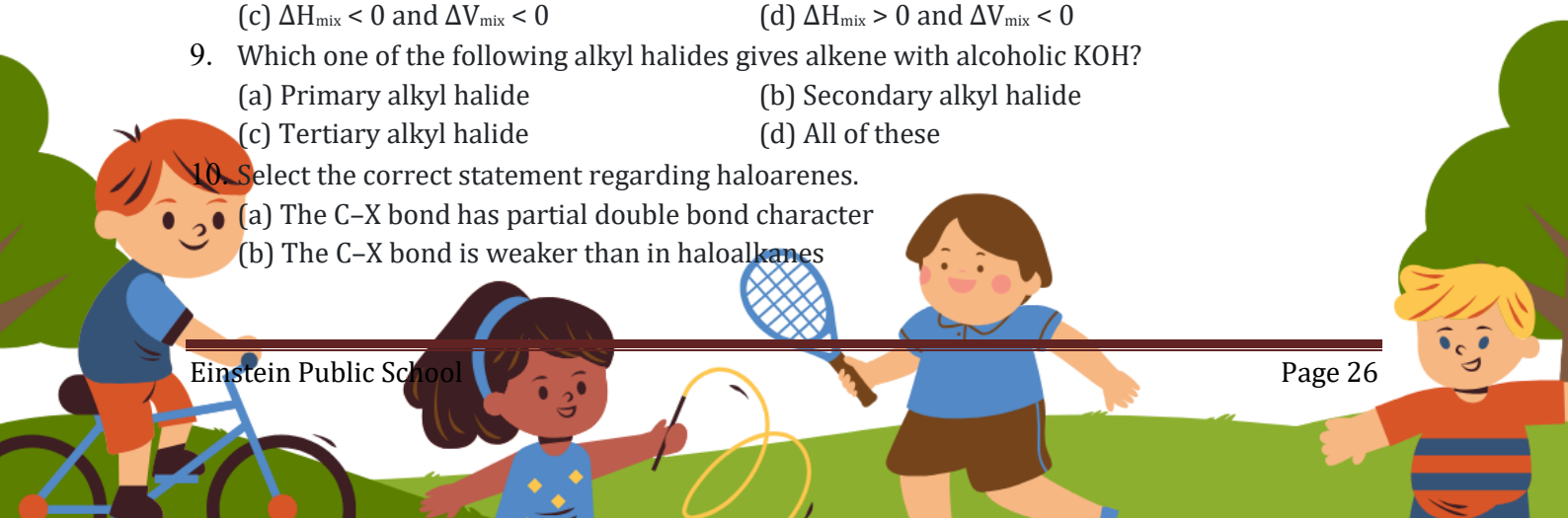
1. What role does pituitary gonadotropins play during follicular and ovulatory phases of menstrual cycle? Explain the shifts in steroidal secretions.
2. Meiotic division during oogenesis is different from that in spermatogenesis. Explain how and why?
3. The zygote passes through several developmental stages till implantation, Describe each stage briefly with suitable diagrams.
4. Draw a neat diagram of the female reproductive system and label the parts associated with the following (a) production of gamete, (b) site of fertilisation (c) site of implantation and, (d) birth canal.
5. With a suitable diagram, describe the organisation of mammary gland.



Chemistry

MCQ

1. How many types of alkyl halides exist based on the position of the halogen?
   (a) 1 (b) 2 (c) 3 (d) 4
2. Which of the following binary mixtures will have same composition in liquid and vapour phase?
   (a) Benzene-Toluene (b) Water-Nitric acid
   (c) Water-Ethanol (d) n-Hexane - n-Heptane
3. The value of KH (Henry's law constants) for the given gases in water at 293 K are
   I. He – 144.97 k bar
   II. H_2 – 69.16 k bar
   III. N_2 – 76.45 k bar
   IV. O_2 – 34.86 k bar
   Which gas has the lowest solubility in water?
   (a) He (b) H_2 (c) N_2 (d) O_2
4. Solubility of CO_2 in soda water increases with
   (a) Increase in pressure and temperature.
   (b) Increase in pressure and decrease in temperature.
   (c) Decrease in pressure and increase in temperature.
   (d) Decrease in pressure and temperature.
5. Which of the following reagents is used to convert alcohols to alkylbromides?
   (a)HCl (b)PCl_5 (c)HI (d) PBr_3
6. The value of K_H (Henry's law constant)
   (a) increases with decrease in temperature
   (b) decreases with increase in temperature
   (c) increases with increase in temperature
   (d) remains constant
7. Which of the following cannot be prepared by direct halogenation?
   (a) Benzene → iodobenzene (b) Toluene → *p*-chlorotoluene
   (c) Phenol → *p*-chlorophenol (d) Benzene → chlorobenzene
8. Which of the following conditions is correct for an ideal solution?
   (a) $\Delta H_{mix} = 0$ and $\Delta V_{mix} = 0$ (b) $\Delta H_{mix} > 0$ and $\Delta V_{mix} > 0$
   (c) $\Delta H_{mix} < 0$ and $\Delta V_{mix} < 0$ (d) $\Delta H_{mix} > 0$ and $\Delta V_{mix} < 0$
9. Which one of the following alkyl halides gives alkene with alcoholic KOH?
   (a) Primary alkyl halide (b) Secondary alkyl halide
   (c) Tertiary alkyl halide (d) All of these
10. Select the correct statement regarding haloarenes.
    (a) The C–X bond has partial double bond character
    (b) The C–X bond is weaker than in haloalkanes



(c) They are more reactive than haloalkanes
(d) They undergo nucleophilic substitution easily

Very Short Answer Type Questions -:

11. Identify the compounds A, B, C and D in the following sequence of reaction:

$$C_2H_5OH \xrightarrow[443\ K]{\text{Conc. } H_2SO_4} A \xrightarrow{HBr} B \xrightarrow{KOH(aq)} C \xrightarrow{I_2,\ NaOH} \underset{\text{yellow ppt.}}{D}$$

12. Answer the following questions:
    i. What is meant by chirality of a compound? Give an example.
    ii. Which one of the following compounds is more easily hydrolyzed by KOH and why?
    $CH_3CHClCH_2CH_3$ or $CH_3CH_2CH_2Cl$
13. Cyanide ion acts as an ambident nucleophile From which end it acts as a stronger nucleophile in aqueous medium? Give reason for your answer.
14. Some alkyl halides undergo substitution whereas some undergo elimination reaction on treatment with bases. Discuss the structural features of alkyl halides with the help of examples which are responsible for this difference.
15. Name the alkene which will yield 1-chloro-1-methylcyclohexane by its reaction with HCl. Write the reactions involved.
16. The freezing point of a solution composed of 5.85 g of NaCl in 100 g of water is –3.348 °C. Calculate the van't Hoff factor 'i' for this solution. K_f (water) = 1.86 K kg mol^{-1}.
17. What is van't Hoff factor? What types of values can it have if in forming the solution the solute molecules undergo (i) Dissociation (ii) Association?
18. A 10% solution of urea is isotonic with 20% solution of 'x' at same temperature. Calculate molecular weight of x.
19. What type of deviation from Raoult's law is observed by mixing chloroform and acetone ? Why is a decrease in vapour pressure observed on mixing chloroform and acetone?
20. Write two differences between ideal solutions and non-ideal solution.

Short Answer Type Questions

21. Complete the following reactions:

(i) $CH_3CH_2OH \xrightarrow{SOCl_2}$ 'A' $\xrightarrow{KCN}$ 'B'

(ii) $CH_3-\underset{\underset{OH}{|}}{CH}-CH_3 \xrightarrow{PCl_5}$ 'A' $\xrightarrow{AgCN}$ 'B'

(iii) $CH_3CH_2Cl \xrightarrow{AgNO_2}$ 'A'

(iv) $(CH_3)_2CHCl + CH{\equiv}CNa \longrightarrow$ 'A'

(v) $CH_3CH_2CH_2Cl + CH_3COOAg \longrightarrow$ 'A' + 'B'

(vi) $2(CH_3)_2CHCl + 2Na \xrightarrow{\text{dry ether}}$

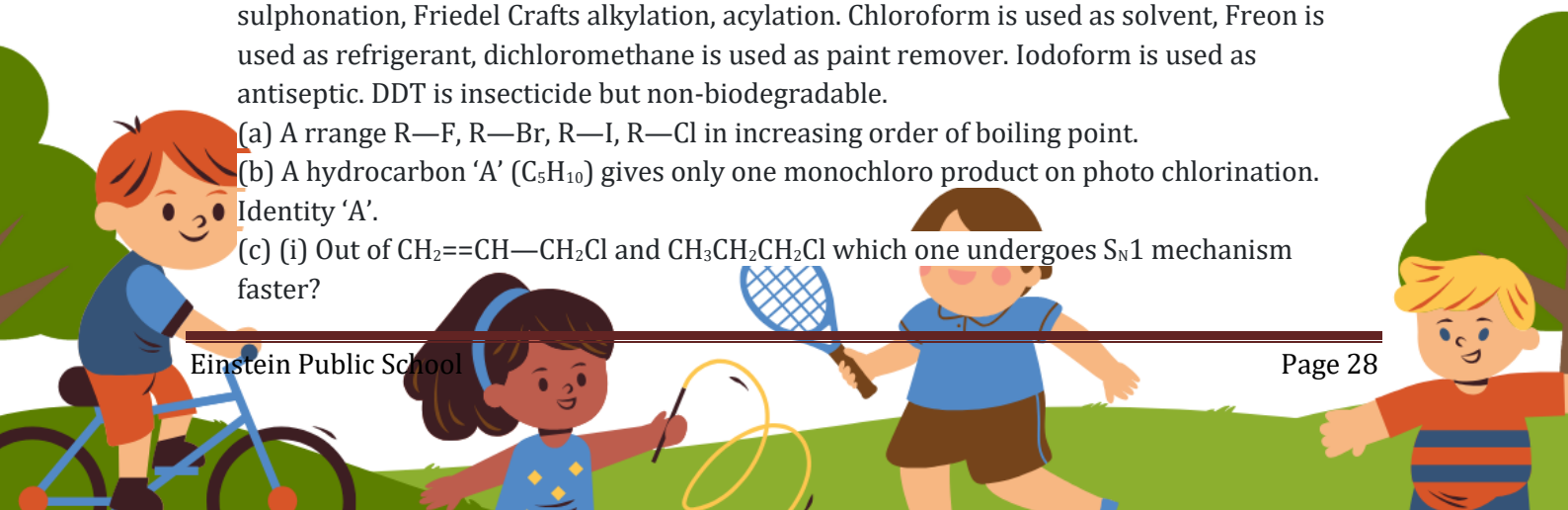
22. How would you differentiate between S_N1 and S_N2 mechanisms of substitution reactions? Give one example of each.
23. Write the main pro[illegible] when

(i) n-Butyl chloride is treated with alcoholic KOH
(ii) 2, 4, 6- Tri nitrochlorobenzene is subjected to hydrolysis
(iii) methyl chloride is treated with AgCN

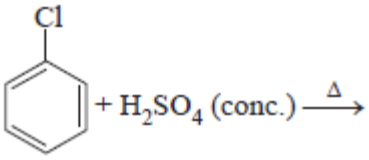
24. (a) Write a chemical test to distinguish between :
(i) Chlorobenzene and Benzyl chloride.
(ii) Chloroform and Carbon tetrachloride.
(b) Why is methyl chloride hydrolysed more easily than chlorobenzene?
25. Give reasons:
(a) n-Butyl bromide has higher boiling point than t-butyl bromide.
(b) Racemic mixture is optically inactive.
(c) The presence of nitro group ($-NO_2$) at o/p positions increases the reactivity of haloarenes towards nucleophilic substitution reactions.
26. (a) Give an example each of solid in gas and liquid in gas solution.
(b) Define mole fraction.
27. (a) What are the values of ΔH and ΔV for positive deviation from ideality? Give one example.
(b) Can we separate an azeotropic mixture by distillation? Why do we call it a mixture?
(c) Give two examples of ideal solution.
28. Calculate the freezing point of an aqueous solution 10.5 g of $MgBr_2$ in 200 g of water, assuming complete ionisation of MgBr2. [Molar mass of $MgBr_2$ = 184 g mol^{-1}, K_f of H_2O = 1.86 K/m]
29. A solution 0.1 M of Na_2SO_4 is dissolved to the extent of 95%. What would be its osmotic pressure at 27°C? (R = 0.0821 L atm K^{-1} mol^{-1})
30. A decimolar solution of $K_4[Fe(CN)_6]$ is 50% ionised. Calculate its osmotic pressure at 300 K. (3 Marks) [R = 0.0821 L atm K^{-1} mol^{-1}]

Case based questions

31. **Read the given passage and answer the questions that follow:**
Haloalkanes are colourless (when pure), sweet smelling liquids. CH_3Cl, CH_3Br and C_2H_5Cl and freons are gases. Boiling point increases with increase in molecular weight and increase in carbon chain and decreases with branching. They are insoluble in water due to inability to form H-bonds with water. Dipole moment increases with polarity, density increases with increase in molar mass. They are non-inflammable, therefore, CCl_4 is used as fire xtinguisher under the name pyrene. p-dichloro benzene has zero dipole moment, higher melting point than o-dichloro benzene due to symmetry, fits into crystal lattice readily. Haloalkanes undergo nucleophilic substitution reaction by S_N2 mechanism, 1° > 2° > 3°, S_N1 if carbocation formed is stable. They also undergo nucleophilic elimination reactions with alcoholic KOH. Haloarenes are less reactive than haloalkanes towards nucleophilic substitution due to resonance. Haloarenes undergo electrophilic substitution reaction like nitration, sulphonation, Friedel Crafts alkylation, acylation. Chloroform is used as solvent, Freon is used as refrigerant, dichloromethane is used as paint remover. Iodoform is used as antiseptic. DDT is insecticide but non-biodegradable.
(a) A rrange R—F, R—Br, R—I, R—Cl in increasing order of boiling point.
(b) A hydrocarbon 'A' (C_5H_{10}) gives only one monochloro product on photo chlorination. Identity 'A'.
(c) (i) Out of CH_2==CH—CH_2Cl and $CH_3CH_2CH_2Cl$ which one undergoes S_N1 mechanism faster?



(*ii*) Complete the following:



Or

(c) (i) Why is chloroform stored in dark coloured bottles?
(ii) What is use of fully fluorinated organic compounds?

32. **Read the given passage and answer the questions that follow:**
The substitution reaction of alkyl halides occurs in S_N1 or S_N2 mechanism whatever mechanism alkyl halide follow for substitution reaction to occur, the polarity of the carbon-halogen bond is responsible for the substitution reaction. The rate of S_N1 reactions are governed by the stability of carbocation where as for S_N2 reactions steric factor is the deciding factor. If the starting material is a chiral compound, we may end up with an inverted product or racemic mixture depending upon the type of mechanism followed by alkyl halide. Cleavage of ethers with HI is also governed by steric factor and stability of carbocation which indicates that in organic chemistry, these two major factors help us in deciding the kind of product formed.
(a) Why do optically active tert. halides undergo recemisation?
(b) Name the instrument used for measuring optical rotation.
(c) 2-Bromo butane on heating with alc KOH gives 81% 2-Butene. Give reason. Name the type of reaction.

Or

How is Anilsole prepared from Williamson synthesis? What products will it give on reaction with HI?

33. **Read the following passage and answer the questions that follow:**
Nucleophilic substitution reaction of haloalkane can be conducted according to both SN^1 and SN^2 mechanisms. However, which mechanism it is based on is related to such factors as the structure of haloalkane, and properties of leaving group, nucleophilic reagent and solvent.
Influences of halogen : No matter which mechanism the nucleophilic substitution reaction is based on, the leaving group always leave the central carbon atom with electron pair. This is just the opposite of the situation that nucleophilic reagent attacks the central carbon atom with electron pair. Therefore, the weaker the alkalinity of leaving group is, the more stable the anion formed is and it will be more easier for the leaving group to leave the central carbon atom; that is to say, the reactant is more easier to be substituted. The alkalinity order of halogen ion is $I^- < Br^- < Cl^- < F^-$ and the order of their leaving tendency should be $I^- > Br^- > Cl^- > F^-$. Therefore, in four halides with the same alkyl and different halogens, the order of substitution reaction rate is RI > RBr > RCl > RF. In addition, if the leaving group is very easy to leave, many carbocation intermediates are generated in the reaction and the reaction is based on S_N1 mechanism. If the leaving group is not easy to leave, the reaction is based on S_N2 mechanism.

Influences of solvent polarity: In S_N1 reaction, the polarity of the system increases from the reactant to the transition state, because polar solvent has a greater stabilizing effect on the transition state than the reactant, thereby reduce activation energy and accelerate the reaction. In S_N2 reaction, the polarity of the system generally does not change from the reactant to the transition state and only charge dispersion occurs. At

this time, polar solvent has a great stabilizing effect on Nu than the transition state, thereby increasing activation energy and slow down the reaction rate. For example, the decomposition rate (S_N1) of tertiary chlorobutane in 25°C water (dielectric constant 79) is 300000 times faster than in ethanol (dielectric constant 24). The reaction rate (S_N2) of 2-bromopropane and NaOH in ethanol containing 40% water is twice slower than in absolute ethanol. In a word, the level of solvent polarity has influence on both SN1 and SN2 reactions, but with different results. Generally speaking, weak polar solvent is favourable for SN2 reaction, while strong polar solvent is favorable for SN1 reaction, because only under the action of polar solvent can halogenated hydrocarbon dissociate into carbocation and halogen ion and solvents with a strong polarity is favourable for solvation of carbocation, increasing its stability. Generally speaking, the substitution reaction of tertiary haloalkane is based on SN1 mechanism in solvents with a strong polarity (for example, ethanol containing water).

(Ding, Y. (2013). A Brief Discussion on Nucleophilic Substitution Reaction on Saturated Carbon Atom. In Applied Mechanics and Materials (Vol. 312, pp. 433- 437). Trans Tech Publications Ltd.)

(a) Why is S_N1 mechanism favoured in polar solvent?

(b) Why does 1-iodo-2,2-dimethyl propane react faster than 1-fluoro-2,2-dimethyl propane?

(c) Why S_N2 mechanism is favoured by non-polar solvents? Give example.

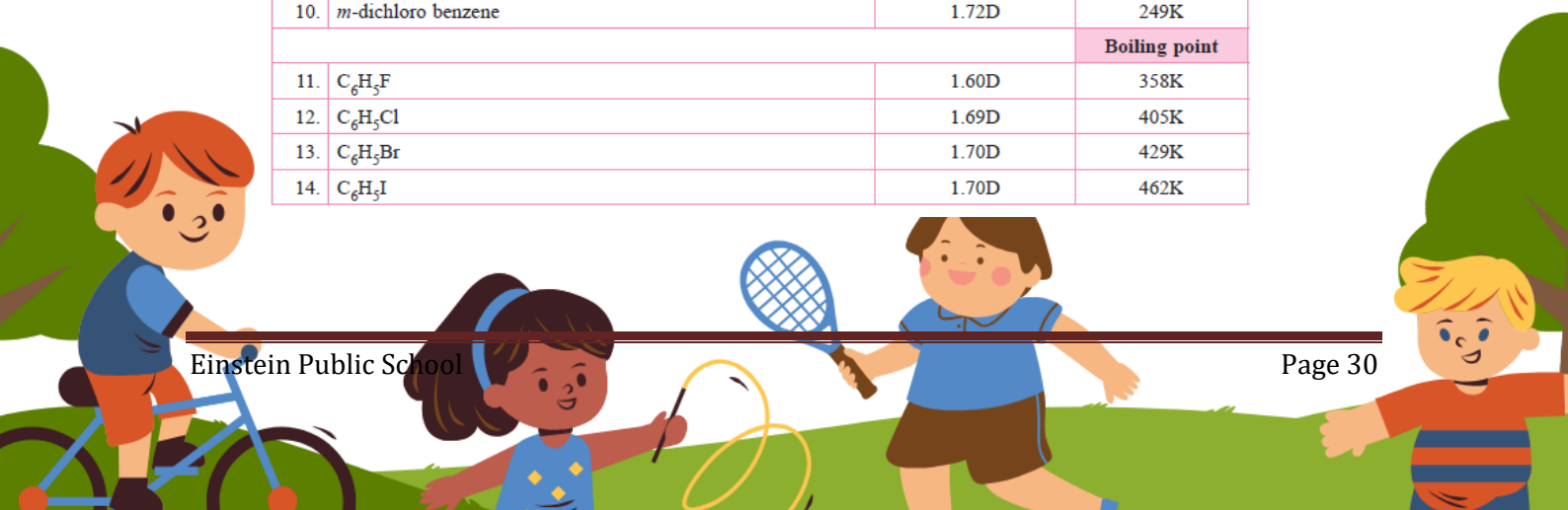
Or

Why water has higher dielectric constant (79) than Chloroform (4.72)? Is chloroform soluble in water? Give reason.

34. Observe the table in which physical data of Halomethane, polyhalogen derivative and haloarenes is given and answer the questions based on the table given below.

Table: Some Physical Data of Halomethanes (CH_3—X)

		Bond C—X length	Bond enthalpy	Dipole moment	
1.	CH_3F	139	452	1.847D	
2.	CH_3Cl	178	351	1.860D	
3.	CH_3Br	193	293	1.83D	
4.	CH_3I	214	234	1.636D	
5.	CH_2Cl_2	—	—	1.62D	
6.	$CHCl_3$	—	—	1.03D	
7.	CCl_4	—	—	Zero	
				Dipole moment	**Melting point**
8.	*p*-dichloro benzene			Zero	325K
9.	*o*-dichloro benzene			2.54D	216K
10.	*m*-dichloro benzene			1.72D	249K
					Boiling point
11.	C_6H_5F			1.60D	358K
12.	C_6H_5Cl			1.69D	405K
13.	C_6H_5Br			1.70D	429K
14.	C_6H_5I			1.70D	462K



(a) Why does CH_3Cl has highest dipole moment among CH_3Cl, CH_3F, CH_3Br and CH_3I?
(b) Why is dipole moment of *o*-dichlorobenzenehigher than p-dichlorobenzene?
(c) (i) Why is melting point of *p*-bromo benzene higher than o- and m- isomers?
(ii) Why is dipole moment of C_6H_5I higher than C_6H_5F?

Or

(c) (i) Why is boiling point of C_6H_5I highest among haloarenes?
(ii) Why is dipole moment of CH_2Cl_2 higher than CCl_4?

Long Answer Type Questions

35. (a) Assuming complete ionisation, calculate the expected freezing point of solution prepared by dissolving 6.00 g of Glauber's salt, $Na_2SO_4.10H_2O$ in 0.1 kg of H_2O. (K_f for H_2O = 1.86 K kg mol^{-1}) [At. mass of Na = 23, S = 32, O = 16, H = 1 u].
(b) Two liquids X and Y boil at 110 °C and 130 °C respectively. Which of them has higher vapour pressure at 50 °C ?
36. (a) Non-ideal solutions exhibit either positive or negative deviations from Raoult's law. What are these deviations and how are they caused?
(b) State Raoult's law for a solution containing volatile components. Write two characteristics of the solution which obeys Raoult's law at all concentrations.
37. (a) A 4% solution (W/w) of sucrose (M = 342 g mol^{-1}) in water has a freezing point of 271.15 K. Calculate the freezing point of 5% glucose (M = 180 g mol^{-1}) in water. (Given: Freezing point of pure water = 273.15 K).
(b) A solution prepared from 1.25 g of oil of wintergreen (methyl salicylate) in 90.0 g of benzene has a boiling point of 80.31 °C. Determine the molar mass of this compound. (Boiling point of pure benzene = 80.10 °C and K_b for benzene = 2.53 °C kg mol^{-1}).
38. (a) A 10% solution (by mass) of sucrose in water has a freezing point of 269.15 K. Calculate the freezing point of 10% glucose in water if the freezing point of pure water is 273.15 K. Given: (Molar mass of sucrose = 342 mol^{-1})
(Molar mass of glucose = 180 mol^{-1})
(b) Define the following terms:
(i) Reverse osmosis
(ii) Abnormal molar mass
39. (a) 30 g of urea (m = 60 g mol^{-1}) is dissolved in 846 g of water. Calculate the vapour pressure of water for this solution if vapour pressure of pure water at 298 K is 23.8 mm Hg.
(b) Visha took two aqueous solutions — one containing 7·5 g of urea (Molar mass = 60 g/mol) and the other containing 42·75 g of substance Z in 100 g of water, respectively. It was observed that both the solutions froze at the same temperature. Calculate the molar mass of Z.
40. (a) Why is value of van't Hoff factor for ethanoic acid in benzene is 0.5?
(b) Determine the osmotic pressure of a solution prepared by dissolving 2.32×10^{-2} g of K_2SO_4 in 1 L of solution at 25°C assuming K_2SO_4 is completely ionised. [R = 0.082 L atm K–1 mol–1 Molar mass of K_2SO_4 = 174 g mol^{-1}]
(c) When 25.6 g of sulphur was dissolved in 1000 g of benzene, the freezing point was lowered by 0.512 K. Calculate the formula of sulphur (S_x).
[K_f for benzene = 5.12 K kg mol^{-1}Atomic mass of S = 32 g mol^{-1}]

41. Project 1.
    To study the presence of oxalate ions in guava fruit at different stages of ripening.
42. Project 2.
    To study of quantity of casein present in different samples of milk.
43. Project 3.
    Preparation of soyabean milk and its comparison with natural milk with respect to curd formation, effect of temperature, etc.
44. Project 4.
    To study the effect of potassium bisulphate as food preservative under various conditions (temperature, concentration, time, etc.)
45. Project 5.
    To study the digestion of starch by salivary amylase and effect of pH and temperature on it.
46. Project 6.
    A comparative study of the rate of fermentation of following materials: wheat flour, gram flour, potato juice, carrot juice, apple juice etc.
47. Project 7.
    Extraction of essential oils present in saunf (aniseed), ajwain (carum), illaichi (cardamom).
48. Project 8.
    To study the common food adulterants in fat, oil, butter, sugar, turmeric powder, chilli powder and pepper.
    ATTEMPT ANY ONE

Economics

Section A – MCQs (10 Questions)

1. Macroeconomics deals with:

a) Individual consumer
b) Individual firm
c) Economy as a whole
d) Single market

2. Which of the following is a stock variable?

a) Income b) Investment c) Wealth d) Production

3. In a two-sector economy, savings are equal to:

a) Consumption b) Investment c) Exports d) Imports

4. GDP at market price includes:

a) Depreciation only b) Net indirect taxes c) Subsidies only d) Transfer payments

5. Which method is also called the product method?

a) Income method
b) Expenditure method
c) Value added method
d) Inventory method

6. Transfer payments are included in:

a) National income b) Factor income c) Personal income d) Operating surplus

7. The circular flow of income in a four-sector economy includes:

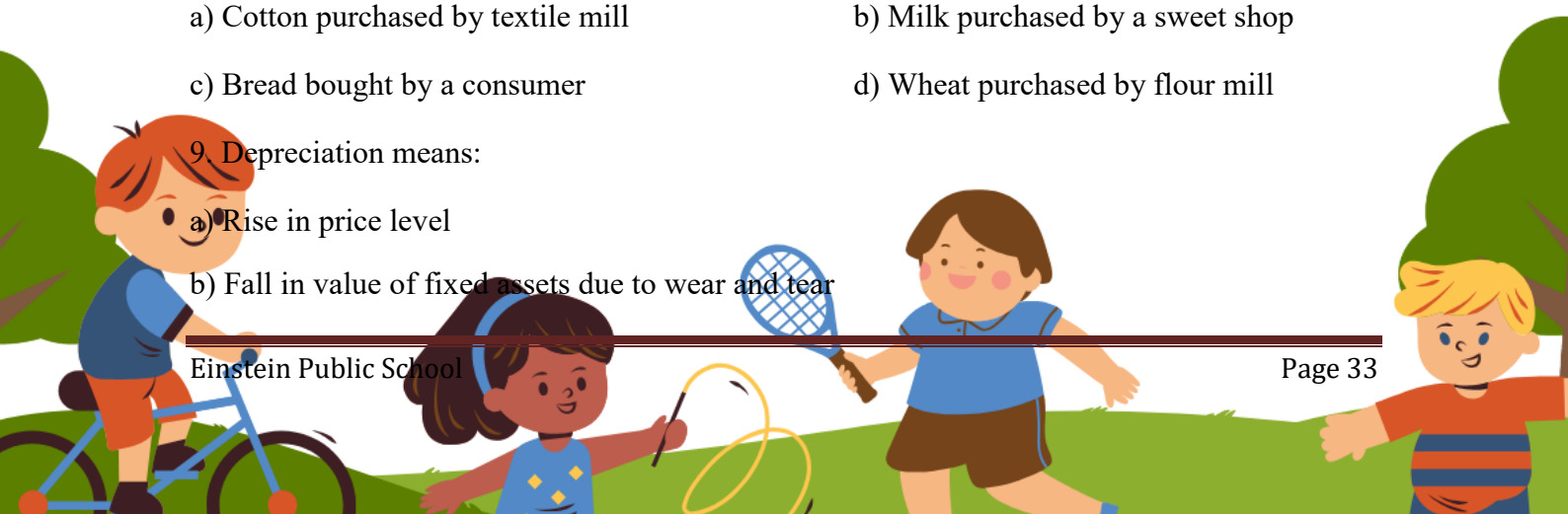
a) Households and firms only
b) Government only
c) Foreign sector also
d) Financial institutions only

8. Which of the following is an example of final goods?

a) Cotton purchased by textile mill
b) Milk purchased by a sweet shop
c) Bread bought by a consumer
d) Wheat purchased by flour mill

9. Depreciation means:

a) Rise in price level
b) Fall in value of fixed assets due to wear and tear



c) Increase in investment

d) Decrease in imports

10. Net National Product at factor cost is also known as:

a) GDP b) National Income c) Personal Income d) Disposable Income

Section B – Assertion and Reason (5 Questions)

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.

11. Assertion: Macroeconomics studies the economy as a whole.

Reason: It deals with aggregates like national income and employment.

12. Assertion: Circular flow of income shows continuous movement of income and expenditure.

Reason: Production creates income and income creates demand.

13. Assertion: Intermediate goods are not included in national income.

Reason: Their inclusion leads to double counting.

14. Assertion: GDP at factor cost is always greater than GDP at market price.

Reason: Net indirect taxes are added to factor cost.

15. Assertion: Depreciation reduces the value of fixed capital assets.

Reason: Machines lose value because of wear and tear.

Section C – Short Answer Questions (10 Questions)

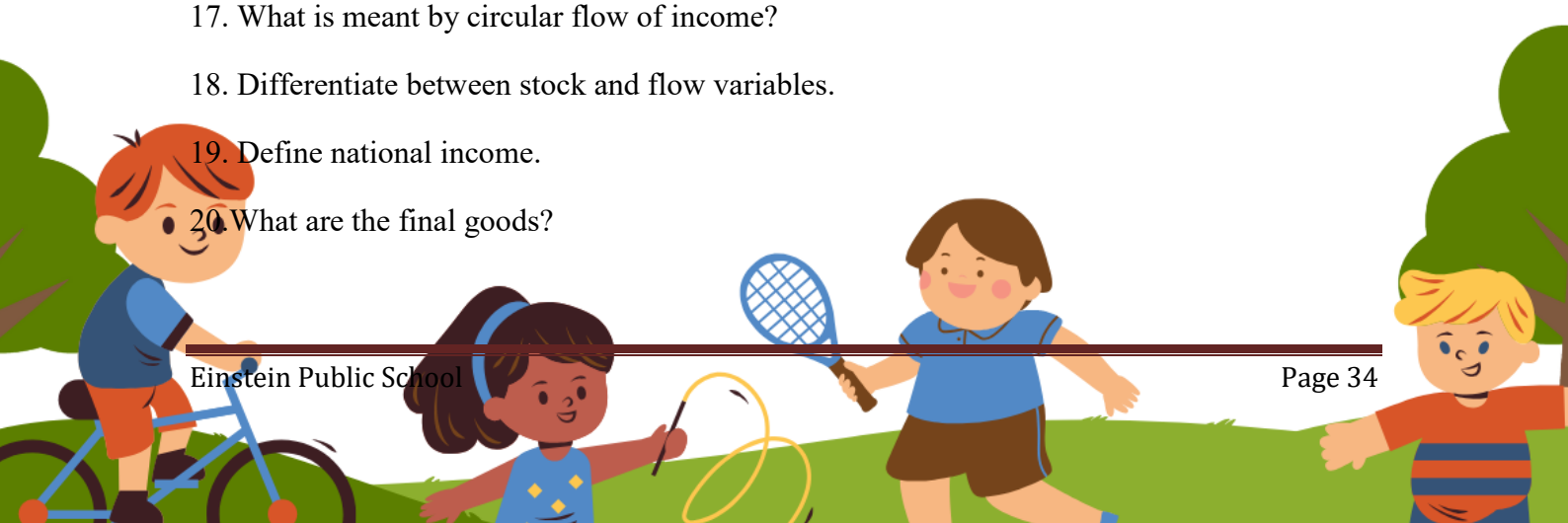
16. Define macroeconomics.

17. What is meant by circular flow of income?

18. Differentiate between stock and flow variables.

19. Define national income.

20. What are the final goods?



21. What is depreciation?

22. Explain the meaning of GDP.

23. Define personal income.

24. What is meant by double counting?

25. State any two precautions while measuring national income.

Section D – Long Answer Questions (5 Questions)

26. Explain the circular flow of income in a two-sector economy with a diagram.

27. Differentiate between GDP, GNP, NDP and NNP.

28. Explain the income method of measuring national income.

29. Explain the expenditure method of measuring national income.

30. Describe the precautions required while calculating national income.

Section E – Numerical Based Questions (10 Questions)

31. Calculate GDP at market price from the following:Compensation of employees = ₹500 croreRent = ₹100 croreInterest = ₹80 croreProfit = ₹120 croreNet indirect taxes = ₹50 croreDepreciation = ₹30 crore

32. Calculate NDP at factor cost:GDP at market price = ₹1200 croreDepreciation = ₹100 croreNet indirect taxes = ₹80 crore

33. Calculate National Income:NNP at market price = ₹1500 croreNet indirect taxes = ₹100 crore

34. Calculate Gross Value Added:Value of output = ₹900 croreIntermediate consumption = ₹300 crore

35. Calculate Net Value Added at factor cost:Gross value added at market price = ₹700 croreDepreciation = ₹50 croreNet indirect taxes = ₹30 crore

36. In a two-sector economy:Consumption expenditure = ₹600 croreInvestment expenditure = ₹200 crore Calculate national income.

37. Calculate GDP at factor cost: GDP at market price = ₹2500 croreNet indirect taxes = ₹200 crore

38. Calculate Net National Product at market price:Gross National Product at market price = ₹3000 croreDepreciation = ₹250 crore

39. Calculate Gross Value Added at Market Price and Net Value Added at Factor Cost:

Value of output = ₹1500 crore

Intermediate consumption = ₹500 crore

Depreciation = ₹80 crore

Net indirect taxes = ₹60 crore

40. Calculate National Income from the following data:

(₹ in crore)

Compensation of employees = 900

Rent = 150

Interest = 120

Profit = 180

Net indirect taxes = 100

Depreciation = 80

Corporate tax = 60

Undistributed profits = 40

Transfer payments = 30

History

PROJECT STRUCTURE & LAYOUT

History Project (Class XII)

Themes in Indian History – Part I

Academic Session: 2026–27

PRELIMINARY PAGES

1. Cover Page

- Project Title
- Student Name
- Roll Number
- Class & Section
- School Name
- Subject: History
- Academic Year: 2026–27

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2. Certificate of Authenticity

- Formal certificate statement
- Signature of History Teacher
- Signature of External Examiner
- School Seal

---

3. Acknowledgement

- Gratitude to:
  - Principal
  - History Teacher
  - Parents/Guardians
  - School Library/Resources

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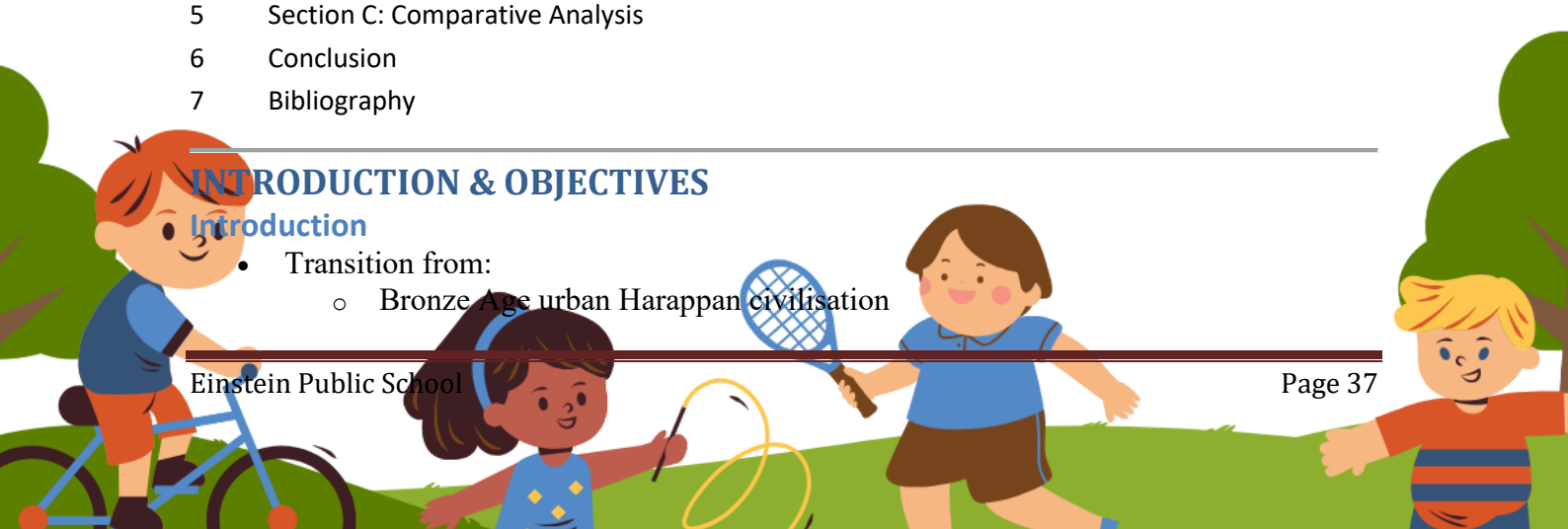
4. Table of Contents (Index)

INTRODUCTION & OBJECTIVES

Introduction

- Transition from:
  - Bronze Age urban Harappan civilisation



  - To Iron Age political states and empires
- Evolution of:
  - Urban planning
  - Economy
  - Political systems
  - Social structures
- Importance of archaeological and literary evidence in reconstructing history

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Objectives

- To analyze the town planning and material culture of the Harappan Civilisation
- To understand political and economic developments during the Mauryan and Gupta eras
- To evaluate historical sources such as archaeology, inscriptions, and literature

---

CORE CONTENT DEVELOPMENT
SECTION A
Bricks, Beads, and Bones (The Harappan Civilisation)

1. Town Planning and Engineering

Subtopics:

- Citadel and Lower Town division
- Grid pattern of streets
- Drainage and sanitation system
- Standardized burnt bricks
- Granaries and storage structures

---

2. Subsistence Strategies & Economy

Subtopics:

- Agriculture and farming methods
- Evidence of ploughed fields at Kalibangan
- Domesticated animals
- Food production and storage

---

3. Artifacts, Crafts, and Trade

Subtopics:

- Chanhudaro as a craft-production centre
- Bead-making industry
- Materials used:
  - Carnelian
  - Jasper
  - Lapis Lazuli
- Harappan seals and weights
- Maritime trade with:
  - Oman
  - Mesopotamia

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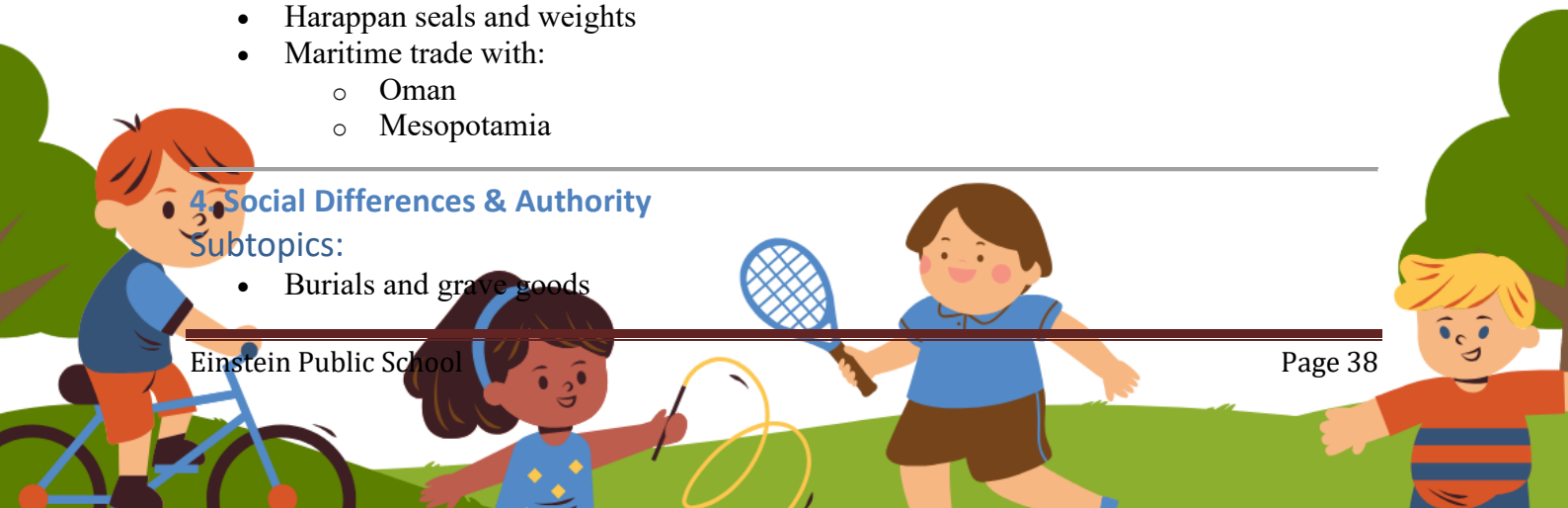
4. Social Differences & Authority

Subtopics:

- Burials and grave goods



- Luxury vs. utilitarian objects
- Social hierarchy indicators
- Theories regarding Harappan governance:
    - Priest-King theory
    - Multiple rulers theory
    - Decentralized governance theory

SECTION B
Kings, Farmers, and Towns (Early States & Economies)
1. Rise of the Mahajanapadas
Subtopics:

- Formation of 16 Mahajanapadas
- Political expansion in the 6th century BCE
- Rise of Magadha:
    - Iron resources
    - Fertile Gangetic plains
    - Elephant army
    - Strategic capitals:
        - Rajgir
        - Pataliputra

---

2. The Mauryan Empire & Dhamma
Subtopics:

- Chandragupta Maurya
- Administrative system
- Ashoka and his empire
- Concept of Dhamma:
    - Social harmony
    - Moral governance
    - Political unification

---

3. Deciphering the Past (Epigraphy)
Subtopics:

- Brahmi and Kharosthi scripts
- James Prinsep's contribution
- Ashokan inscriptions and edicts
- Importance of epigraphy in history

---

4. Agrarian Strategies & Rural Society
Subtopics:

- Iron ploughshares
- Transplantation of paddy
- Irrigation systems:
    - Sudarsana Lake
- Rural inequalities in Buddhist texts
- Taxation and agrarian economy

SECTION C
Comparative Analysis
Comparative Table

Feature	Harappan Civilisation (Chapter 1)	Early Historic Period / Mauryas (Chapter 2)
Primary Sources	Archaeological evidence such as seals, pottery, ruins, bones	Inscriptions, coins, literary texts
Political Setup	Decentralized or consensus-based governance	Centralized bureaucratic empire
Economy & Trade	Barter system and maritime trade	Coin-based trade and land routes
Urban Character	Civic amenities and sanitation-focused cities	Fortified capitals and royal architecture

---

CONCLUSION
Conclusion

- Decline of Harappan urbanism
- Emergence of second urbanization in the Ganga Valley
- Transition from trade-centric cities to political empires
- Importance of both periods in shaping Indian socio-economic history

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BIBLIOGRAPHY
Books & References

1. NCERT Class XII – *Themes in Indian History, Part I*
2. The Land of the Seven Rivers
3. Archaeological Survey of India (ASI)
4. Additional school notes and classroom materials

VISUAL ELEMENTS (Suggested Placement)
Left-Hand Pages

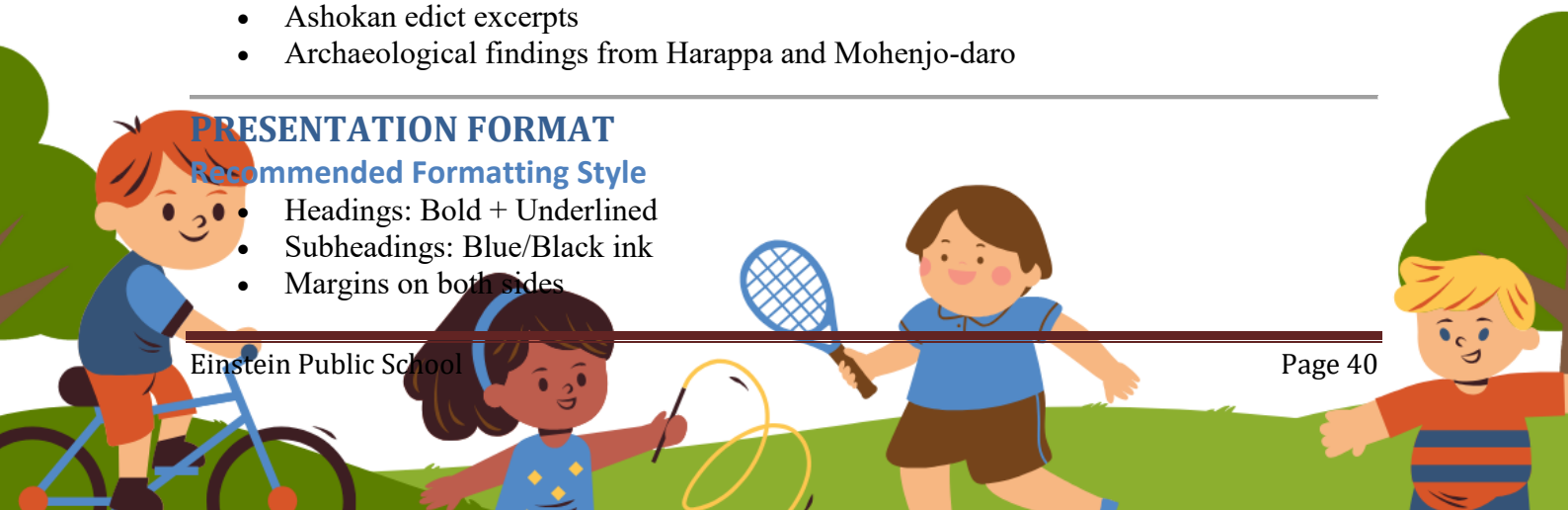
- Map of major Harappan sites
- Map of the 16 Mahajanapadas
- Sketches of Harappan seals
- Images of Ashokan pillars
- Drainage system diagrams

SOURCE-BASED BOXES (Optional Enhancement)
Suggested Source Boxes

- Excerpt from Megasthenes' *Indica*
- John Marshall's statement on the discovery of the Indus Valley Civilisation
- Ashokan edict excerpts
- Archaeological findings from Harappa and Mohenjo-daro

PRESENTATION FORMAT
Recommended Formatting Style

- Headings: Bold + Underlined
- Subheadings: Blue/Black ink
- Margins on both sides



- Use ruled sheets or A4 sheets
- Include page borders for neatness
- Maintain uniform spacing and handwriting/style throughout the project

Physical Education

PART -A

***Objective Type Question/ MCQ (1Markeach)

Q.1 What is planning?

A. To Decide in well in Advance B. To Organize
C. Make Decision. D. To Judge
Q.2 Find out the Specific Sports Programmed?

A. Run for Fun B. Basketball
C. Kabaddi D. Kho-Kho
Q.3 What is Intramural?
A. Outside of the School Campus B. Inside of the School Campus

C. Within the City D. Outside of the City

Q.4 What is Extramural?
A. Outside of the School Campus B. Inside of the School Campus
C. Within the City D. Outside of the City
Q.5 What is 'Bye'?
A. Seeding. B. Disadvantage
C. Round Match D. Advantage
Q.6 What is league tournament?
A. All teams play with each other B. Selective teams play with each other
C. Eliminated after one loose. D. None the above
Q.7 Formula for total no's of matches in league tournament?
A. N-1. B. N (N-1)
C. N (N-1)/2. D. (N-1)/2
Q.8 How to Decide No of Byes?
A. Next Power of 3. B. Next power of four
C. Power of 3. D. Next power of 2
Q.9 What is Seeding?
A. Directly Inter in First Round B. Played from first Match
C. Get byes. D. Directly Play From Quarter/Semi
Q.10 What is Knock out Tournament?

A. Round Robin Tournament. B. Stair case Tournament

C. Elimination Tournament D. Ladder Tournament

Q.11Hunch back' is also known as?
A. Back pain B. Scoliosis
C. Lordosis D. Kyphosis

Q.12 Side ward curvature of the spine is called?
A. knock knee B. Kyphosis
C. Scoliosis D. Lordosis

***Give one word answers.

1. What is the name of the committee that announces the dates and venue of tournament?
2. Which committee is responsible for preparing the grounds or laying out the track and field?
3. What is the formula to calculate the number of matches in a single league tournament?
4. Write down the formula for calculating the number of matches for double league tournament.
5. How many byes are given if 15 teams are participating in a knock-out tournament?

**Fill in the blanks.

1. The second bye is given to the.....team of the upper half.

2. Tabular method is used for fixtures in a.....tournament.

3. .....means the activities which are performed with in the campus of an institution.

**State True or False.

1. League tournament is also called the Berger system.(True/False)
2. Knock-out tournaments are less expensive in comparison to other forms of tournaments. (True/False)

3 . Seema Antilis related to athletics.(True/False)
4-. Krishna Poonia is related to athletics.(True/False)
5. If a women athlete takes less number of calories persistently for a long time, she may not suffer from amenorrhoea.(True/False)

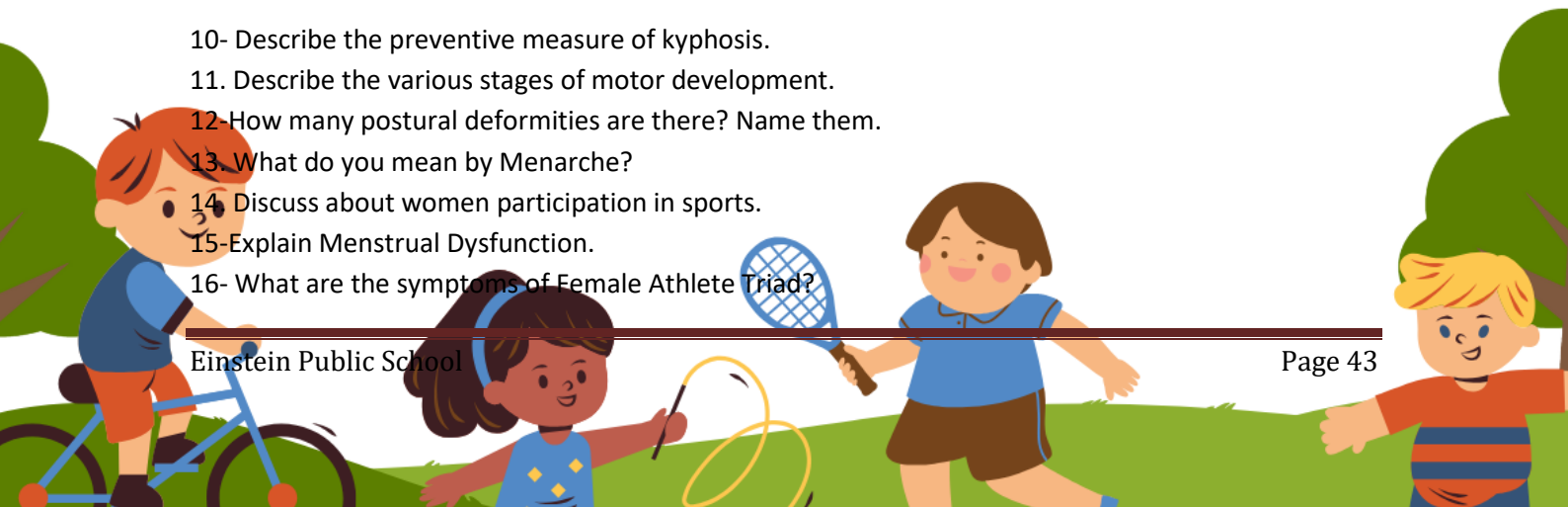
***Short Answer Type Question (30 to 50 Words) (3 Marks each)

1. Write the advantages & disadvantages of knock-out tournaments.
2. Define league. Explain its types. Write its advantage & disadvantage of league tournament?
3. Write the procedure of fixtures in league tournaments?
4. What are the objectives of Extramural?

5. Define Tournament? Write the types of tournaments?
6. Explains any two specific sports program.
7. Define 'Fixtures' and classify several types of tournaments.
8. Enlist various committees for organizing an event and explain function of any three.

9-. Write the meaning and types of motor development.

10- Describe the preventive measure of kyphosis.
11. Describe the various stages of motor development.
12-How many postural deformities are there? Name them.
13. What do you mean by Menarche?
14. Discuss about women participation in sports.
15-Explain Menstrual Dysfunction.
16- What are the symptoms of Female Athlete Triad?



17-Explain Amenorrhea.
18-What do you understand about Osteoporosis?

****Long Answer Type Question (75 to 100 Words) (5 Marks each)

1. Describe the various committees for the organizing of sports events.
2. Draw a knock out fixture of 21 teams mentioning all the steps involved.
3. Define Intramurals. Write its objectives of and principles.
4. Define Extramural. Write its objectives and principles.
5. Explain the meaning of specific sports programme? Write its contribution for society.
6. Prepare the fixture of 18 teams where last year position holder team will directly play in semi-final.
7. Prepare the fixture of 23 teams according to Knock-out cum League basis/League cum Knock-out basis tournament.
8. Prepare the fixture of 7 and 8 teams on league basis tournament.

9. Write an essay on sports participation of women in India.
10. Describe any two physiological changes in women after Menarche.
11.. Explain Female Athletes Triad.
12. Discuss the method by which women participation in sports can be increased.
13-. According to exercise guidelines at different stages of growth. What kind of exercise one should do? Explain with the help example at every stage.
14-. Describe the factors affecting motor development of children.?

PART-B

Practical FILE :GAME OF SPECIALIZATION

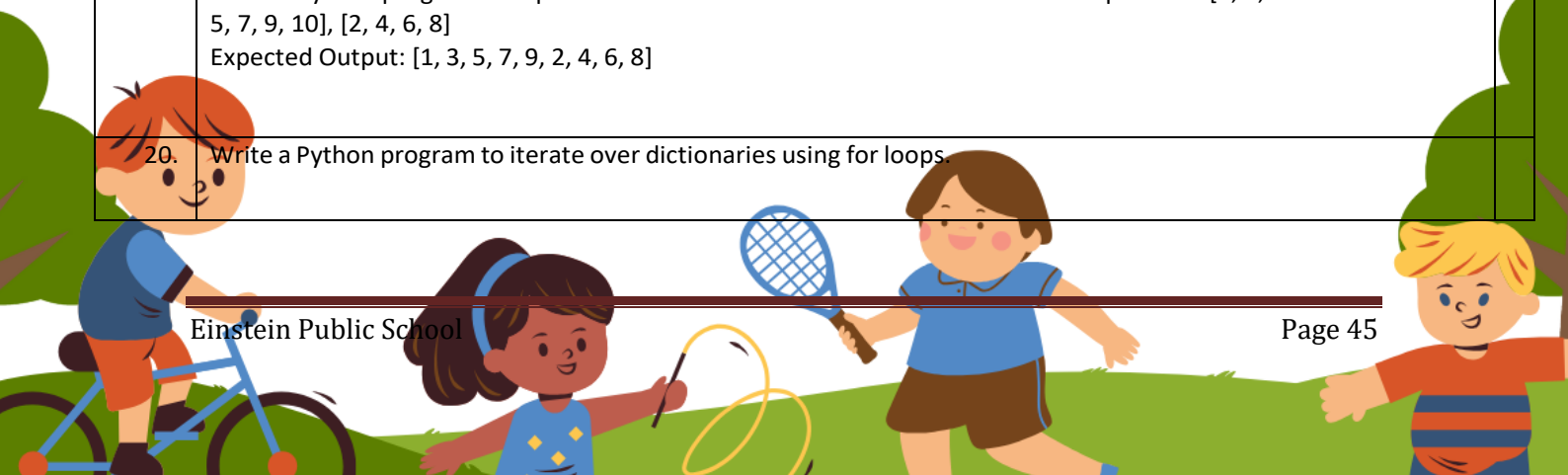
Select any one game from followings (Student Choice):-

Athletics,Football,Kho-Kho,Kabbadi Handball,Volleyball & ,Yoga.

The Content of the File as follows:-
1.Discuss in detail the History of the game.
a.International History(5 pages) .b.National History(5 pages)
2.Explain the Fundamental Skills of the game.
3.Describe the Rules and Regulations of the game.
4.Write down the SportsbPersonalities of the game(One player per page)
a.International Player(5 players)b.National Player(5 players)
5.Sports Awards.
a.Arjun Award b.Dronarcharya Award c.Rajiv Gandhi Khel Ratan Award
6.Sports Injuries.
a.5 major injuries of the game.
7.Bibliography

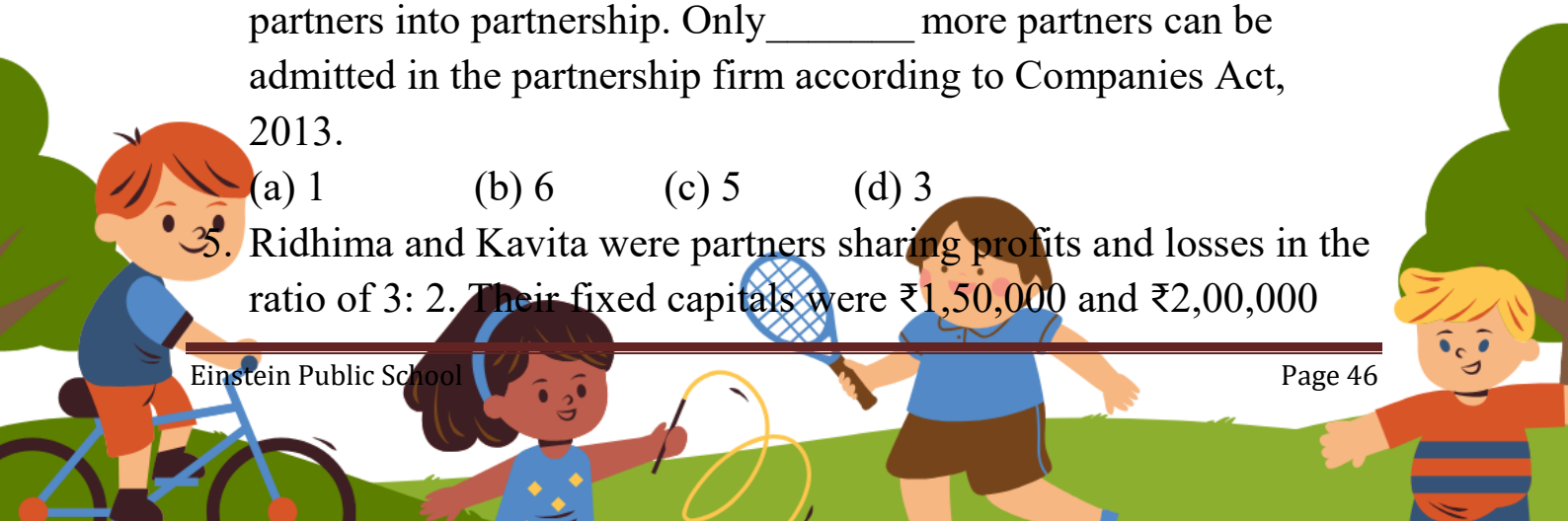
Computer Science

	Revision Tour of Python	
1.	Write a Python program to calculate the length of a string.	
2.	Write a Python program to count the number of characters (character frequency) in a string.Sample String: 'google.com' Expected Result: {'g': 2, 'o': 3, 'l': 1, 'e': 1,'.': 1, 'c': 1, 'm': 1}	
.3	Write a Python program to remove the nth index character from a nonempty string.	
4.	Write a Python program that accepts a comma separated sequence of words as input and printsthe unique words in sorted form (alphanumerically). Sample Words: red, white, black, red, green, blackExpected Result: black, green, red, white, red	
5.	Write a Python program to print the following floating numbers with no decimal places.	
6.	Write a Python program to count and display the vowels of a given text.	
7.	Write a Python program to sum all the items in a list.	
8.	Write a Python program to get the largest number from a list.	
9.	Write a Python program to remove duplicates from a list. a = [10,20,30,20,10,50,60,40,80,50,40]	
10.	Write a Python function that takes two lists and returns True if they have at least one commonmember.	
11.	Write a Python program to shuffle and print a specified list.	
12.	Write a Python program to count the number of elements in a list within a specified range.	
13.	Write a Python program to generate groups of five consecutive numbers in a list.	
14.	Write a Python program to replace the last element in a list with another list.Sample data: [1, 3, 5, 7, 9, 10], [2, 4, 6, 8] Expected Output: [1, 3, 5, 7, 9, 2, 4, 6, 8]	
20.	Write a Python program to iterate over dictionaries using for loops.	



Accountancy

1. Vibha and Asha are partners in a firm. Asha withdrew ₹ 1,000 at the end of each quarter during the year ended 31st March 2022. Interest on drawings will be calculated for an average period of
   (a) 6 months (b) 4.5 months
   (c) 7.5 month (d) 6.5 months
2. Aman and Chaman are partners in a firm. On 1st July, 2021 Aman advanced a loan of ₹ 6,00,000 to the firm. There is no partnership deed. On 31st March, 2022, Aman was entitled to get the following amount as interest on loan;
   (a) 36,000 (b) 18,000 (c) ₹9,000 (d) 27,000
3. 'A' and 'B' were partners in a firm sharing profits and losses in the ratio of 7: 1. 'A' withdrew a fixed amount of Rs. 12,000 at the beginning of each quarter. Interest on drawings is charged @ 6% p.a. The journal entry for charging interest on drawings at the end of the year will be:
   a) Interest on drawings A/c Dr. Rs. 1,800
   To A's Capital A/c Rs. 1,800
   b) Interest on drawings A/c Dr. Rs. 1,800
   To A's Current A/c Rs. 1,800
   c) A's Capital A/c Dr. Rs. 1,800
   To Interest on drawings A/c Rs. 1,800
   d) Profit and Loss Appropriation A/c Dr. Rs. 1,800
   To Interest on drawings A/c Rs. 1,800
4. A partnership firm has 45 partners. It wants to admit 7 more partners into partnership. Only_____ more partners can be admitted in the partnership firm according to Companies Act, 2013.
   (a) 1 (b) 6 (c) 5 (d) 3
5. Ridhima and Kavita were partners sharing profits and losses in the ratio of 3: 2. Their fixed capitals were ₹1,50,000 and ₹2,00,000



respectively. The partnership deed provides for interest on capital @ 8% p.a. The net profit of the firm for the year ended 31st March, 2023 amounted to ₹21,000. The amount of interest on capital credited to the capital accounts of Ridhima and Kavita will be:

(a) ₹12,000 and ₹16,000 respectively
(b) ₹10,500 and ₹10,500 respectively
(c) ₹9,000 and ₹12,000 respectively
(d) ₹16,000 and ₹5,000 respectively

6. Ruchika and Harshita were partners in a firm. Ruchika had withdrawn ₹9,000 at the end of each quarter, throughout the year. The interest to be charged on Ruchika'a drawings at 6% p.a. will be:

(a) 540 (b) 2,160 (c) ₹ 1,080 (d) ₹810

7. Mahi, Ruhi and Ginni are partners in a firm sharing profits and losses in the ratio 6:4: 1. Mahi guaranteed a profit of ₹50,000 to Ginni. Net profit for the year ending 31st March, 2023 was ₹ 1,10,000, Mahi's share in the profit of the firm after giving guaranteed amount to Ginni will be:

(a) ₹20,000 (b) ₹60,000 (c) ₹ 40,000 (d) ₹10,000

Read the following hypothetical situations and answer the questions given

A. Harsh and Vinay are partners sharing profits in the ratio of 2: 1. Their capitals are ₹2,00,000 and ₹1,50,000 respectively. Interest on capital is payable @ 10% p.a. Harsh is entitled to a salary of ₹ 10,000 p.m. The profit before interest on capital but after Harsh salary was ₹ 2,20,000. Vinay is entitled to a commission of 10% of profit after interest on capital and Harsh's salary.

Following is their profit & loss appropriation A/c.

Dr. Cr.

Particulars	₹	Particulars	₹
To Interest on Capital		By Net profit	(1)
Harsh	–		
Vinay	–		
To Harsh's Salary A/c	1,20,000		
To Vinay's commission	–		
To Profit transferred to capital A/c	–		
Harsh	(2)		
Vinay	–		

8. The amount reflected in blank (1) will be:
   (a) ₹2,20,000 (b) ₹3,40,000 (c) ₹ 1,00,000 (d) ₹3,75,000
9. Harsh's share of profit will be:
   (a) ₹1,11,000 (b) ₹1,66,500 (c) ₹55,500 (d) ₹1,40,000

B. Radha and Sudha are partners in a firm, Sudha is guaranteed a minimum profit of 40,000 including commission @10% of net profit after charging such commission. The net profit for the year ending 31st March 2023 was ₹66,000.

10. The commission payable to Sudha will be:
   (a) ₹ 6,600 (b) ₹3,300
   (c) ₹ 6,000 (d) None of these
11. The share of profit of Radha will be:
   (a) ₹ 30,000 (b) ₹34,000 (c) ₹28,000 (d) ₹26,000

C. Kavita, Savita and Madhu were partners in a firm with capitals of ₹6,00,000, ₹4,00,000 and 2,00,000 respectively. After providing interest on capital @ 10% p.a., the profits are divisible as follows: Kavita 1/3, Savita 1/2 and Madhu 1/6. Kavita personally guaranteed that Savita's share of profit after charging interest on capital would not be less than ₹1,00,000 in any year.
The profit for the year ending 31st March, 2022 amounted to ₹3,00,000 before providing interest on capital.

12. Savita's share of profit is short of the guaranteed amount by:
   (a) ₹40,000 (b) ₹70,000 (c) ₹20,000 (d) ₹10,000

13. The total profits of the firm after adjustment of guaranteed amount will be distributed between the partners as:
(a) Kavita ₹60,000, Savita ₹40,000 and Madhu ₹20,000
(b) Kavita ₹50,000, Savita ₹ 1,00,000 and Madhu ₹30,000
(c) Kavita ₹60,000, Savita ₹90,000 and Madhu ₹30,000
(d) Kavita ₹60,000, Savita ₹ 1,00,000 and Madhu ₹20,000

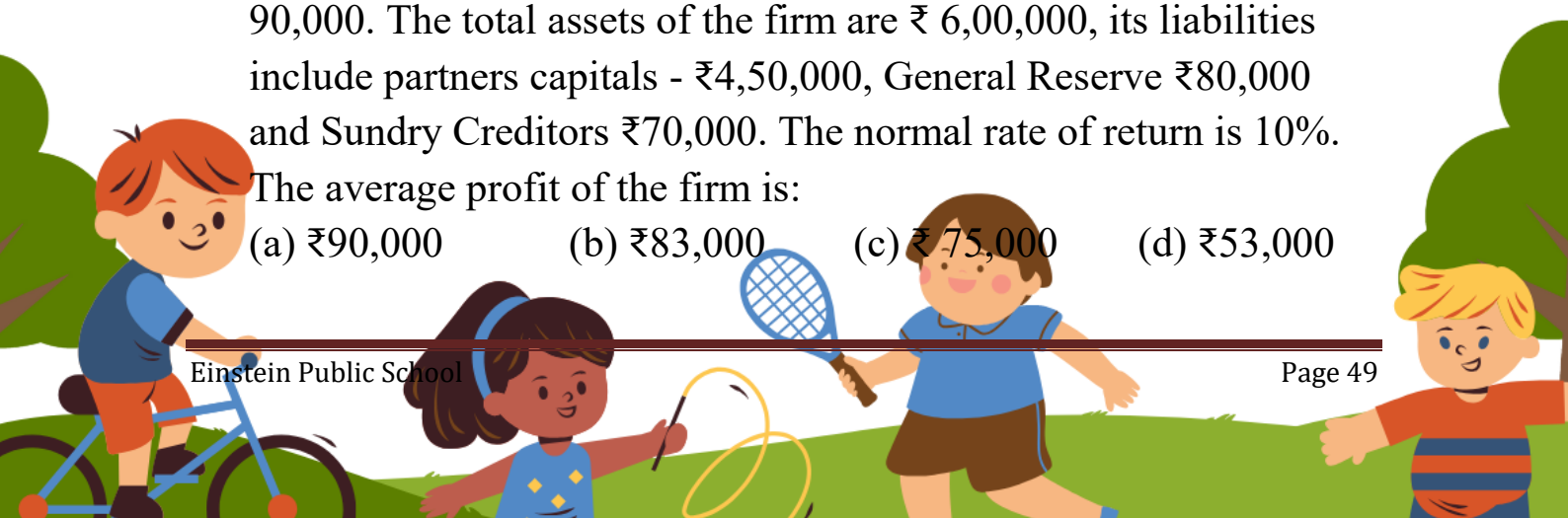
14. The normal rate of return in a business is 10%. The average profit of last five years of the firm is ₹70,000. Capital invested in the business is ₹ 5,00,000. Value of goodwill at three years purchase of super profit will be:
(a) ₹ 20,000 (b) ₹70,000 (c) ₹ 60,000 (d) 50,000

15. Net assets of a firm, including fictitious assets of ₹ 15,000, are ₹ 95,000 and its outside liabilities are ₹ 40,000. Average profit of the firm is ₹6,000. Value of goodwill as per capitalisation of super profit, when normal rate of return is 10%, will be:
(a) ₹20,000 (b) ₹40,000 (c) ₹60,000 (d) ₹80,000

16. A firm earns a profit of ₹1,25,000. The normal rate of return is 10%. Assets of the firm are ₹12,00,000 and liabilities are ₹4,00,000. Value of goodwill by capitalization of average profit will be:
(a) ₹50,000 (b) ₹4,50,000 (c) ₹45,000 (d) ₹8,00,000

17. Net profits of a firm for the last three years are ₹26,000, ₹32,000 and ₹ 62,000. Capital invested in the business is ₹2,00,000. The normal rate of return is 10%. Value of goodwill on the basis of three years purchase of super profit will be:
(a) ₹ 40,000 (b) ₹80,000 (c) ₹20,000 (d) ₹60,000

18. Goodwill of a firm at 3 years purchase of super profit is ₹ 90,000. The total assets of the firm are ₹ 6,00,000, its liabilities include partners capitals - ₹4,50,000, General Reserve ₹80,000 and Sundry Creditors ₹70,000. The normal rate of return is 10%. The average profit of the firm is:
(a) ₹90,000 (b) ₹83,000 (c) ₹ 75,000 (d) ₹53,000



19. The profits earned by a firm in last 5 years are as follows: ₹15,000; ₹16,000; ₹17,000; ₹21,000 and ₹4,000 (loss). The value of goodwill on the basis of 2 years purchase of last 5 years average profits will be:
(a) ₹ 26,000 (b) ₹36,000 (c) ₹25,000 (d) ₹32,000

20. The average profit earned by a firm is₹1,25,000. The normal rate of return is 15%. Tangible assets of the firm are ₹12,50,000 and outside liabilities are ₹3,00,000. The amount of capital employed is:
(a) ₹9,00,000 (b) ₹3,50,000 (c) ₹9,50,000 (d) ₹12,50,000

21. The average capital employed by a firm is ₹ 6,00,000 and normal rate of return is 10%. Average profit earned by the firm is ₹ 1,00,000. If management cost is ₹ 20,000 per annum, value of goodwill at 2 years purchase of super profit will be:
(a) ₹80,000 (b) ₹40,000 (c) ₹20,000 (d) ₹ 60,000

22. Which of the following is not correct?
(a) Super profit = Actual (Average profit) - Normal Profit
(b) Goodwill = $\frac{Super\ profit \times 100}{Normal\ rate\ of\ return}$
(c) Value of goodwill = Capitalised value of the business - Net assets
(d) Super profit = Average profit + Normal profit

ASSERTION-REASON BASED QUESTIONS

In the questions given below, there are two statements marked Assertion (A) and Reason (R). Read the statements and choose the correct option:

(a) Both Assertion (A) and Reason (R) are correct and Reason (R) is the correct explanation of Assertion (A).
(b) Both Assertion (A) and Reason (R) are correct but Reason (R) is not the correct explanation of Assertion (A).
(c) Assertion (A) is correct but Reason (R) is incorrect.
(d) Assertion (A) is incorrect but Reason (R) is correct.

23. **Assertion (A):** Kartik is a partner in a firm. He advanced a loan of ₹ 80,000 to the firm without any agreement. He claims an interest @ 6% p.a. on loan.
Reason (R): In the absence of any agreement/partnership deed, provisions of Indian Partnership Act 1932 would apply.
24. **Assertion (A):** As per section 464 of the Companies Act 2013, the Central Government is empowered to prescribe maximum number of partners in a firm, which cannot be more than 100.
Reason (R): The Central Government has prescribed the maximum number of partners in a firm as 100.
25. **Assertion (A):** Rent payable to a partner is debited to Profit & Loss account.
Reason (R): Rent payable is a charge against profits.
26. **Assertion (A):** Interest on capital is not paid in case of loss.
Reason (R): Interest on capital is an appropriation of profit.
27. **Assertion (A):** In the absence of partnership deed profit is shared equally by the partners irrespective of capital invested by them.
Reason (R): In the absence of partnership deed provisions of the Indian Partnership Act 1932 apply.
28. **Assertion (A):** In case of guarantee of a minimum profit to a partner, guaranteed amount is paid even when his share of profit is more than guaranteed amount.
Reason (R): Partner is entitled for share of profit or guaranteed amount whichever is higher.
29. **Assertion (A):** Liability of a partner in a firm is unlimited.
Reason (R): Private assets of partners cannot be used to pay off firm's debt.
30. **Assertion (A):** Only firms earning super profits have goodwill
Reason (R): A firm earning only normal profits or incurring losses has no goodwill.
31. **Assertion (A):** Average profit is multiplied by number of years purchase for valuing goodwill.

Reason (R): Number of years purchase means the number of future years in which the firm is expected to earn the same profit.

32. **Assertion (A):** While calculating goodwill abnormal gains are deducted from the profit

Reason (R): The reason for deducting abnormal gain is that firm will not be able to get abnormal gain in future years.

33. **Assertion (A):** Favourite location is also a factor affecting goodwill of the firm.

Reason (R): A centrally located firm is able to earn more because of increased sales due to favourable location

34. **Assertion (A):** Number of competitors is not a factor affecting goodwill of the firm

Reason (R): Lack of competitors enables the firm to sell at a higher price and earn more profits.

35. **Assertion (A):** Goodwill is an intangible asset.

Reason (R): Goodwill is the value of the reputation of a firm in respect of profits expected in future, over and above the normal profits.

PROBLEM 36. (Guarantee to a Partner) Ali, Bimal and Deepak are partners in a firm. On 1st April, 2011 their capital accounts stood at ₹ 4,00,000, ₹ 3,00,000 and ₹ 2,00,000 respectively. They shared profits and losses in the proportion of 5 : 3 : 2. Partners are entitles to interest on capital @ 10% per annum and salary to Bimal and Deepak @ ₹ 2,000 per month and ₹ 3,000 per quarter respectively as per the provisions of the partnership deed.

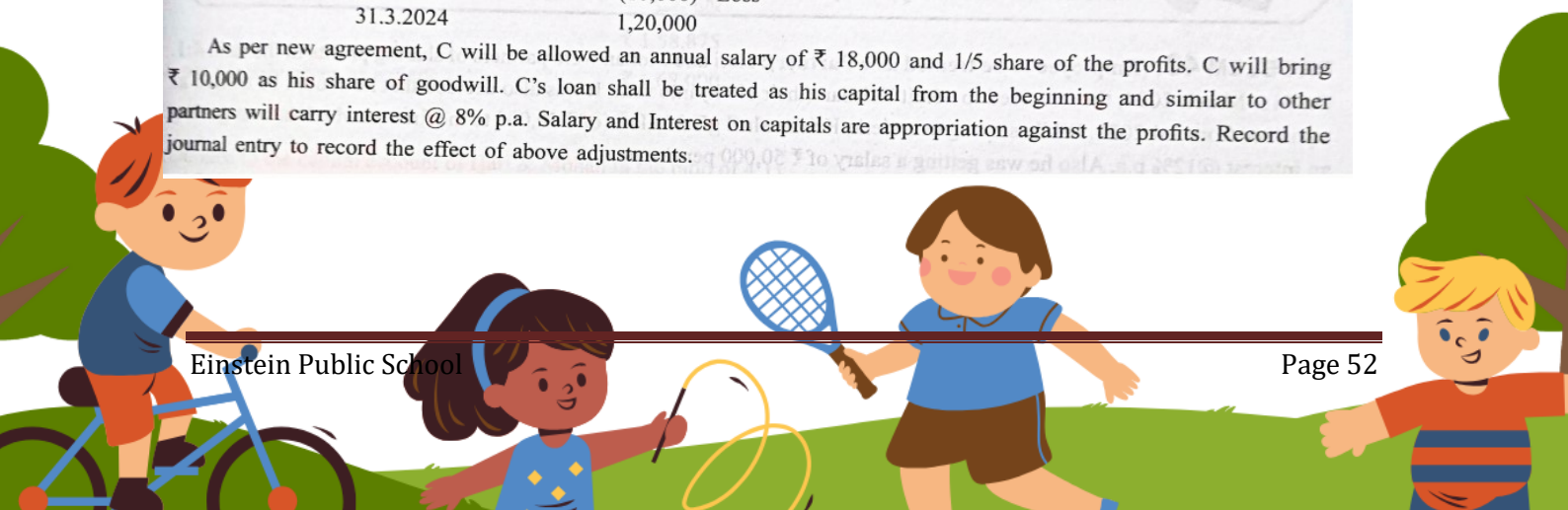
Bimal's share of profit (excluding interest on capital but including salary) is guaranteed at a minimum of ₹ 50,000 p.a. Any deficiency arising on that account shall be met by Deepak.

The profits of the firm for the year ended 31st March, 2012 amounted to ₹ 2,00,000. Prepare Profit & Loss Appropriation Account for the year ended on 31st March, 2012.

Problem 37 **(Manager to be treated as a Partner):** A and B are partners sharing profits and losses in the ratio of 3 : 2. On 1.4.2024, they decided to take their manager C into partnership w.e.f. 1.4.2021. As manager, C was getting annual salary of ₹ 36,000. He had also advanced ₹ 50,000 to the firm by way of loan on which he gets interest @ 10% p.a. During the last three years, firm's profits after all adjustments were as follows:

	₹	
31.3.2022	1,60,000	
31.3.2023	(10,000)	Loss
31.3.2024	1,20,000	

As per new agreement, C will be allowed an annual salary of ₹ 18,000 and 1/5 share of the profits. C will bring ₹ 10,000 as his share of goodwill. C's loan shall be treated as his capital from the beginning and similar to other partners will carry interest @ 8% p.a. Salary and Interest on capitals are appropriation against the profits. Record the journal entry to record the effect of above adjustments.



Problem 38 **(Average of Super Profits):** Sunny and Rohan were partners in a firm sharing profits and losses in the ratio of 2 : 1. Their books showed that the capital employed on 31st March, 2023 was ₹ 7,00,000. The average profits earned by the firm were ₹ 90,000. Calculate the value of goodwill on the basis of 5 years purchase of super profits assuming that the normal rate of return is 10%.

Problem 39 **(Calculation of goodwill):** A partnership firm earned net profits during the last three years as follows:

Years	Net Profit (₹)
2007 - 2008	1,90,000
2008 - 2009	2,20,000
2009 - 2010	2,50,000

The capital employed in the firm throughout the above mentioned period has been ₹ 4,00,000. Having regard to the risk involved, 15% is considered to be a fair return on the capital. The remuneration of all the partners during this period is estimated to be ₹ 1,00,000 per annum.

Calculate the value of goodwill on the basis of (*i*) two years' purchase of super profits earned on average basis during the above mentioned three years and (*ii*) by capitalisation method. ***[CBSE 2011 Set-I, II, III (Outside)]***

Problem 40 **(Calculation of Interest on Capital):** Rakshit and Malik are partners in a firm sharing profits and losses in the ratio of 4: 1. On 1st April, 2021, their capitals were ₹ 1,20,000 and ₹ 80,000 respectively. On 1st December, 2021, they decided that the total capital of the firm should be ₹ 3,00,000 to be contributed by them in the ratio of 2 : 1.

According to the partnership deed, interest on capital is allowed to the partners @ 6% p.a.

Calculate interest on capital to be allowed for the year ending 31st March, 2022.

Problem 41 **(Distribution of Profits):** On 1-4-2013 Jay and Vijay, entered into partnership for supplying laboratory equipments to government schools situated in remote and backward areas. They contributed capitals of ₹ 80,000 and ₹ 50,000 respectively and agreed to share the profits in the ratio of 3: 2. The partnership deed provided that interest on capital shall be allowed at 9% per annum. During the year firm earned a profit of ₹ 7,800.

Showing your calculations clearly, prepare 'Profit and Loss Appropriation Account' of Jay and Vijay for the year ended 31-3-2014.

Problem 42 **(Distribution of Profits):** Yadu, Vidu and Radhu were partners in a firm sharing profits in the ratio o 4 : 3 : 3. Their fixed capitals on 1st April, 2018 were ₹ 9,00,000, ₹ 5,00,000 and ₹ 4,00,000 respectively. On 1st November 2018, Yadu gave a loan of ₹ 80,000 to the firm. As per the partnership agreement:

(*i*) The partners were entitled to an interest on capital @ 6% p.a.

(*ii*) Interest on partners' drawings was to be charged @ 8% p.a.

The firm earned profits of ₹ 2,53,000 (after interest on Yadu's loan) during the year 2018-19. Partners' drawings fo the year amounted to Yadu: ₹ 80,000, Vidu: ₹ 70,000 and Radhu: ₹ 50,000. Prepare Profit and Loss Appropriatio Account for the year ending 31st March, 2019.

Problem 43 **(Interest on Drawings):** Calculate interest on Drawings of Ram @ 6% p.a. for the year ended 31st December 2023 in the following cases:

(*i*) If his drawings during 2023 were ₹ 25,000

(*ii*) If he withdraws ₹ 2,400 in the beginning of every month.

(*iii*) If he withdraws ₹ 2,400 at the end of every month.

(*iv*) If he withdraws ₹ 2,400 in the middle of every month.

(*v*) If he withdraws the following amounts:

	₹
1st February, 2023	5,600
31st March, 2023	4,400
31st July, 2023	8,800
30th September, 2023	1,800
30th November, 2023	3,600

Problem 44 **(Guarantee to a Partner):** Moli, Bhola and Raj were partners in a firm sharing profits and losses in the ratio of 3 : 3 : 4. Their partnership deed provided for the following:

(*i*) Interest on capital @ 5% p.a.

(*ii*) Interest on drawing @ 12% p.a.

(*iii*) Interest on partner's loan @ 6% p.a.

(*iv*) Moli was allowed on annual salary of ₹ 4,000; Bhola was allowed a commission of 10% of net profit as shown by Profit and Loss Account and Raj was guaranteed a profit of ₹ 1,50,000 after making all the adjustments as provided in the partnership agreement.

Their fixed capitals were Moli: ₹ 5,00,000; Bhola: ₹ 8,00,000 and Raj: ₹ 4,00,000. On 1st April, 2016 Bhola extended a loan of ₹ 1,00,000 to the firm. The net profit of the firm for the year ended 31st March, 2017 before interest on Bhola's loan was ₹ 3,06,000.

Prepare Profit and Loss Appropriation Account of Moli, Bhola and Raj for the year ended 31st March, 2017 and their Current Accounts assuming that Bhola withdrew ₹ 5,000 at the end of each month, Moli withdrew ₹ 10,000 at the end of each quarter and Raj withdrew ₹ 40,000 at the end of each half year.

Problem 45 **(Change in profit sharing ratio – Retrospective effect):** Prem, Param and Priya were partners in a firm. Their fixed capitals were Prem ₹ 2,00,000; Param ₹ 3,00,000 and Priya ₹ 5,00,000. They were sharing profits in the ratio of their capitals. The firm was engaged in the sale of ready-to-eat food packets at three different locations in the city, each being managed by Prem, Param and Priya. The outlet managed by Prem was doing more business than the outlets managed by Param and Priya. Prem requested Param and Priya for a higher share in the profits of the firm which Param and Priya accepted. It was decided that the new profit sharing ratio will be 2: 1: 2 and its effect will be introduced retrospectively for the last four years. The profits of the last four years were ₹ 2,00,000; ₹ 3,50,000; ₹ 4,75,000 and ₹ 5,25,000 respectively. Showing your calculations clearly, pass a necessary adjustment entry to give effect to the new agreement between Prem, Param and Priya.

Business Studies

Chapters: Nature & Significance of Management | Principles of Management | Financial Management

Days	Task
Day 1-4	**Project File:** "Fayol's 14 Principles in My School". Identify 5 principles followed/violated in EPS with evidence. Suggest improvements.
Day 5-7	**Role Play:** 1-page dialogue showing violation of 'Unity of Command' and its solution.
Day 8-10	**Financial Chart:** For 'Amul' or 'Parle-G', identify 1 Investment, 1 Financing, 1 Dividend Decision in last 2 years.
Day 11-14	**Mind Map:** "Management as Science, Art, Profession" with 2 points + 1 local example for each.
Day 15-17	**Case Study:** Solve 3 NCERT cases on Principles of Management. Identify principle + value violated + 1 suggestion.
Day 18-21	**Local Survey:** Visit 2 Lalganj shops. Ask: How do you arrange capital? Equity or Loan? Why? Write factors in 120 words.
Day 22-23	**Worksheet:** 20 MCQs + 5 Case-based questions on all 3 chapters.
Day 24-26	**Poster:** A4 poster on "Effectiveness vs Efficiency" with examples from cricket/kitchen/school.
Day 27-28	**Article:** "Why should even a small kirana shop need management?" 200 words.
Day 29-30	**Self-Test:** Re-attempt Block Test. Create 5 new MCQs.

Political Science

HOLIDAY HOMEWORK: BOARD EXAMINATION PROJECT WORK

I. Project Overview & Weightage

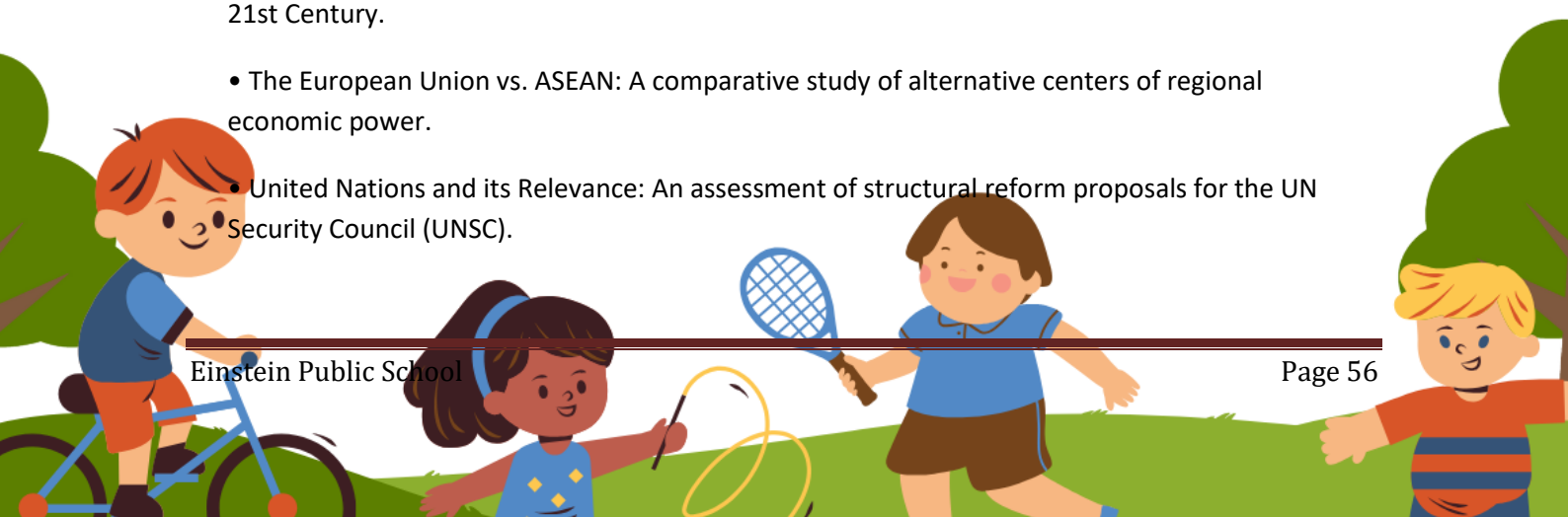
As per the mandatory board examination guidelines, every student must prepare an extensive, research-backed Project File. This project carries a total weightage of 20 Marks, which will be evaluated by an External and Internal Examiner panel during the practical board exams.

S. No.	Assessment Component	Marks Allocated
1	Introduction, Statement of Purpose, Research Question & Objectives	3 Marks
2	Literature Review, Presentation of Core Themes & Content	7 Marks
3	Critical Analysis, Conclusions, and Limitations	3 Marks
4	Viva-Voce (Based entirely on the student's project theme)	7 Marks
	Total Weightage	**20 Marks**

II. Suggested Research Topics (Choose Any four)

Students must choose a single comprehensive topic from the Class 12 curriculum, spanning either Book 1: Contemporary World Politics or Book 2: Politics in India Since Independence.

- The Evolution of India's Foreign Policy: From Non-Alignment (NAM) to Multi-Alignment in the 21st Century.
- The European Union vs. ASEAN: A comparative study of alternative centers of regional economic power.
- United Nations and its Relevance: An assessment of structural reform proposals for the UN Security Council (UNSC).



• The Shift from Single-Party Dominance to Coalition Politics: An analysis of Indian general elections from 1989 to the present.

• Partition of India: A human, structural, and political analysis of its long-term socio-political legacy.

• The Rise and Re-evaluation of Democratic Upsurges in India: Studying the historical shifts in mass political participation.

• Environmental Politics: Global climate agreements (from the Kyoto Protocol to the Paris Agreement) and India's sovereign environmental stance.

III. Step-by-Step Structural Format of the Project File

The final project must be compiled in an A4 size project folder, written neatly (or typed, according to school preferences) and arranged in the following strict sequential order:

1. Cover Page: Must clearly display the Project Title, Student's Name, Board Roll Number (leave blank for now), Class/Section, Subject, and Academic Session.

2. Certificate of Authenticity: A formal declaration statement to be signed by your internal guide/teacher.

3. Acknowledgment: Expressing gratitude to sources, libraries, institutions, and guides.

4. Table of Contents (Index): Highlighting the chapters and corresponding page numbers.

5. Introduction & Statement of Purpose: Introducing the core topic, why it is relevant today, and what specific research questions your project intends to investigate.

6. Detailed Content / Chapterization: Structured into explicit sub-chapters:
- Chapter 1: Historical background, definitions, and context of the political event, institution, or policy.
- Chapter 2: Structural analysis, data presentation, core political arguments, and supporting evidence (such as charts, timelines, newspaper clippings, or historical photographs).
- Chapter 3: Current status, contemporary challenges, or modern relevance of the theme.

7. Critical Analysis & Findings: The student's personal analytical insights, critical evaluation, and interpretation of the collected information.

8. Conclusion: A concise summary of the research findings.

9. Bibliography / References: Explicitly listing all secondary/primary sources used (e.g., NCERT Textbooks, books by political analysts like Rajni Kothari or Ramachandra Guha, verified web articles, and newspaper editorials from The Hindu or The Indian Express).

IV. Summer Break Execution Targets

To ensure steady progress, students are expected to complete the following foundational groundwork before the school reopens:

Target 1: Finalize the choice of the Project Topic.

Target 2: Draft a 1-page Project Proposal outlining the primary Research Question and at least three learning objectives.

Target 3: Identify and list at least 5 authentic sources (books, journals, or official reports) in a preliminary bibliography.

Target 4: Prepare a handwritten or typed rough draft of the Introduction and Chapter 1 (Historical Background) to present to the teacher for initial review on the first day of school.

Einstein PUBLIC SCHOOL
Nurturing a better tomorrow

Geography

PROJECT WORK

Class XII Geography (CBSE)

Fundamentals of Human Geography

Chapter 4 — Primary Activities

Prepared by

PGT Geography Department

Academic Session 2026-27

Projects: 2 | CBSE Board Aligned

Project 1: Types of Agriculture — A Comparative Study

Chapter 5 — Primary Activities | Fundamentals of Human Geography

Difficulty	Moderate
Format	Report with world map (10–12 pages)
Type	Individual
Key Concepts	Subsistence farming, Commercial farming, Food security

Objective:

Students will prepare a detailed comparison of subsistence farming and commercial farming using maps, photographs from newspapers or the internet, and data tables.

Background:

Agriculture is the oldest and most widespread primary activity. Based on the level of technology, market involvement, and scale of operations, it is broadly classified into subsistence and commercial farming. Understanding this distinction is fundamental to studying the geography of food production worldwide.

Content to Cover:

- Definition and characteristics of subsistence and commercial farming
- Inputs comparison: land, labour, and capital used in each type
- Output, marketability, and economic significance of both types
- Examples from India (subsistence) and the USA / Australia (commercial)
- Role of technology in transforming subsistence farming to commercial farming
- Impact of each farming type on national and global food security

Suggested Activities:

1. Draw or trace a world map showing regions where each type of agriculture is dominant — use two different colours and include a legend.
2. Create a detailed comparison table with at least 8 parameters such as: farm size, labour, capital, crop variety, output, market linkage, use of machinery, and examples.
3. Include at least 2 photographs (printed or hand-drawn) with proper captions.
4. Write a 1-page reflection: Which type of farming is more sustainable in the long term, and why?

Expected Outcome:

Students will develop a clear understanding of how farming practices vary across the world based on economic development, technology, and geography, and will be able to critically evaluate their impact on food systems.

Suggested Sources:

- NCERT Fundamentals of Human Geography — Chapter 5
- FAO (Food and Agriculture Organization) — www.fao.org
- Census of India — Agriculture data
- Current newspaper articles on Indian farming

Project 2: Plantation Agriculture — A Crop Case Study

Chapter 5 — Primary Activities | Fundamentals of Human Geography

Difficulty	Moderate
Format	Illustrated Report + map (10–12 pages)
Type	Individual or Pair
Key Concepts	Plantation farming, Colonial history, Cash crops, Export economy

Objective:

Students will choose one plantation crop — tea, coffee, rubber, or sugarcane — and prepare a comprehensive case study examining its geography, history, and economic significance.

Background:

Plantation agriculture is a large-scale commercial farming system introduced during the colonial era. It involves a single crop grown over a vast area with cheap labour and for the purpose of export. Understanding plantation agriculture helps students connect historical geography with present-day global trade patterns.

Choose Any ONE Crop:

- Tea — Assam, Darjeeling, Sri Lanka, Kenya
- Coffee — Brazil, Colombia, Ethiopia, Karnataka
- Rubber — Malaysia, Indonesia, Thailand, Kerala
- Sugarcane — Brazil, India, Cuba, Australia

Content to Cover:

- Origin and history of the chosen plantation crop in the selected region
- Climatic requirements — rainfall, temperature, altitude, and soil type
- Major producing countries with a shaded world map
- Role of colonial history in the spread and organisation of plantation farming
- Labour conditions then (colonial era) and now (modern plantations)
- Present-day economic importance: export earnings, employment, and GDP contribution
- Environmental concerns: monoculture, soil exhaustion, water usage

Suggested Activities:

5. Draw a world map highlighting the top 5 producing nations of the chosen crop — use shading with a clear legend.
6. Prepare a climate suitability chart showing the ideal temperature range and annual rainfall required for the crop.
7. Create a timeline of the crop's journey from colonial introduction to its present-day status in the global market.
8. Design an 'Export Data Table' showing the top 5 exporting countries and the percentage share of world export for your chosen crop.
9. Write a 200-word conclusion on the future of your chosen crop in the context of climate change and global demand.

Expected Outcome:

Students will understand how colonial economic structures shaped present agricultural patterns, develop map-reading and data-interpretation skills, and recognise the link between geography, history, and international trade.

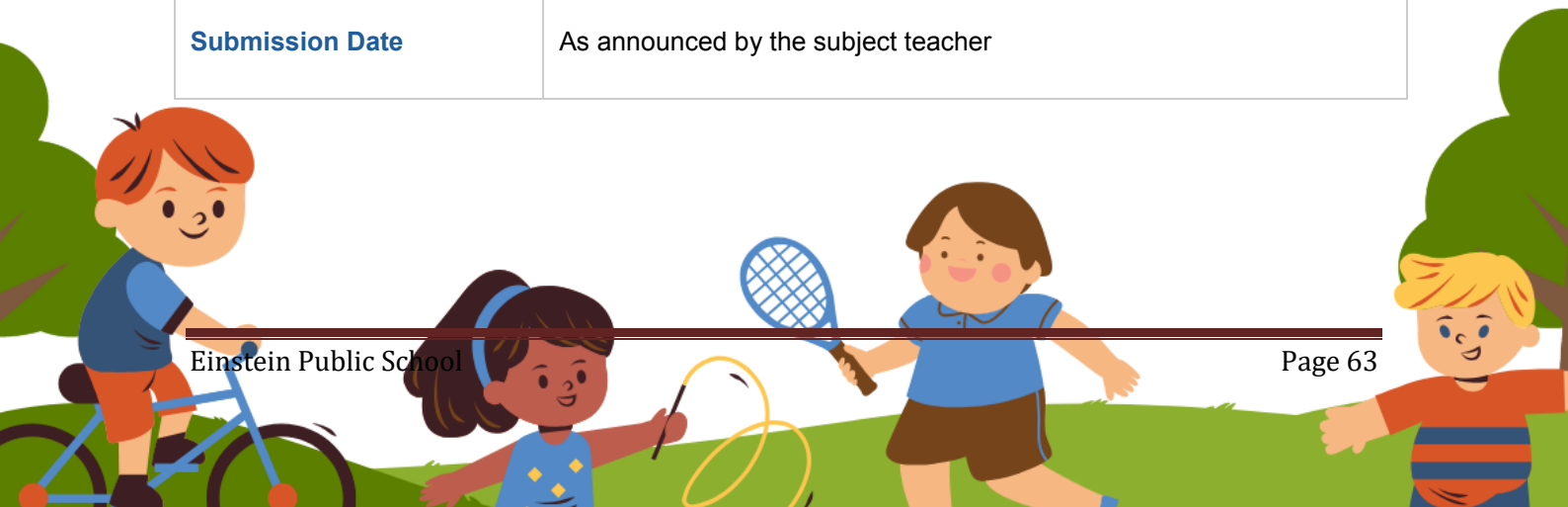
Suggested Sources:

- NCERT Fundamentals of Human Geography — Chapter 5
- FAO Crop Statistics — www.fao.org/faostat
- Tea Board of India / Coffee Board of India websites
- NCERT India People and Economy — Chapter on Agriculture

Submission Guidelines

All project files must follow the guidelines below for uniform evaluation across Einstein Public School.

Title Page	Student name, class, roll number, school name (Einstein Public School)
Minimum Length	10–12 pages including maps, graphs, data tables and diagrams
Sources / References	NCERT, FAO (UN Food & Agriculture), Census India, newspapers
Diagrams & Maps	Must be hand-drawn or printed and properly labelled
Format	Individual or pair project (as per teacher's instruction)
Submission Date	As announced by the subject teacher



Suggested Evaluation Rubric

Criterion	Description	Marks
Content & Accuracy	NCERT-aligned, factually correct, relevant	25
Maps & Diagrams	Labelled, neat, appropriate scale and legend	20
Data & Analysis	Tables, graphs, surveys, interpretation of data	20
Presentation	Layout, handwriting/typing, title page, index	15
Originality	Student's own analysis, conclusions, creativity	15
References & Sources	NCERT, FAO, Census India cited correctly	5
Total		100

Applied Maths

Section A: Multiple Choice Questions (5 Marks)

1. If a matrix has 8 elements, which of the following cannot be the order of the matrix?

a) 1x8 b) 2x4 c) 3x2 d) 8x1

2. A matrix A = $[a_{ij}]\{m/n\}$ is said to be a square matrix if:

a) m < n b) m > n c) m = n d) m = 1

3. In a scalar matrix, all non-diagonal elements are:

a) 1 b) 0 c) Any real number d) Equal to the diagonal element

4. Total number of possible matrices of order 3 × 3 with each entry 2 or 0 is

(a) 9 (b) 27 (c) 81 (d) 512

5. If a matrix has 6 elements, what are the possible orders it can have?

a)1× 6, 6×1, 2×3, 3×2 b)1×6, 6×1 c)2×3, 3×2, d)2×2

6. A square matrix $A=[a_{ij}]$ is a diagonal matrix a_{ij} =0 for:

a) i = j b)i ≠ j c) i > j d) i < j

7. If A is a 2 × 3 matrix and B is 3 × 4 matrix, the order of matrix ABS is :

a)3×3 b) 4 × 4 c) 2 × 4 d)Not defined

8. If A = $\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ then 2A is:

a) $\begin{bmatrix} 2 & 3 \\ 3 & 4 \end{bmatrix}$ **b)** $\begin{bmatrix} 1 & 2 \\ 6 & 8 \end{bmatrix}$ **c)** $\begin{bmatrix} 2 & 4 \\ 6 & 8 \end{bmatrix}$ **d)** $\begin{bmatrix} 2 & 2 \\ 3 & 4 \end{bmatrix}$

9. The value of x if $\begin{bmatrix} x+3 & 4 \\ y & -1 \end{bmatrix} = \begin{bmatrix} 5 & 4 \\ 2 & -1 \end{bmatrix}$ **is**

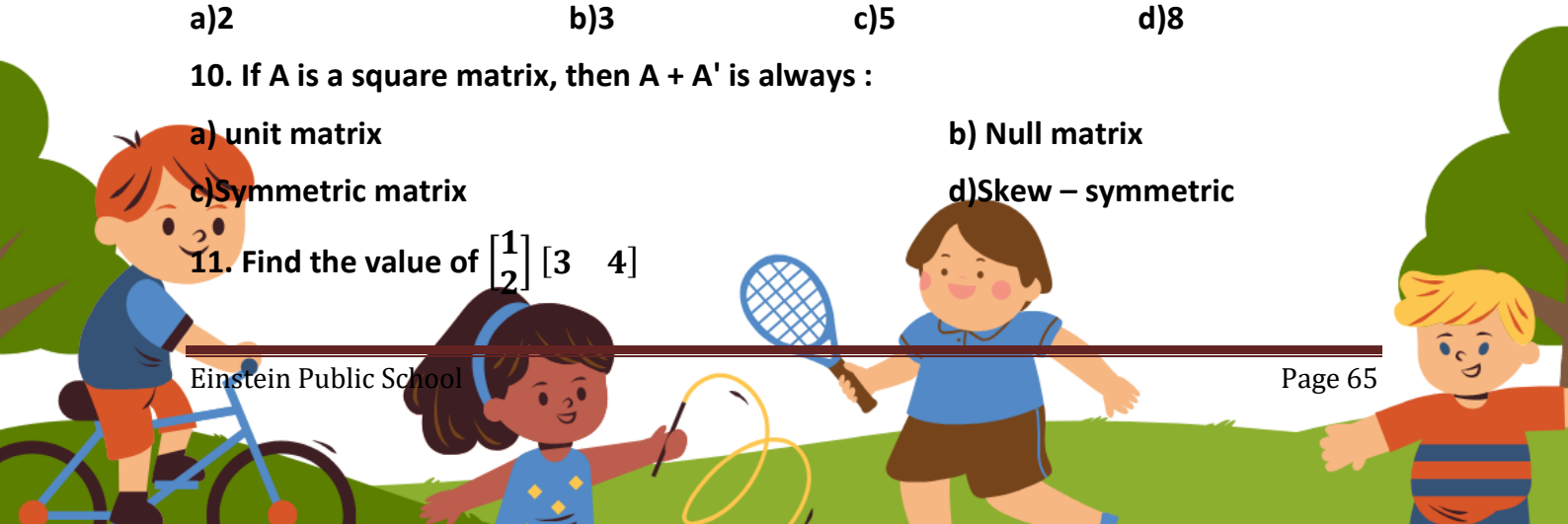
a)2 b)3 c)5 d)8

10. If A is a square matrix, then A + A' is always :

a) unit matrix b) Null matrix

c)Symmetric matrix d)Skew – symmetric

11. Find the value of $\begin{bmatrix} 1 \\ 2 \end{bmatrix} \begin{bmatrix} 3 & 4 \end{bmatrix}$



a) $\begin{bmatrix} 3 & 4 \\ 6 & 8 \end{bmatrix}$ **b) [11]** **c)** $\begin{bmatrix} 3 \\ 8 \end{bmatrix}$ **d) Not possible**

12. If A is of order m×n , then A' (transpose) is of order :

a) m×n **b) nxm** **c)n×n** **d)mxm**

13. For any square matrix A with real entries A – A, is :

Assertion & Reason

Instructions:

- (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.

14. Assertion (A): If A and B are square matrices of the same order, then AB is always equal to BA.

Reason (R): Matrix multiplication is not always commutative.

15. **Assertion (A):** The sum of two matrices A and B is possible only if they have the same order.
Reason(R): Addition of matrices is done by adding corresponding elements.

Short answer type 1 questions (2x2 =4)

9. Find the value of a if

$$\begin{bmatrix} a-b & 2a+c \\ 2a-b & 3c+d \end{bmatrix} = \begin{bmatrix} -1 & 5 \\ 0 & 13 \end{bmatrix}.$$

10. If $\begin{pmatrix} 2 & 3 \\ 5 & 7 \end{pmatrix}\begin{pmatrix} 1 & -3 \\ -2 & 4 \end{pmatrix} = \begin{pmatrix} -4 & 6 \\ -9 & x \end{pmatrix}$, write the value of x.

Short answer type 2 questions (3x2 =6)

11. Let $A = \begin{pmatrix} 2 & -1 \\ 3 & 4 \end{pmatrix}, B = \begin{pmatrix} 5 & 2 \\ 7 & 4 \end{pmatrix}, C = \begin{pmatrix} 2 & 5 \\ 3 & 8 \end{pmatrix}$, find a matrix D such that $CD - AB = O$.

12. If the matrix $A = \begin{bmatrix} 0 & a & -3 \\ 2 & 0 & -1 \\ b & 1 & 0 \end{bmatrix}$ a skew symmetric matrix, find the value of 'a' and 'b'?

13. if $A = \begin{bmatrix} 2 & 4 \\ 3 & 2 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 3 \\ -2 & 5 \end{bmatrix}$, Find 3A – B.

14. **Construct a 2×2** matrix A = $[a_{ij}]$ whose elements are given by $a_{ij} = \frac{(i+j)^2}{2}$

Long answer type questions (5x1 =5)

15. Find x and y if $2\begin{bmatrix} 1 & 3 \\ 0 & x \end{bmatrix} + \begin{bmatrix} y & 0 \\ 1 & 2 \end{bmatrix} = \begin{bmatrix} 5 & 6 \\ 1 & 8 \end{bmatrix}$.

16. if A = $\begin{bmatrix} \cos\theta & \sin\theta \\ -\sin\theta & \cos\theta \end{bmatrix}$, then show that A' A = I.

17. Express the matrix A = $\begin{bmatrix} 3 & 5 \\ 1 & -1 \end{bmatrix}$ as the sum of a symmetric and a skew-symmetric matrix.

18. Find the value of a, b, c, d from the equation: $\begin{bmatrix} a-b & 2a+c \\ 2a-b & 3c+d \end{bmatrix} = \begin{bmatrix} -1 & 5 \\ 0 & 13 \end{bmatrix}$

19. **if A =** $\begin{bmatrix} 1 & 2 & 3 \\ 3 & -2 & 1 \\ 4 & 2 & 1 \end{bmatrix}$, then show that A^3- 23A-40I=0

20. **if A =** $\begin{bmatrix} 0 & 6 & 7 \\ -6 & 0 & 8 \\ 7 & -8 & 0 \end{bmatrix}$, **B =** $\begin{bmatrix} 0 & 1 & 1 \\ 1 & 0 & 2 \\ 1 & 2 & 0 \end{bmatrix}$, **C =** $\begin{bmatrix} 2 \\ -2 \\ 3 \end{bmatrix}$ Calculate AC,BC and (A+B)C.

Case study (4 marks)

21. Two schools P and Q want to award their selected students on the values of Tolerance, Kindness, and Leadership. The school P wants to award Rs x each, Rs y each and Rs z each for the three respective values to 3, 2 and 1 students respectively with total award money of Rs. 2200.

School Q wants to spend Rs 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 P). If the total amount of award for one prize on each value is Rs1200, using matrices, find the following:

i. What is award money for Tolerance?
   a) 350 b) 300 c) 500 d) 400
ii. What is the award money for Leadership?
   a) 300 b) 280 c) 450 d) 500
iii. What is the award money for Kindness?
   a) 500 b) 400 c) 300 d) 550
iv. If a matrix A is both symmetric and skew-symmetric, then
   a) A is a diagonal matrix b) A is a scalar matrix
   c) A is a zero matrix d) A is a square matrix