Einstein
PUBLIC SCHOOL
Nurturing a better tomorrow

SUMMER Holidays

HOMEWORK

CLASS XI

Hindi

निर्देश:

1. सभी कार्य A4 साइज प्रोजेक्ट फाइल में सुंदर लिखावट व चित्रों सहित करें।
2. शब्द सीमा का ध्यान रखें।

3. ग्रीष्मकालीन अवकाश गृहकार्य का मूल्यांकन आंतरिक मूल्यांकन परीक्षा के अंतर्गत किया जाएगा जिसके लिए हिंदी विषय में 20 अंक निर्धारित है।

प्रश्न 1: डायरी लेखन

पाठ: 'नमक का दरोगा' - आरोह भाग-1

कार्य: स्वयं को 'मुंशी वंशीधर' मानकर उस रात की डायरी लिखिए जब पंडित अलोपीदीन ने रिश्वत दी और आपने ठुकरा दी। मन की उथल-पुथल, ईमानदारी का गर्व और कर्तव्य-बोध लिखिए। (150-200 शब्द)

प्रश्न 2: पत्र लेखन

पाठ: 'अभिव्यक्ति और माध्यम' पर आधारित कार्य: आपके मोहल्ले में जल जमाव की समस्या है। नगर निगम अधिकारी को शिकायती पत्र लिखिए जिसमें समस्या, कारण और समाधान के सुझाव हों। (120-150 शब्द)

प्रश्न 3: विज्ञापन लेखन कला एकीकरण

पाठ: 'भारतीय गायिकाओं में बेजोड़: लता मंगेशकर' वितान भाग-1

कार्य: विद्यालय में 'संगीत महोत्सव' के लिए A4 साइज रंगीन पोस्टर बनाइए। आकर्षक स्लोगन, तिथि, समय, स्थान और मुख्य आकर्षण लिखिए। लता जी की गायन शैली से प्रेरित 2 पंक्तियाँ भी जोड़िए।

प्रश्न 4: संवाद लेखन

पाठ: 'मियाँ नसीरुद्दीन' - आरोह भाग-1

कार्य: मियाँ नसीरुद्दीन अपने काम को 'कला' मानते थे। आप और आपके क्षेत्र के किसी हस्तशिल्पकार (कुम्हार/बुनकर/दर्जी) के बीच संवाद लिखिए। उसमें कारीगर के संघर्ष, कला के प्रति प्रेम और नई पीढ़ी की उदासीनता पर चर्चा हो। (12-15 संवाद)

प्रश्न 5: चरित्र-चित्रण

पाठ: 'नमक का दरोगा' आरोह भाग-1 -

कार्य: पंडित अलोपीदीन और मुंशी वंशीधर के चरित्र का तुलनात्मक चित्रण कीजिए। दोनों के मूल्यों, व्यवहार और सोच में अंतर को सारणी बनाकर स्पष्ट कीजिए। साथ में एक नैतिक संदेश भी लिखिए।

छुट्टियों का सदुपयोग करें। शुभकामनाएँ!

English

Complete the work in a separate notebook.

Q. 1 Answer each question in 30–40 words. (The Portrait of a Lady)

i. Why was it hard for the author to believe that the grandmother was once young and pretty?

ii. The grandmother has been portrayed as a very religious lady. What details in the story create this impression?

iii. The grandmother was a kind -hearted woman. Give examples in support of your answer.

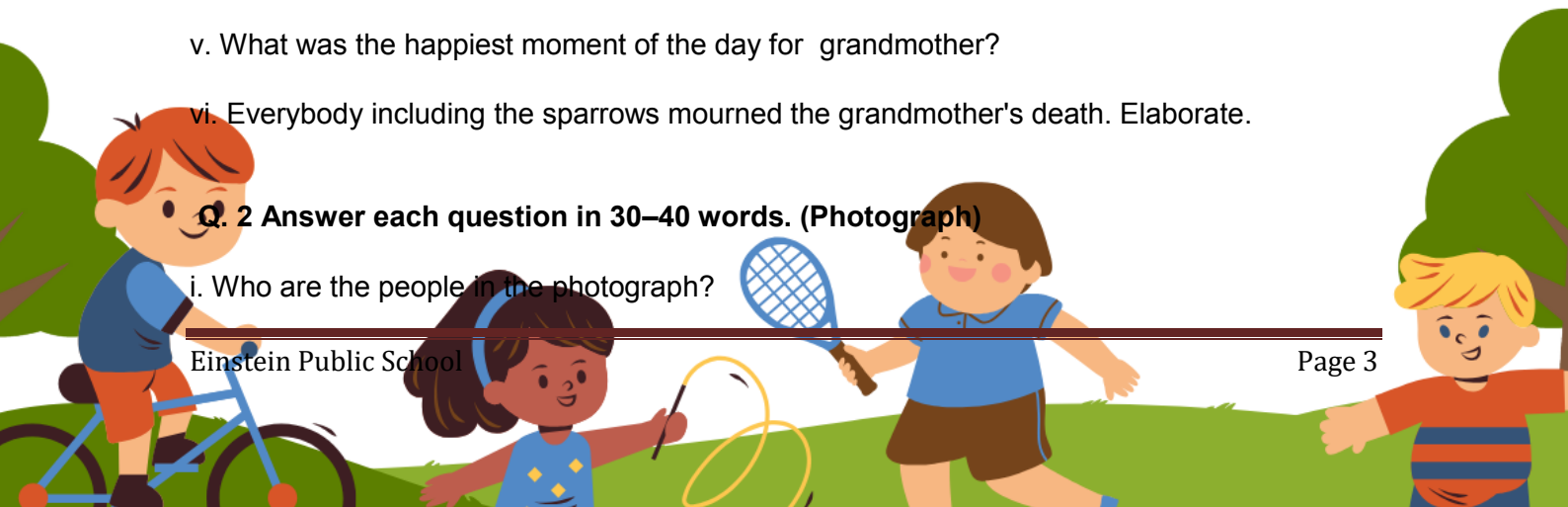
iv. Draw a comparison between the author's village school education and city school education.

v. What was the happiest moment of the day for grandmother?

vi. Everybody including the sparrows mourned the grandmother's death. Elaborate.

Q. 2 Answer each question in 30–40 words. (Photograph)

i. Who are the people in the photograph?



ii. What was the mother doing in the photograph?
iii. How is the sea described in the poem?
iv. What does “terribly transient feet” mean?
v. What changes have taken place over time?
vi. How does the poem show loss and passage of time?

Q. 3 Prepare a Tense Table including:
All 12 tenses
Helping verbs
Verb forms (V1, V2, V3, V-ing)
Make it clear, neat, and well-organized.

Q. 4 Read at least 5 short English stories.
While reading, note down:
New words
Idioms/phrases
Be ready to share your learning in class.

Maths

1. The number of elements in the Power set P(S) of the set S = [[Φ] , 1, [2, 3]] is

A. 4 B. 8 C. 2 D. None of these

2. If A and B are sets and A∪ B= A ∩ B, then

A. A= Φ B. B= Φ C. A=B D. None of these

3. Let S be an infinite set and S1, S2, S3, ..., Sn be sets such that S1 ∪S2 ∪ S3∪....Sn = S then

A. at least one of the sets Si is a finite set
B. not more than one of the set Si can be infinite
C. at least one of the sets Si is an infinite set
D. none of these

4. If A be a finite set of size n, then number of elements in the power set of A x A

A. 2^2 B. 2^n C. n^2 D. none of these

5. Total number of different partitions of a set having four elements is

A. {0} B. Ø C. { } D. Both (b) & (c)

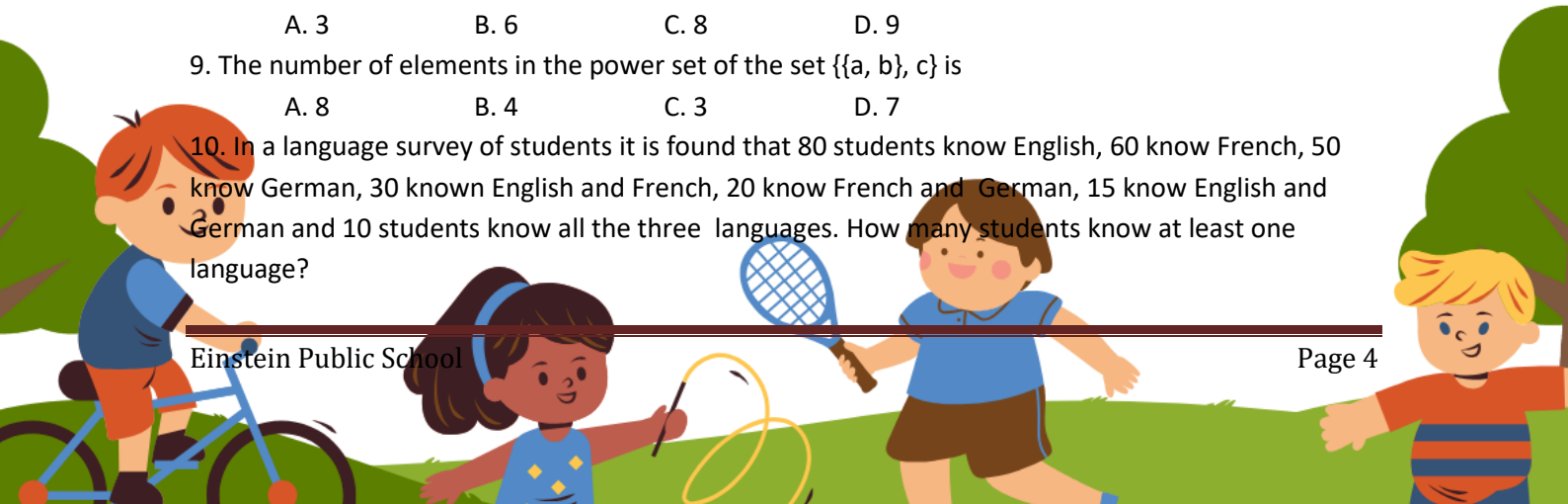
8. Number of subsets of a set of order three is

A. 3 B. 6 C. 8 D. 9

9. The number of elements in the power set of the set {{a, b}, c} is

A. 8 B. 4 C. 3 D. 7

10. In a language survey of students it is found that 80 students know English, 60 know French, 50 know German, 30 known English and French, 20 know French and German, 15 know English and German and 10 students know all the three languages. How many students know at least one language?



A. 135 B. 30 C. 10 D. 45

Assertion & reason Based questions

11. Assertion (A): The group of "all skilled workers" in a factory is not a well-defined set.
Reason (R): The term "skilled" is subjective and lacks a precise, measurable criterion, making the collection not well defined.

12. Assertion (A): The set of ingredients for a cheese pizza, {dough, tomato sauce, cheese), is equal to the set of ingredients for a "classic pizza," (cheese, dough, tomato sauce).
Reason (R): The order in which elements are listed in a set does not change the set's identity.

13. Assertion (A): In biological classification, the set of all 'Tigers' is a proper subset of the set of all 'Mammals'.
Reason (R): Every tiger is a mammal, but there are many other mammals (like elephants) that are not tigers.

14. Assertion (A): An email spam filter places emails into a 'Spam' folder (Set S). The set of all emails in your main 'Inbox' can be represented as S'.
Reason (R): The complement S' contains all emails from the universal set of incoming mail that are not in the set S.

15. Assertion (A): If a software program's Version 2.0 (Set V2) has all the features of Version 1.0 (Set V1) plus some new ones, then the set of
new features is represented by V2 - V1.
Reason (R): The difference of sets A - B contains only the elements that are in A but not in B.

Very Short Answer type 1

16. Is "the collection of all talented writers in India" a set?
17. Write the set A = {x : xin Z, -2 < x < 3} in roster form.
18. Is A = {x : x , 3 < x < 4 } an empty set ?
19. Determine if the set of all lines parallel to the x-axis is finite or infinite
20. Are sets A = {1, 2, 3} and B = {3, 1, 2} equal?
21. If A = {a, b}, write all possible subsets of A
22. If A is empty set then, find cardinality of P(P(P(A)))
23. If A = {a, b , c }, write all possible subsets of P(A).
24. If A is empty set then P(A) ?
25. Define proper and improper subsets with example
25. State and prove De- Morgan's Law
26. Define ne complement of A sets with examples
27. If U = {1, 2, 3, 4, 5, 6} and A = {2, 4, 6} find A'?
28. If n(A) = 3 and n(B) = 2 , find the maximum number of elements in AUB .
29. What is venn - diagrams explain with three examples
30. Define Symmetric difference with 2 examples

Short answer type

31. If A = {x : x is a prime number less than 20} and B = {x : x is an odd natural number less than 20}, find A ∩ B and A − B.

32. Let U = {1, 2, 3, ..., 15}, A = {2, 4, 6, 8, 10, 12, 14}, and B = {3, 6, 9, 12, 15}. Find (A ∪B)'.

33. If n(A) = 25, n(B) = 18, and n(A ∩ B) = 7, find n(A ∪ B).

34. In a class of 50 students, 28 like Mathematics, 22 like Science, and 10 like both. How many students like neither Mathematics nor Science?

35. Prove that:

$$A - (B \cup C) = (A - B) \cap (A - C)$$

36. If A = {1, 2, 3, 4, 5} and B = {2, 4, 6, 8}, verify whether A ⊆ B.

37. Let A = {x : $x^2 - 5x + 6 = 0$}. Write the set in roster form.

38. If A = {x : x is a factor of 24} and B = {x : x is an even factor of 24}, find A ∩ B and check whether B ⊆ A.

39. Using Venn diagram laws, simplify:

(A ∩ B) ∪ (A ∩ B')

40. Let A = {1, 3, 5, 7, 9} and B = {2, 3, 5, 7, 11}. Find the symmetric difference A Δ B.

41. If A = {x : x ∈ Z, −3 ≤ x ≤ 3}, list all elements of set A.

42. In a survey of 80 students, 45 play cricket, 32 play football, and 15 play both games. Find how many students play only cricket.

43. Prove that: (A ∪ B)' = A' ∩ B' using De Morgan's Law.

44. If A = {a, b, c, d} and B = {c, d, e, f}, find: A ∪ B, A ∩ B, A − B

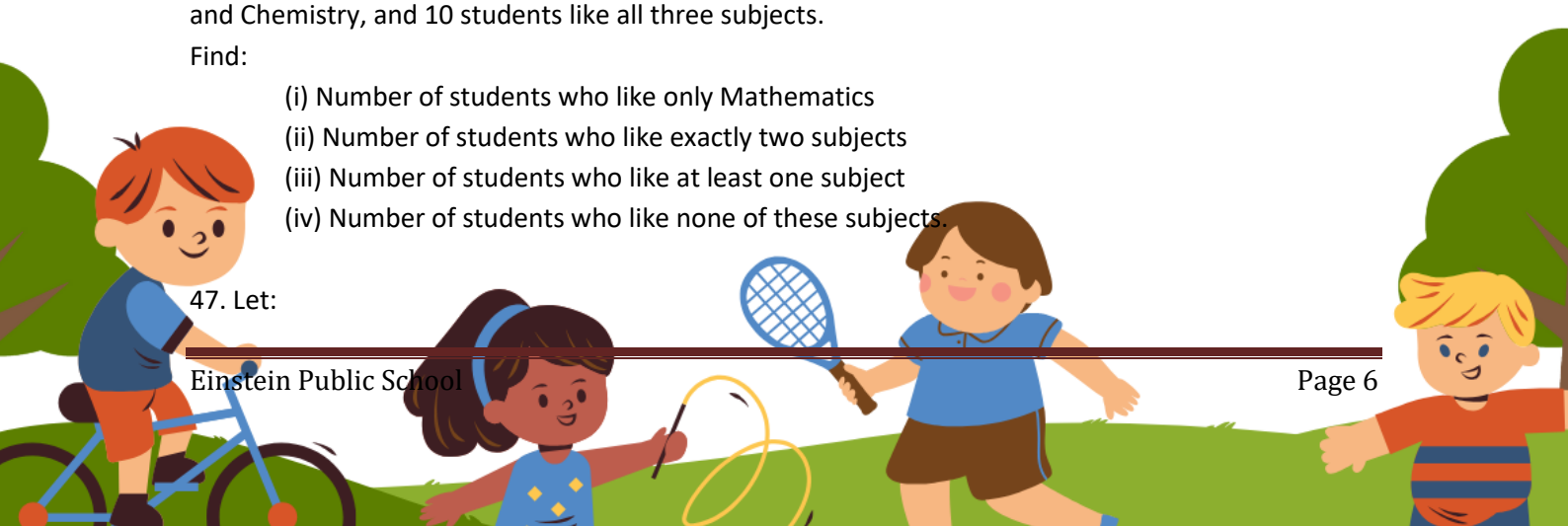
45. Three sets A, B, and C are such that:
n(A) = 20, n(B) = 18, n(C) = 15
n(A ∩ B) = 5, n(B ∩ C) = 4, n(A ∩ C) = 3
n(A ∩ B ∩ C) = 2
Find n(A ∪ B ∪ C).

Case Based questions

46. In a survey of 120 students, 65 students like Mathematics, 55 like Physics, and 45 like Chemistry. 30 students like both Mathematics and Physics, 25 like Physics and Chemistry, 20 like Mathematics and Chemistry, and 10 students like all three subjects.
Find:

(i) Number of students who like only Mathematics
(ii) Number of students who like exactly two subjects
(iii) Number of students who like at least one subject
(iv) Number of students who like none of these subjects.

47. Let:



A = {x : x is a factor of 60}
B = {x : x is a prime factor of 60}
C = {x : x is an even factor of 60}

Find:

(i) $A \cap B$

(ii) $A \cap C$

(iii) $(A - C)$

(iv) Verify whether $B \subseteq A$ and $C \subseteq A$

(v) Draw the Venn diagram representing the sets.

48. Prove the following identities using laws of sets:

(i) $A - (B \cap C) = (A - B) \cup (A - C)$

(ii) $(A \cup B) \cap (A \cup C) = A \cup (B \cap C)$

49. In a group of 150 people: 80 people like Tea, 70 like Coffee, 50 like Juice, 35 like both Tea and Coffee, 25 like Coffee and Juice, 20 like Tea and Juice, and 10 like all three drinks.
Find:
(i) Number of people who like only Tea
(ii) Number of people who like only Coffee
(iii) Number of people who like only Juice
(iv) Number of people who like exactly one drink
(v) Number of people who like none of these drinks.

50. Let:
U = {1,2,3,4,5,6,7,8,9,10,11,12}
A = {2,4,6,8,10,12}
B = {1, 2, 3, 4, 5, 6}
C = {3, 6, 9, 12}

Find:

(i) $A \cup B$

(ii) $A \cap B$

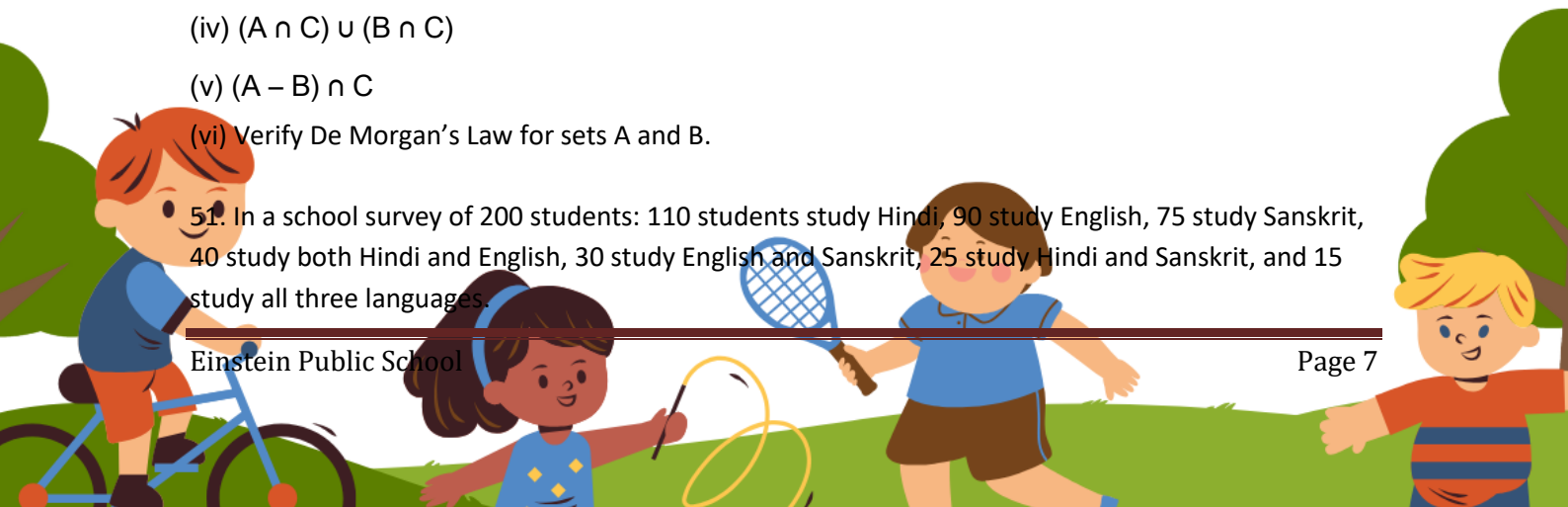
(iii) $(A \cup B)'$

(iv) $(A \cap C) \cup (B \cap C)$

(v) $(A - B) \cap C$

(vi) Verify De Morgan's Law for sets A and B.

51. In a school survey of 200 students: 110 students study Hindi, 90 study English, 75 study Sanskrit, 40 study both Hindi and English, 30 study English and Sanskrit, 25 study Hindi and Sanskrit, and 15 study all three languages.



Find:
(i) Number of students studying only Hindi
(ii) Number of students studying only English
(iii) Number of students studying only Sanskrit
(iv) Number of students studying exactly two languages
(v) Number of students studying at least one language
(vi) Number of students studying none of these languages.

Long Answer type questions

52. Let:

$A = \{x \in N : x \leq 30 \text{ and } x \text{ is divisible by } 2\}$

$B = \{x \in N : x \leq 30 \text{ and } x \text{ is divisible by } 3\}$

$C = \{x \in N : x \leq 30 \text{ and } x \text{ is divisible by } 5\}$

Find:

(i) $A \cup B \cup C$

(ii) $A \cap B \cap C$

(iii) Number of elements in $A \cup B \cup C$

(iv) Number of elements which are divisible by exactly one of the numbers 2, 3, and 5.

53. In a survey of 200 students: 120 students like Mathematics, 90 like Physics, 80 like Chemistry, 50 like both Mathematics and Physics, 40 like Physics and Chemistry, 30 like Mathematics and Chemistry, and 20 like all three subjects.
Find:
(i) Number of students who like only Mathematics
(ii) Number of students who like exactly two subjects
(iii) Number of students who like at least one subject
(iv) Number of students who like none of these subjects.

54. Let:
$U = \{1,2,3,...,20\}$

$A = \{x \in U : x \text{ is prime}\}$

$B = \{x \in U : x \text{ is even}\}$

$C = \{x \in U : x \text{ is a multiple of } 3\}$

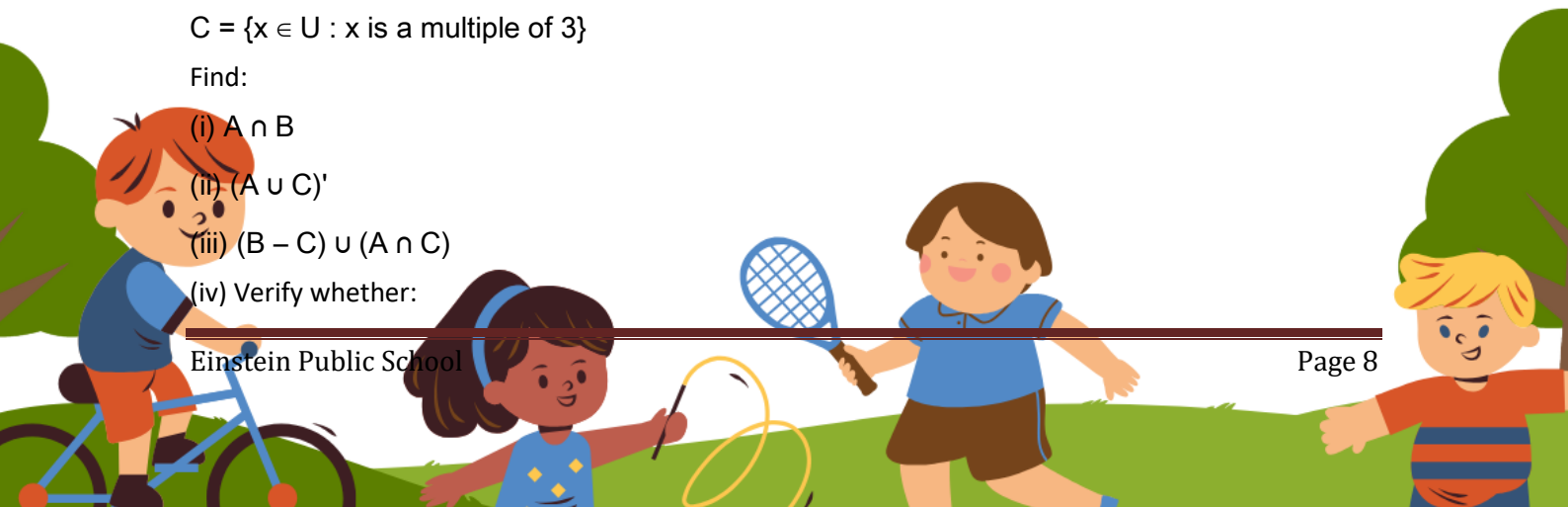
Find:

(i) $A \cap B$

(ii) $(A \cup C)'$

(iii) $(B - C) \cup (A \cap C)$

(iv) Verify whether:



$(A \cup B)' = A' \cap B'$

55. Prove the following identities using algebra of sets:

(i) $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$

(ii) $(A - B) - C = A - (B \cup C)$

(iii) $(A \cup B) - C = (A - C) \cup (B - C)$

56. Let:

$A = \{x : x^2 - 7x + 12 = 0\}$

$B = \{x : x^2 - 5x + 6 = 0\}$

$C = \{x : x^2 - 8x + 15 = 0\}$

Find:

(i) A, B, and C in roster form

(ii) $A \cup B \cup C$

(iii) $A \cap B$

(iv) $(A \cup C) - B$

57. In a city survey:

60% families read newspaper A,

45% read newspaper B,

30% read newspaper C,

20% read both A and B,

15% read both B and C,

10% read both A and C,

and 5% read all three newspapers.

Find:

(i) Percentage of families reading at least one newspaper

(ii) Percentage of families reading exactly one newspaper

(iii) Percentage of families reading none of these newspapers.

58. Let:

$A = \{x \in Z : -5 \leq x \leq 5\}$

$B = \{x \in Z : x^2 < 16\}$

$C = \{x \in Z : x \text{ is odd}\}$

Find:

(i) $A \cap B$

(ii) $B \cap C$

(iii) $(A - C)$

(iv) $(A \cup B) \cap C$

(v) Number of subsets of $A \cap B$.

59. If:
$n(A) = 50$,
$n(B) = 45$,
$n(C) = 40$,
$n(A \cap B) = 20$,
$n(B \cap C) = 18$,
$n(A \cap C) = 15$,
$n(A \cap B \cap C) = 8$,

Find:

(i) $n(A \cup B \cup C)$

(ii) Number of elements belonging to exactly two sets

(iii) Number of elements belonging to only one set.

60. Let:
$A = \{1,2,3,4,5,6,7,8,9,10\}$
$B = \{2,4,6,8,10\}$
$C = \{1,3,5,7,9\}$

Prove that:

(i) $B \cap C = \phi$

(ii) $B \cup C = A$

(iii) $B' = C$ with respect to universal set A

(iv) $(B \cap C)' = B' \cup C'$

(v) Verify De Morgan's Laws using these sets.

Accountancy

Chapters 1 to 5

Instructions:

1.Write all answers in neat handwriting.

2.Use separate notebook pages for each section.

3.Draw tables wherever required.

4.Submit holiday homework after summer vacation.

A Very Short Answer Questions

1.Define accounting.

2. What is bookkeeping?

3.Name any two users of accounting information.

4.What is a business transaction?

5.Define assets.

6.What are liabilities?

7.What is capital?

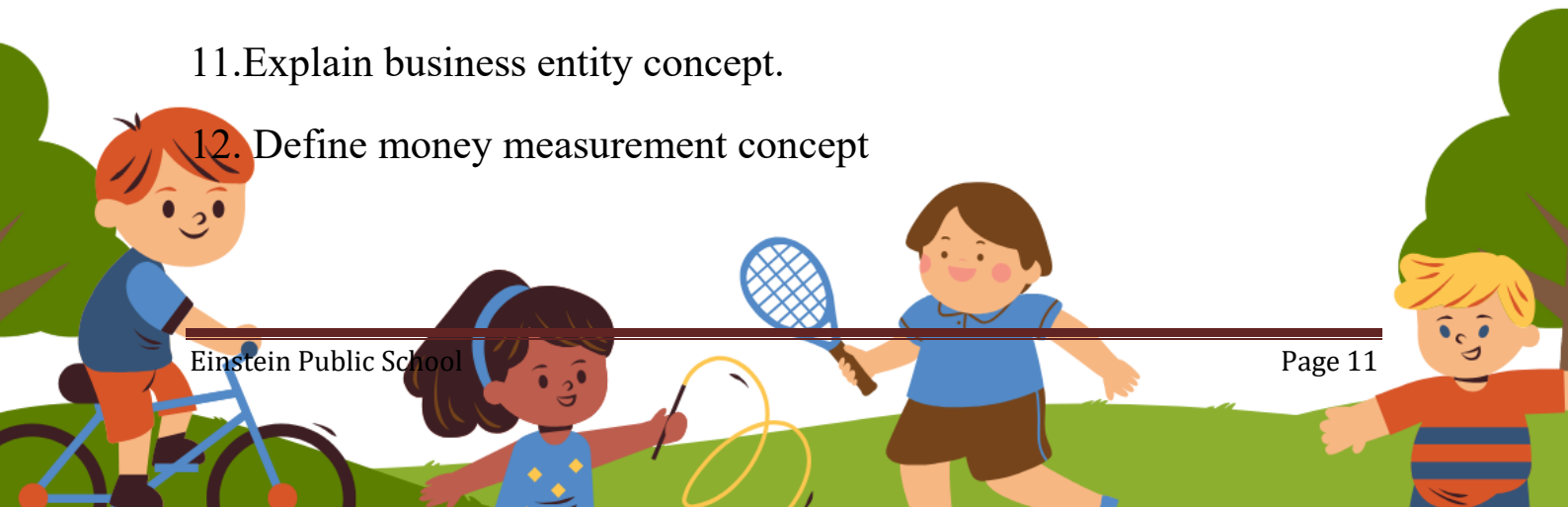
8. Write the accounting equation.

9.Define accounting principles.

10.What is GAAP?

11.Explain business entity concept.

12. Define money measurement concept



B.Short Answer Questions

1.Explain the objectives of accounting.

2.Differentiate between accounting and bookkeeping.

3.Explain the qualitative characteristics of accounting information.

4.State the limitations of accounting.

5.State any four accounting assumptions.

C. Long Answer Questions

1.Explain the advantages and limitations of accounting in detail.

2.Describe the role of accounting in modern business.

3.Explain various accounting concepts in detail.

4.Discuss accounting standards and their importance.

5.Solve questions no.24,25,27,29 from accounting equation.

D.MCQs

1. The process of recording financial transactions is called:

(a) Auditing (b) Accounting

(c) Bookkeeping (d) Costing

2.Assets = Liabilities +

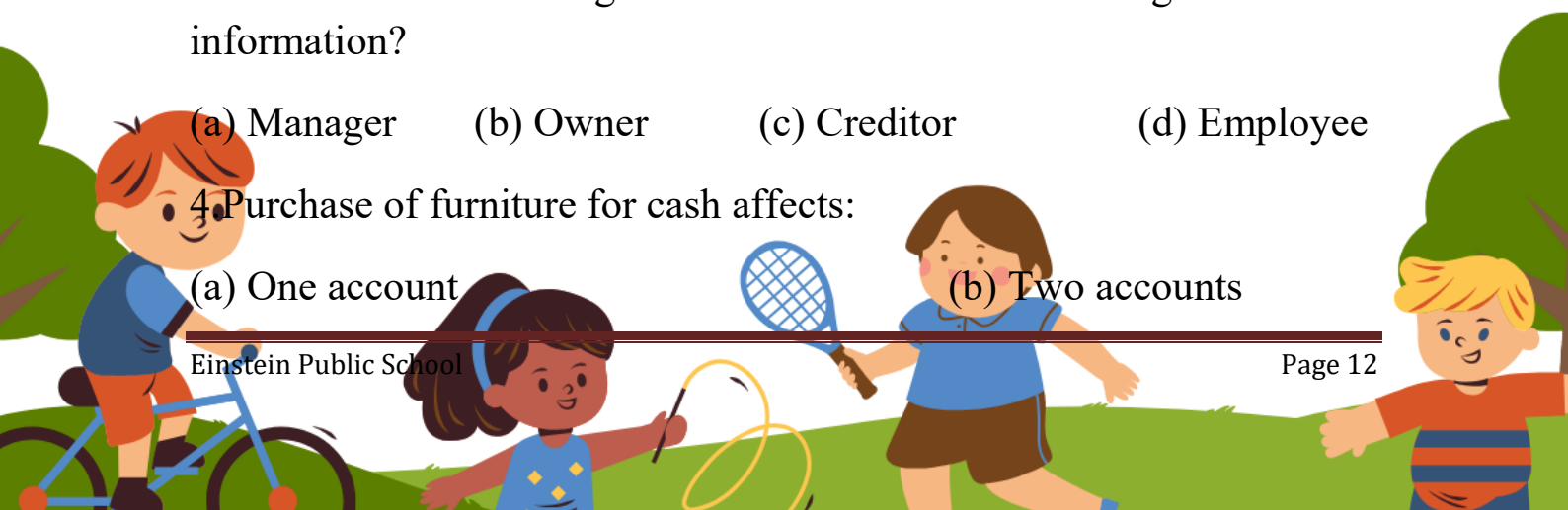
(a) Sales (b) Capital (c) Purchases (d) Expenses

3.Which of the following is an external user of accounting information?

(a) Manager (b) Owner (c) Creditor (d) Employee

4.Purchase of furniture for cash affects:

(a) One account (b) Two accounts



(c) Three accounts (d) No account

5.Salary paid is:

(a) Asset (b) Income (c) Expense (d) Liability

6.Personal accounts are related to:

(a) Expenses (b) Persons (c) Assets (d) Income

Project Work

Activity 1

Prepare a chart showing:

Types of Accounts

Rules of Debit and Credit

Accounting Equation

Business Studies

Chapters:

1.Evolution and Fundamentals of Business

2.Forms of Business Organisation

Instructions:

1.Write all answers in neat handwriting.

2.Use separate notebook pages for each section.

3.Draw tables wherever required.

4.Submit holiday homework after summer vacation.

Section A - Very Short Answer Questions (Answer in 20-30 words)

Q1.Define business activity.

Q2.What is meant by profession?

Q3.State any two features of a sole proprietorship.

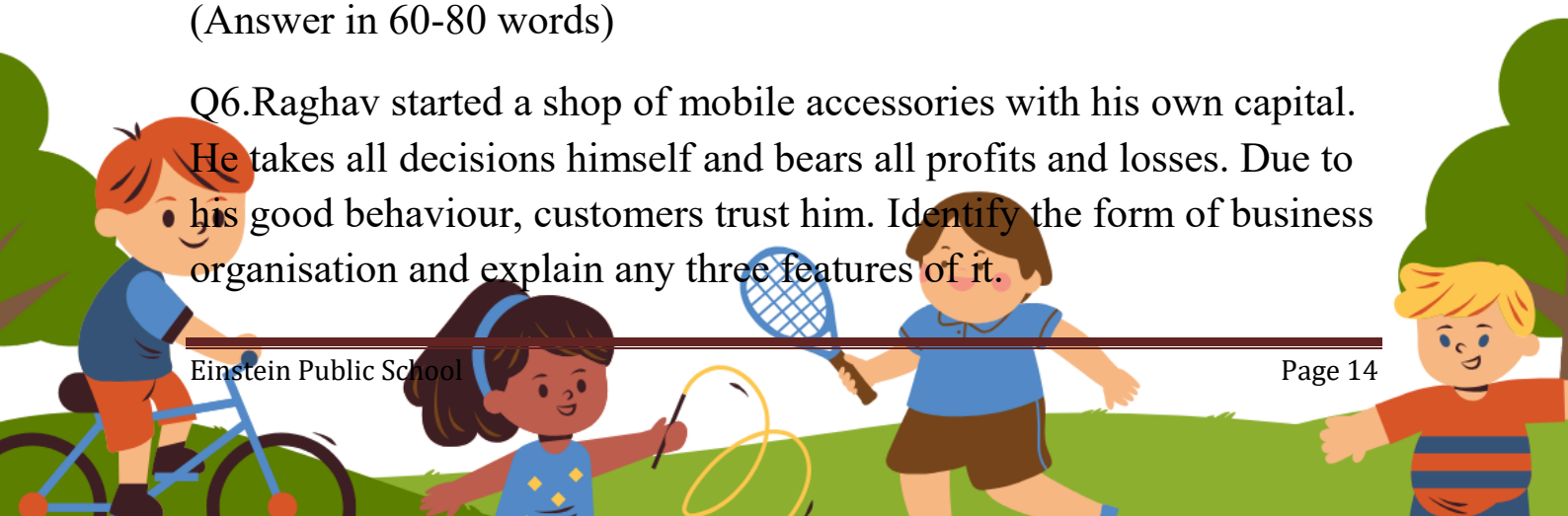
Q4.What is a cooperative society?

Q5.Differentiate between business and employment on the basis of reward.

Section B - Short Answer Questions (Case Study Based)

(Answer in 60-80 words)

Q6.Raghav started a shop of mobile accessories with his own capital. He takes all decisions himself and bears all profits and losses. Due to his good behaviour, customers trust him. Identify the form of business organisation and explain any three features of it.



Q7.Four farmers of a village formed an organisation to purchase seeds and fertilizers at low prices for all members. Every member has equal voting rights.

Identify the form of organisation and explain its advantages.

Q8.A group of doctors opened a hospital together. They contributed capital, shared profits equally and took decisions jointly. Their agreement was written and registered.

Identify the form of business organisation and explain any three features of it.

Q9. "Fresh Bite Foods Ltd." is a large company producing packaged food products across India. The company has a separate legal identity and limited liability of members.

Identify the form of organisation and explain any three merits of this form of business.

Section C - Long Answer Questions (Case Study Based)

(Answer in 120-150 words)

Q10.Arjun wanted to start a garment business. Initially, he started alone, but due to expansion he included his friend Mohit as a business partner. After a few years, they converted the business into a private company to raise more capital and expand nationally.

Answer the following questions:

1.Which form of business did Arjun start initially?

2.Why did he include a partner later?

3.State any four features of partnership.

Why did they convert the business into a company?

4.State any two advantages of a company form of organisation.

Q11."Green Village Dairy Cooperative" was formed by milk producers of a village. The society collects milk from members and sells it in nearby cities. Profits are distributed among members equally.

On the basis of the above case, answer the following:

1.What is meant by cooperative society?

2.State any four characteristics of cooperative society.

3.Explain any four advantages of cooperative societies.

4.Why is the principle of service more important than profit in such organisations?

Section D - MCQs (Assertion & Reason Type)

Q12.Assertion (A): Business activities are undertaken to earn profit.

Reason (R): Profit is essential for the survival and growth of business.

(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

Q13. Assertion (A): A sole proprietorship has unlimited liability.

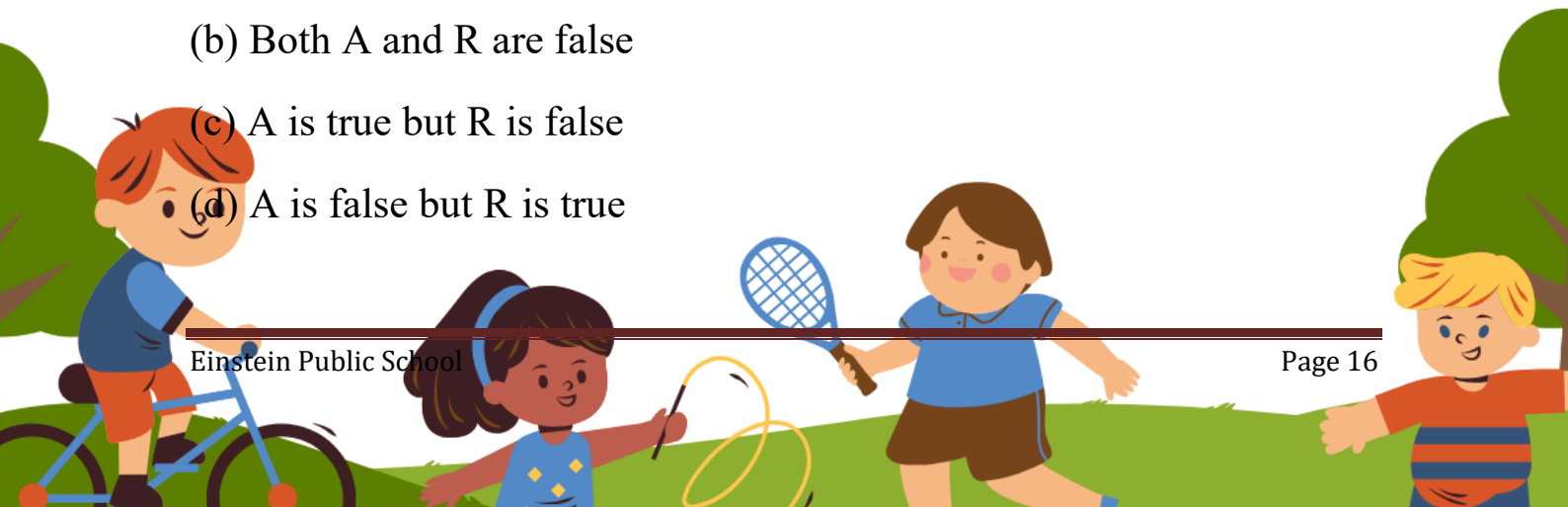
Reason (R): The owner and business are legally separate entities.

(a) Both A and R are true

(b) Both A and R are false

(c) A is true but R is false

(d) A is false but R is true



Q14. Assertion (A): Cooperative societies follow democratic management.

Reason (R): Every member has one vote.

(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

Q15. Assertion (A): Partnership business can have more financial resources than sole proprietorship.

Reason (R): Partnership business has only one owner.

(a) Both A and R are true

(b) Both A and R are false

(c) A is true but R is false

(d) A is false but R is true

Q16. Assertion (A): A company has perpetual succession.

Reason (R): A company is affected by death or insolvency of members.

(a) Both A and R are true

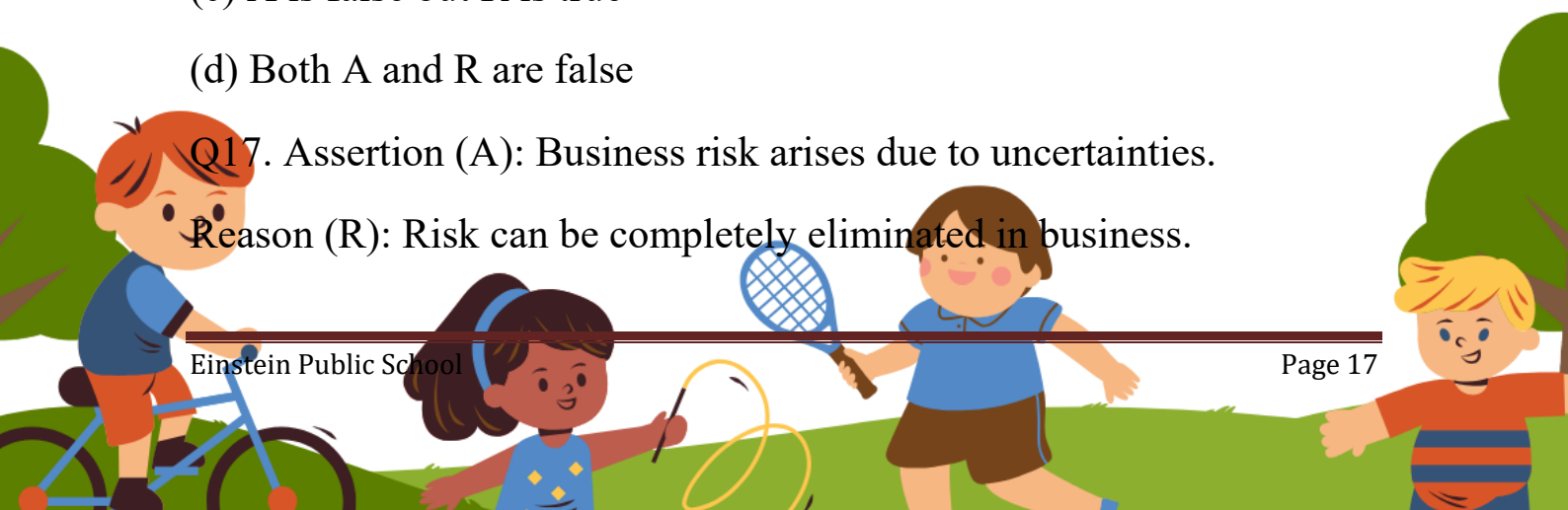
(b) A is true but R is false

(c) A is false but R is true

(d) Both A and R are false

Q17. Assertion (A): Business risk arises due to uncertainties.

Reason (R): Risk can be completely eliminated in business.



(a) Both A and R are true

(b) A is true but R is false

(c) A is false but R is true

(d) Both A and R are false

Q18. Assertion (A): Registration of partnership firm is compulsory in India.

Reason (R): Unregistered firms cannot file a case against third parties.

(a) Both A and R are true

(b) Both A and R are false

(c) A is false but R is true

(d) A is true but R is false

Q19. Assertion (A): Companies can raise large financial resources.

Reason (R): Companies issue shares to the public.

(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

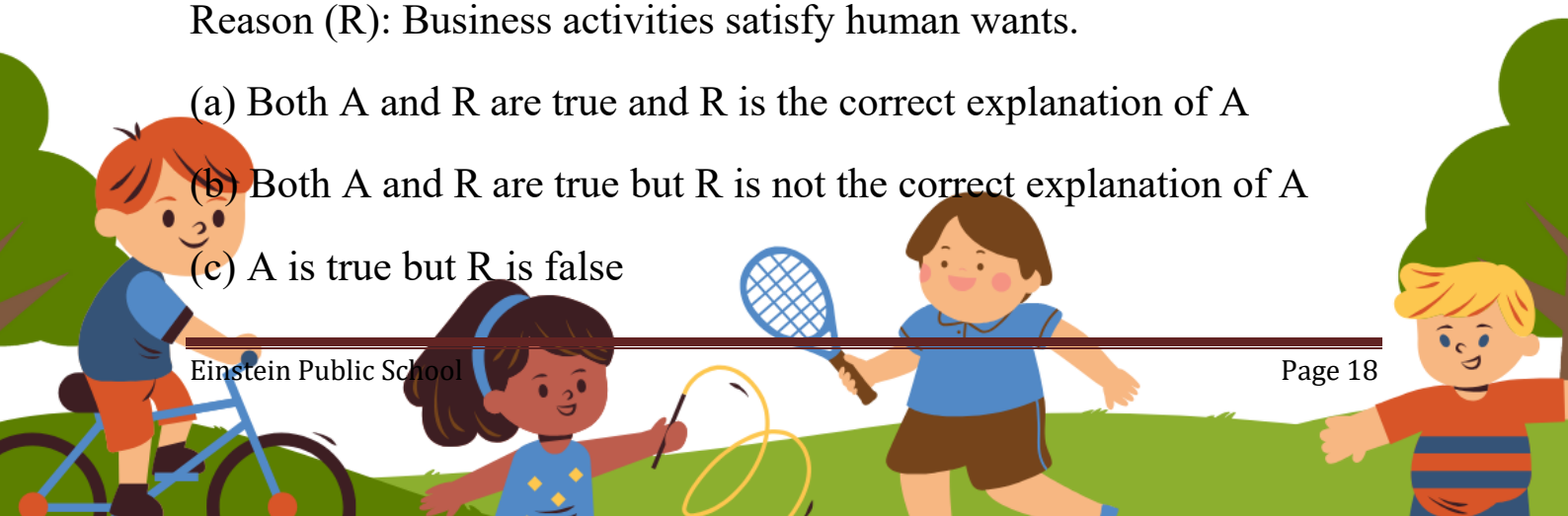
Q20. Assertion (A): Business includes production and distribution of goods and services.

Reason (R): Business activities satisfy human wants.

(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

Q21. Assertion (A): Hindu Undivided Family business is governed by Hindu Succession Act.

Reason (R): Membership is acquired by birth.

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

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

(c) A is true but R is false

(d) A is false but R is true

Project Work / Activity

Q22. Prepare a Chart or PPT on:

"Comparison of Different Forms of Business Organisation" Include:

Sole Proprietorship

Partnership

Joint Hindu Family Business

Cooperative Society

Company

Physics

Class: XI | Total Questions: 60 (Theory, Numerical & MCQs)

Dear Students,

Welcome to Class 11! This structured summer assignment contains exactly 60 curated questions distributed into foundational theory, dimensional analysis applications, core graphical interpretations, and standard multiple-choice questions (MCQs). This packet is specifically designed to optimize your calculation speed and core theoretical mastery before school resumes.

- *Maintain a dedicated, clean, thin homework notebook for this Physics assignment.*
- *For descriptive and numerical questions, write out thorough step-by-step physical arguments, dimensional derivations, and calculus methods.*
- *For multiple-choice questions, write down the correct option accompanied by a brief conceptual or mathematical justification.*
- *Submission must be made directly to the subject teacher on the first working day of school reopening.*

Part A: Units and Dimensions (Q1 – Q30)

1. Conceptual, Theoretical & Dimensional Derivations

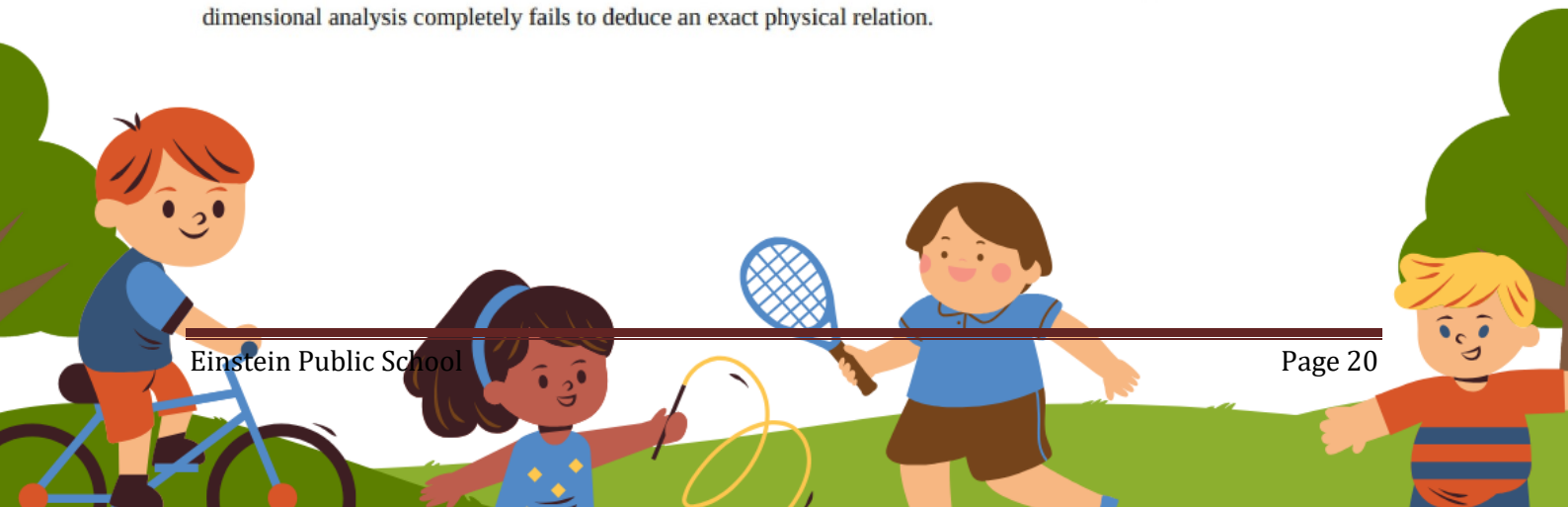
1.
Define a supplementary unit. Name the two supplementary units used in the SI system along with their standard geometric definitions and symbols.

2.
"A dimensionally correct equation may not be a physically correct equation, but a physically incorrect equation must be dimensionally incorrect." Explain this statement thoroughly with a suitable example.

3.
Why are the standards of measurement chosen to be invariant, indestructible, and easily reproducible? Explain the modern definition of a meter and a second.

4.
Can a physical quantity have dimensions but no units? Can it have units but no dimensions? Justify your answers with practical examples.

5.
What are the fundamental limitations of dimensional analysis? Mention at least three key scenarios where dimensional analysis completely fails to deduce an exact physical relation.



6.

Explain the Principle of Homogeneity of dimensions. Why is it impossible to add or subtract physical quantities with completely different dimensional profiles?

7.

Express the standard atmospheric pressure ($1.013 \times 10^5\ N/m^2$) into CGS units ($dyne/cm^2$) using the rigorous conversion principles of dimensional analysis.

8.

If the fundamental unit of force is taken as $100\ N$, the unit of length as $10\ m$, and the unit of time as $100\ s$, determine the corresponding value for the unit of mass in this new theoretical framework.

9.

Find the dimensional formulae and SI base units for the following physical quantities: (a) Universal Gravitational Constant (G), (b) Coefficient of Viscosity (η), (c) Planck's Constant (h), (d) Surface Tension (T).

10.

The velocity v of a particle depends on time t according to the mathematical equation: $v = a + bt + c / (d + t)$. Find the precise dimensional formulae of the constants a, b, c, and d.

11.

The van der Waals equation for a real gas is given by: $(P + a/V^2)(V - b) = RT$. Determine the dimensions of the constants a and b (where P represents pressure and V represents volume).

12.

State the exact rules governing the determination of significant figures. Apply them to give the significant counts for: (a) $0.0053\ m^2$, (b) $4.200 \times 10^5\ kg$, (c) $600.00\ J$.

13.

The mass and volume of a uniform cube are measured as $24.25\ g$ and $4.2\ cm^3$, respectively. Compute its density up to the appropriate number of significant figures under standard rounding criteria.

14.

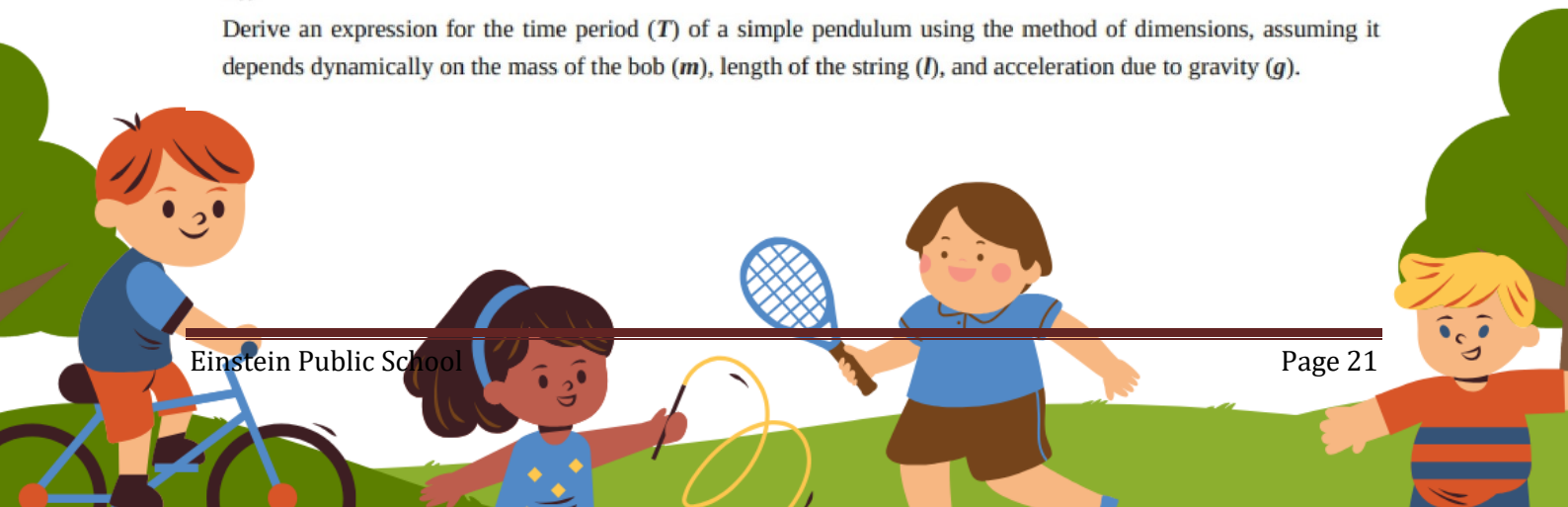
A physical quantity X depends on parameters a, b, c, d according to the formula $X = a^2b^3 / (c\cdot\sqrt{d})$. If the fundamental dimensions of a, b, c, d are given by base SI parameters, write down the ultimate dimensional formula of X given that $[a]=L$, $[b]=M$, $[c]=T$, and $[d]=M^2$.

15.

Check the dimensional validity of the following theoretical equations: (a) $v = \frac{1}{2}l \cdot \sqrt{(T/m)}$ (where v is frequency, l is length, T is tension force, and m is mass per unit length). (b) $V = \pi P r^4 / (8 \eta l)$ (where V is rate of volume flow, P is pressure head, r is radius, η is viscosity, and l is tube length).

16.

Derive an expression for the time period (T) of a simple pendulum using the method of dimensions, assuming it depends dynamically on the mass of the bob (m), length of the string (l), and acceleration due to gravity (g).



17.
The critical velocity v_c of a liquid flowing through a tube depends on the coefficient of viscosity (η), density of the liquid (ρ), and the radius of the tube (r). Deduce the relationship using dimensional analysis.

18.
Convert a energy value of ***100 Joules*** (SI system) into Ergs (CGS system) using fundamental dimensional conversion factors. Show each step clearly.

2. Multiple Choice Questions (Units & Dimensions)

19. Which of the following pairs has identical dimensional formulae?

(a) Impulse and Linear Momentum (b) Work and Power

(c) Torque and Energy (d) Both (a) and (c)

20. The dimensional formula for the universal permeability of free space μ_0 is:

(a) $[MLT^{-2}A^{-2}]$ (b) $[ML^2T^{-2}A^{-2}]$

(c) $[MLT^{-2}A^{-1}]$ (d) $[M^{-1}L^3T^{-2}]$

21. If displacement $x = at + bt^2 + ct^3$, where x is in meters and t is in seconds, the unit of constant c is:

(a) m/s (b) m/s^2

(c) m/s^3 (d) $m \cdot s^3$

22. The number of significant figures in the measured value ***0.02040*** is:

(a) 5 (b) 4

(c) 3 (d) 2

23. The dimensional formula of Surface Tension is identical to that of:

(a) Force per unit volume (b) Spring constant

(c) Pressure (d) Linear mass density

24. Which of the following is not a fundamental SI unit?

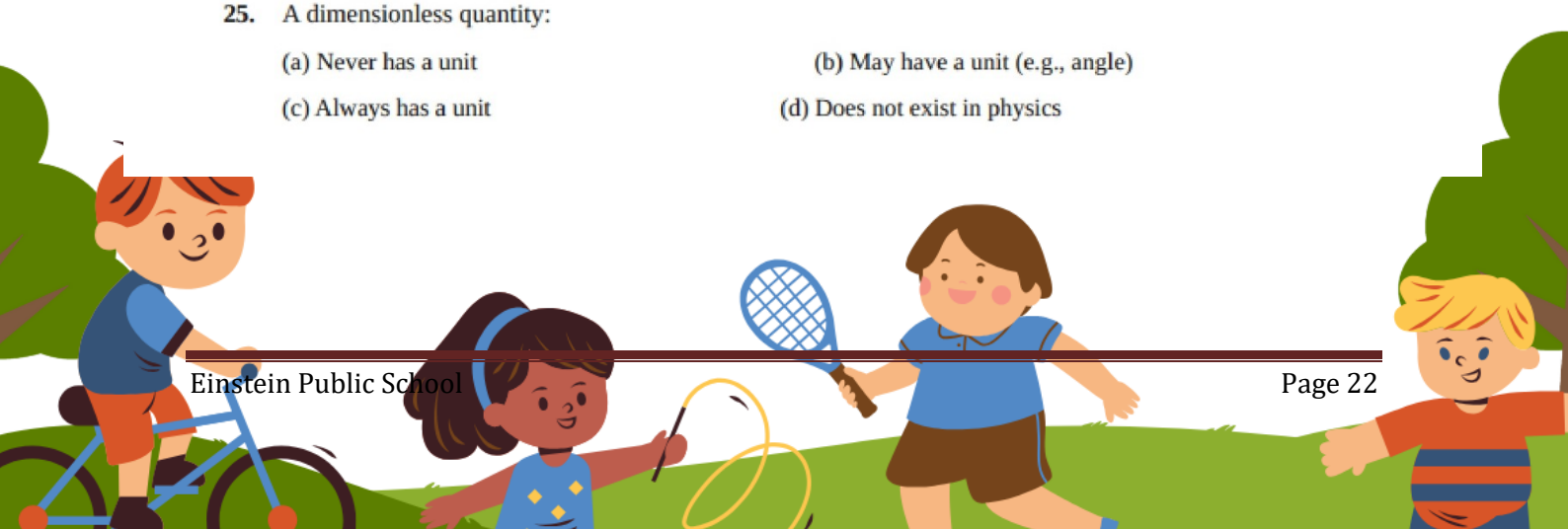
(a) Kelvin (b) Candela

(c) Ampere (d) Joule

25. A dimensionless quantity:

(a) Never has a unit (b) May have a unit (e.g., angle)

(c) Always has a unit (d) Does not exist in physics



26. The physical quantity quantified by the ratio of linear stress to linear strain is dimensionally equivalent to:

(a) Force (b) Pressure

(c) Work (d) Power

27. The structural dimension of Planck's Constant divided by linear momentum yields the dimension of:

(a) Time (b) Frequency

(c) Distance (d) Velocity

28. Light year is a fundamental unit used for the measurement of:

(a) Cosmic time (b) Astronomical distance

(c) Intensity of light (d) Velocity of fast particles

29.

Two quantities ***A*** and ***B*** have different dimensions. Which of the following operations is mathematically permissible?

(a) A + B (b) A − B

(c) A / B (d) Log(A/B) if they have identical units

30.

The value of a force is ***10 N*** in SI units. Its numeric value in a system where the units of mass, length, and time are doubled will be:

(a) 5 (b) 10

(c) 20 (d) 40

Part B: Linear Motion / Motion in a Straight Line (Q31 – Q60)

1. Conceptual & Advanced Graphical Analysis (x-t & v-t Graphs)

31.

Can an object have a constant speed but a varying velocity? Can it have a constant velocity but a varying speed? Explain both cases thoroughly.

32.

Is it physically possible for an object to have zero velocity and yet possess a non-zero acceleration? Provide an accurate real-world physics example.

33.

Draw neat, accurate position-time ($x - t$) graphs for: (a) A body remaining at absolute rest, (b) A body moving with a uniform positive velocity, (c) A body moving with uniform negative velocity, (d) A body moving with uniform positive acceleration.

34.

What physical property does the slope of a position-time graph yield? What does the total area enclosed under a velocity-time graph represent? Can the area under a $v - t$ graph ever be negative? Interpret its physical meaning.

35.

Sketch a standard velocity-time graph for an ideal body thrown vertically upward into the air until it returns back to the thrower's hand. Clearly mark the point corresponding to the maximum height.

36.

Can the position-time graph of a moving particle be a straight line parallel to the position axis? Explain the physical feasibility of this scenario in terms of velocity.

37.

Graph Interpretation Question: Consider a displacement-time ($x - t$) curve that forms a perfect semi-circle starting at origin $(0,0)$ and ending at timestamp $t = 4\ s$. Explain why this graph is physically impossible for a real particle.

38.

Velocity-Time Analysis: A particle starts from rest, accelerates uniformly at a rate α for some time, and then immediately decelerates at a uniform rate β to come to rest. Sketch the complete $v - t$ graph and analytically prove that the total distance covered is given by $S = \frac{1}{2} [\ \alpha\beta / (\alpha + \beta)\ ]\ t^2$ (where t is total time).

39.

x-t Graph Conversion: An object undergoes a constant negative acceleration while moving in a straight line. Its initial velocity is positive. Sketch its position-time ($x - t$) graph, highlighting the vertex where the direction of motion reverses. Then, map this directly onto a corresponding velocity-time graph.

40.

A particle covers exactly half of its total distance with speed v_1 and the remaining half distance with speed v_2. Derive the general expression for its average speed.

41.

A car travels the first third of its total distance with speed v_1, the second third with speed v_2, and the final third with speed v_3. Determine its net average speed.

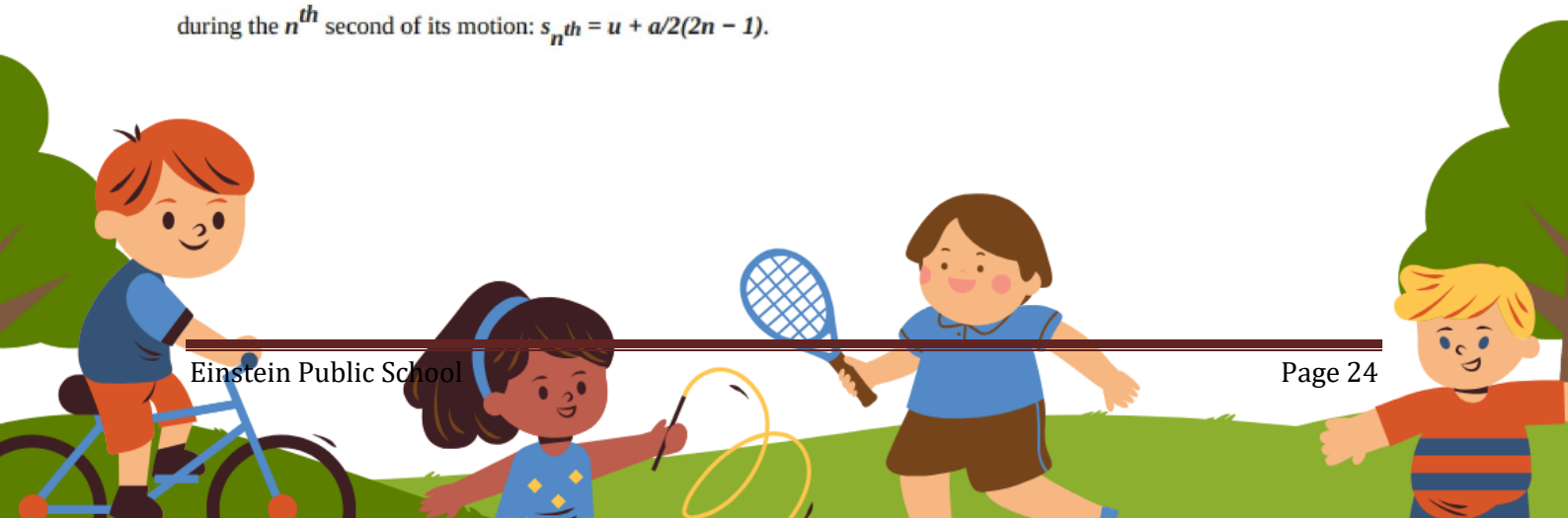
2. Derivations & Calculative Kinematics

42.

Derive the three standard equations of kinematics ($v = u + at$, $s = ut + \frac{1}{2}at^2$, and $v^2 = u^2 + 2as$) using advanced calculus methods (integration and differentiation).

43.

Derive the kinematic expression for the linear distance traveled by a uniformly accelerating body specifically during the n^{th} second of its motion: $s_{n^{th}} = u + a/2(2n - 1)$.



44.

The linear displacement x (in meters) of a particle moving along the x-axis varies with time t (in seconds) as: $x = 4t^2 - 15t + 25$. Find the instantaneous position, velocity, and acceleration of the particle at $t = 0$ s and $t = 2$ s.

45.

The velocity of a particle is governed by the relation $v = 3t^2 + 2t + 2$ m/s. Find the total displacement achieved by the particle between the timestamps $t = 2$ s and $t = 4$ s.

46.

A particle starts its motion from rest and moves with an acceleration function $a = (3t + 2)$ m/s^2. Compute its exact velocity at the end of ***3 seconds***.

47.

The position of an object moving along the x-axis is given by $x = 8.5 + 2.5t^2$. What is its velocity at $t = 0$ s and $t = 2.0$ s? What is the average velocity between $t = 2.0$ s and $t = 4.0$ s?

48.

A luxury car moving along a straight highway with an initial speed of ***126 km/h*** is brought to a complete stop within a linear distance of ***200 m***. What is the uniform retardation of the car, and how long does it take to halt?

49.

A rubber ball is thrown vertically upwards with a velocity of ***20 m/s*** from the top terrace of a multi-storey building. The point of release is exactly ***25.0 m*** high above the ground. (Take $g = 10$ m/s^2). (a) How high will the ball rise from its point of release? (b) How long will it take before the ball strikes the ground?

50.

A stone is dropped gently from a high bridge located ***45 m*** above a river surface. Exactly one second later, a second stone is thrown vertically downwards into the river. If both stones strike the water surface at the exact same instant, find the initial downward velocity of the second stone.

3. Multiple Choice Questions (Linear Motion & Graphs)

51. The area under a velocity-time graph represents:

(a) Instantaneous acceleration (b) Net distance or displacement

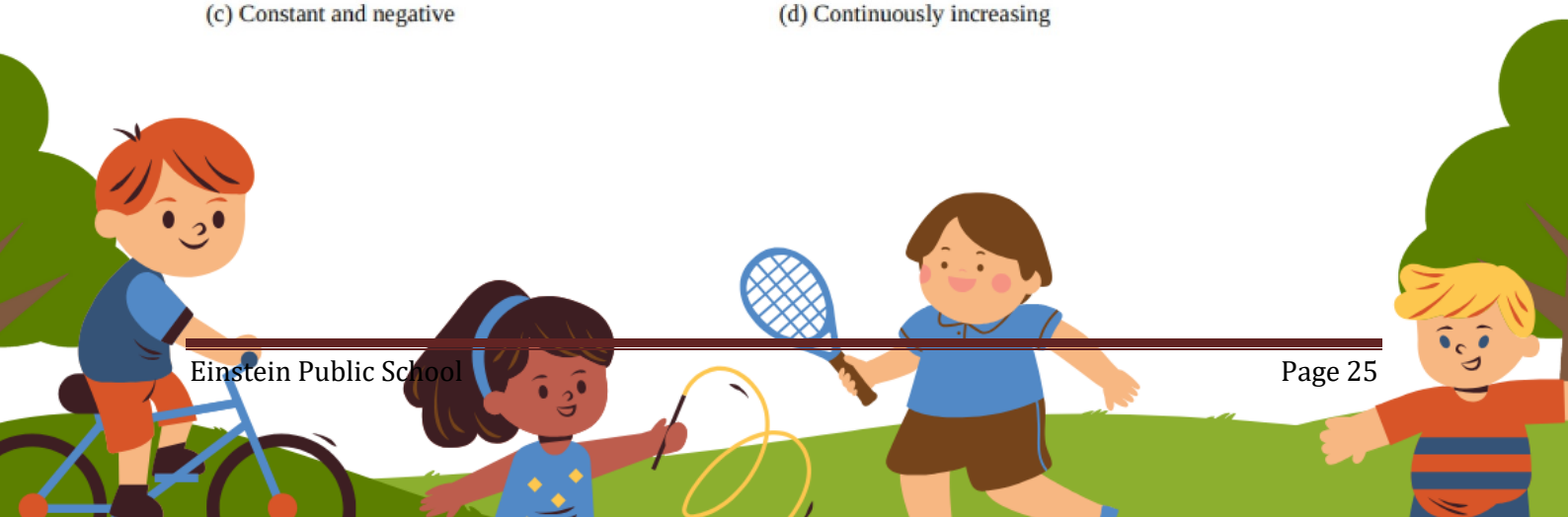
(c) Average velocity (d) Instantaneous speed

52.

A particle moves along a straight line. Its position-time graph is a straight line sloping downwards at a constant angle with the time axis. The velocity of the particle is:

(a) Zero (b) Constant and positive

(c) Constant and negative (d) Continuously increasing



53.
A ball is thrown vertically upwards. Which of the following graphs correctly represents its speed-time profile during its entire flight (ignoring air resistance)?

(a) Parabola opening upwards
(b) Continuous straight line with negative slope
(c) V-shaped straight lines
(d) Horizontal line

54.
If displacement of a particle is directly proportional to the square of time ($x \propto t^2$), then the particle is moving with:

(a) Uniform velocity
(b) Uniform acceleration
(c) Variable non-uniform acceleration
(d) Zero acceleration

55.
A vehicle travels half the distance with speed ***40 km/h*** and the other half with speed ***60 km/h***. Its average speed is:

(a) 48 km/h
(b) 50 km/h
(c) 52 km/h
(d) 45 km/h

56.
The displacement-time graph of two moving objects P and Q are straight lines making angles of ***30°*** and ***60°*** respectively with the time axis. The ratio of their velocities $v_P : v_Q$ is:

(a) 1 : 3
(b) 3 : 1
(c) 1 : √3
(d) √3 : 1

57.
A body is dropped from a high tower and reaches the ground in ***4 seconds***. The height of the tower is approximately:

(a) 40 m
(b) 80 m
(c) 160 m
(d) 20 m

58.
A particle moves along a straight line such that its velocity at any instant is $v = t^2 - t$. The acceleration is zero at timestamp:

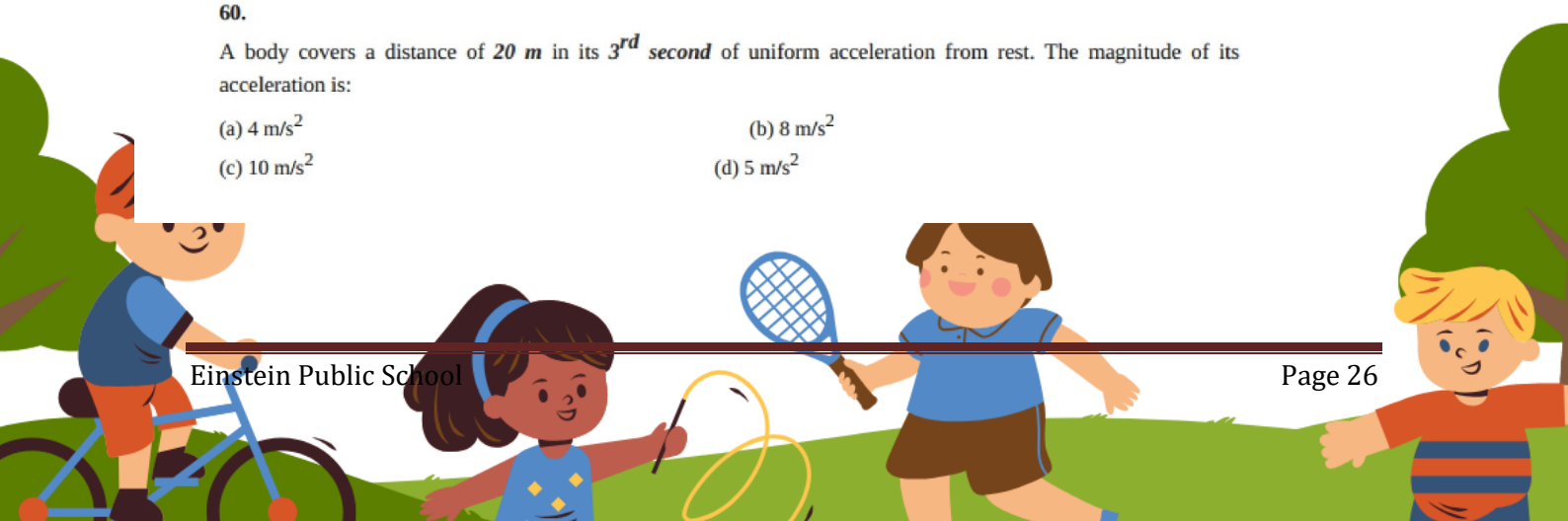
(a) t = 0 s
(b) t = 0.5 s
(c) t = 1 s
(d) t = 2 s

59. A position-time graph parallel to the time axis indicates that the instantaneous velocity is:

(a) Infinite
(b) Variable
(c) Zero
(d) Uniform and non-zero

60.
A body covers a distance of ***20 m*** in its ***3rd second*** of uniform acceleration from rest. The magnitude of its acceleration is:

(a) 4 m/s^2
(b) 8 m/s^2
(c) 10 m/s^2
(d) 5 m/s^2



Physical Education

PART -A

MULTIPLE CHOICE QUESTIONS (1 Mark)

Q. 1 Rackets are used in which of the following games?
(a) Tennis. (b) Table Tennis (c) Badminton (d) All of these
Q. 2. Which technology is being used in cricket from the following?
(a) Hawkeye technology. (b) Hifi technology (c) Hockey technology (d) None of these

Q-3 How many verticals are there in Khelo-India Programme?
(a) Ten (b) Eleven. (c) Twelve. (d) Thirteen
Q. 4. The Ministry of Youth Affairs and Sports, Govt. of India launched the Khelo-India Programme in
a) 2013-2014. (b) 2014-2015 (c) 2016-2017. (d) 2017-2018
Q. 5-The maximum duration of 'Long Term Athlete Development Programme is—
(a) 4 Years. (b) 6 Years. (c) 8 Years. (d) 12 Years
Q. 6.. The scheme of 'Sports for Peace & Development' is exclusively for the state.
(a) Jammu & Kashmir (b) Delhi and NCR. (c) Uttar Pradesh (d) Punjab
Q. 7. First Event of Khelo-India games took place in the year ..... .
(a) 2012. (b) 2014. (c) 2016. (d) 2018
Q. 8.Which state of India in First Khelo-India Games stood at highest rank in 2018?

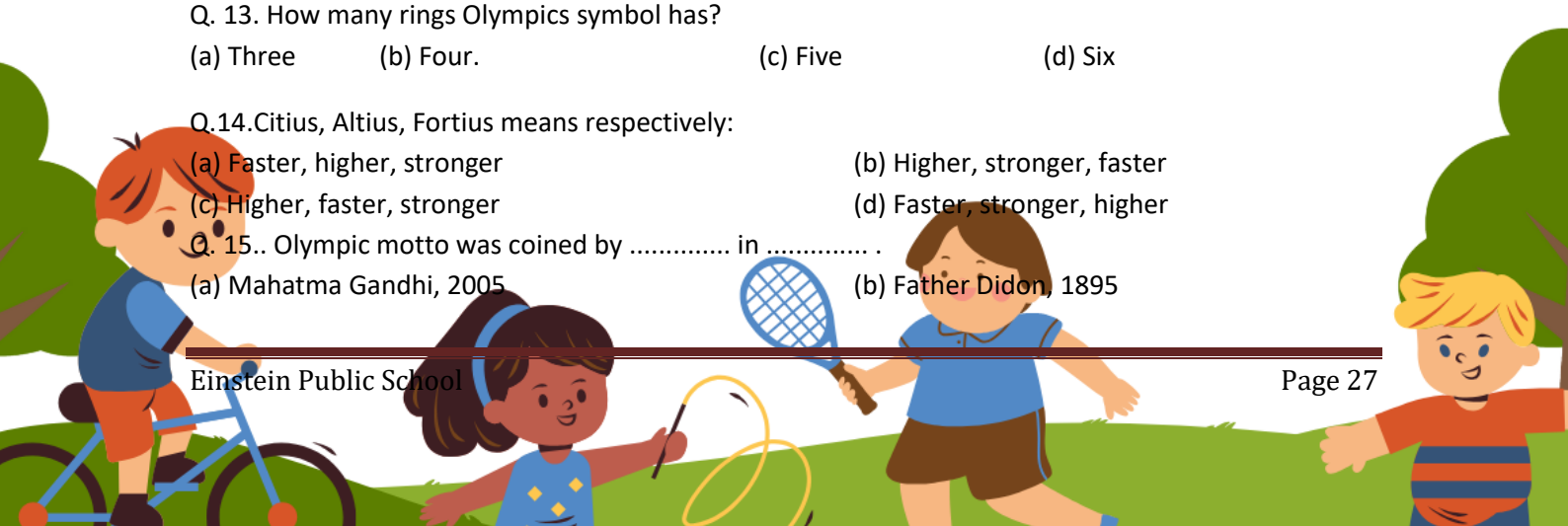
(a) Delhi (b) Maharasthra. (c) Punjab (d) Haryana
Q. 9. How many discipline of sports were there in Ist Kehlo-India?
(a) 15 (b) 14. (c) 12 (d) 16
Q. 10. How many sports are available in Khelo-India app?
(a) 19 (b) 16. (c) 20 (d) 21

Q. 10. The word "Altius" in the Olympic motto means :
(a) Faster (b) Higher. (c) Heavier (d) Stronger

Q.11. The first Olympic torch was lit in :
(a) 1896, Athens, Greece (b) 1920, Antwerp, Belgium
(c) 1924, Paris, France (d) 1928, Amsterdam, Netherlands
Q. 12. The Olympic flag was used for the first time :

(a) 1896, Athens, Greece (b) 1920, Antwerp, Belgium
(c) 1924, Paris, France (d) 1928, Amsterdam, Netherlands
Q. 13. How many rings Olympics symbol has?
(a) Three (b) Four. (c) Five (d) Six

Q.14.Citius, Altius, Fortius means respectively:
(a) Faster, higher, stronger (b) Higher, stronger, faster
(c) Higher, faster, stronger (d) Faster, stronger, higher
Q. 15.. Olympic motto was coined by ..... in ..... .
(a) Mahatma Gandhi, 2005 (b) Father Didon, 1895



(c) Coubertin, 1896 (d) Barak Obama, 2001

Q. 16. Olympic flag was created in ..... by .....

(a) 1915, Donald Trump (b) 1913, Baron de Coubertin

(c) 2011, Obama (d) 1913, Mahatma Gandhi

Q. 17. In which language is Citius Altius Fortius written?

(a) Latin (b) German. (c) Spanish (d) Italian

Q. 18. What is the meaning of Fortius?

(a) Faster (b) Sharper. (c) Higher (d) Stronger

Q. 19.Olympics Flag was hosted for the first time at:

(a) Paris (b) Antiverp Olympic Game (c) Olympic Stadium (d) Africa

Q. 20. Which of the following is NOT a colour in Olympic flag?

(a) Blue (b) Green. (c) Black (d) Pink

****SHORT–I QUESTION ANSWERS (3 Marks, 100 Words)

Q. 1. What are the aims of Khelo-India Programme?

Q. 2. List all the circles of Khelo-India Programme.

Q. 3. Who inaugurated this event?

Q. 4. In how many circles Khelo-India Programme has been divided?

Q. 5. What is Khelo-India Programme?

Q. 6. What is the philosophy of Khelo-India Programme?

Q. 7. What is the vision and mission of Khelo-India Programme?

Q. 8. Who started the Fit India Movement?

Q. 9. What is the goal of Fit India Movement?

Q. 10. What is the basic objective of Fit India?

Q. 11. Why was the Fit India Movement started?

Q. 12. Who started the Fit India Programme and in which year?

Q. 13. Explain the objectives of Olympics.

Q. 14. Explain the values of Olympic Games.

Q. 15. Explain the Olympic symbols.

Q. 16. Write down about the Olympic Ideals.

Q. 17. Write any three features of International Olympic Committee.

Q. 18. Write a short note on Governing Committee of IOC.

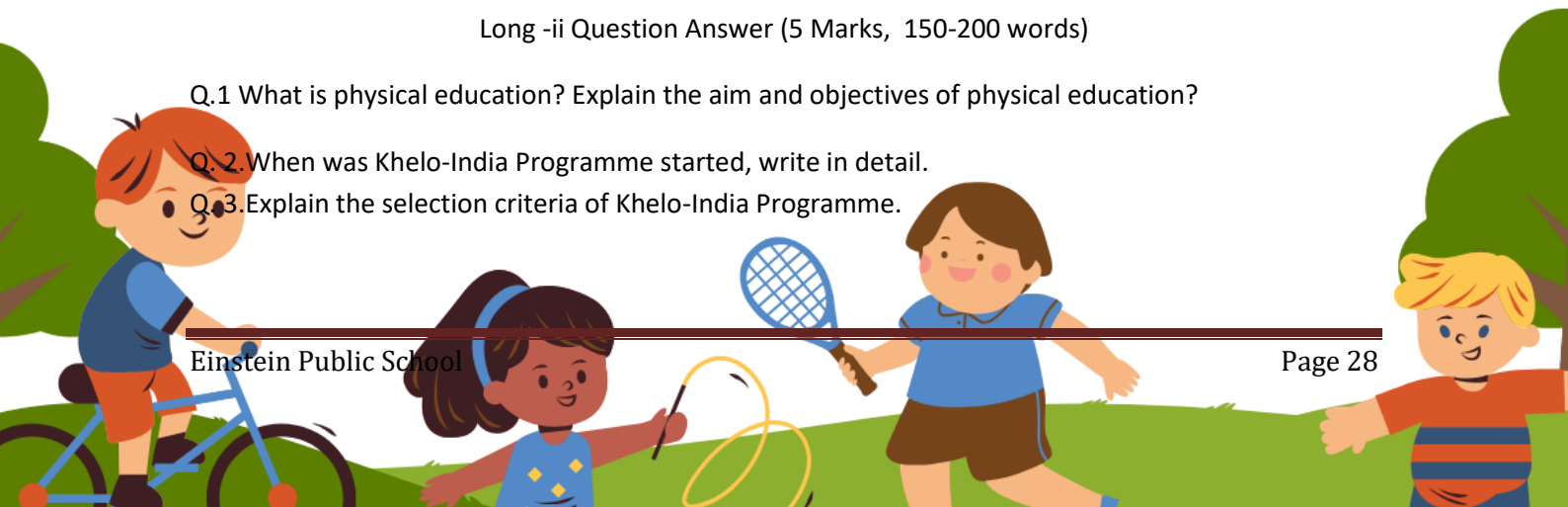
Q. 19- Describe the Olympic oath.

Long -ii Question Answer (5 Marks, 150-200 words)

Q.1 What is physical education? Explain the aim and objectives of physical education?

Q. 2.When was Khelo-India Programme started, write in detail.

Q. 3.Explain the selection criteria of Khelo-India Programme.



Q. 4 What is the importance of five rings in the Olympic flag?
Q. 5 Write a short note on the Olympic Flag.
Q. 6 Briefly explain the development of values through Olympic movement?

Q.7 Explain the main functions of International Olympic Committee.
Q. 8 Write a short note on National Olympic Committee.

Q.9 Describe the formation and objectives of Indian Olympic association.?

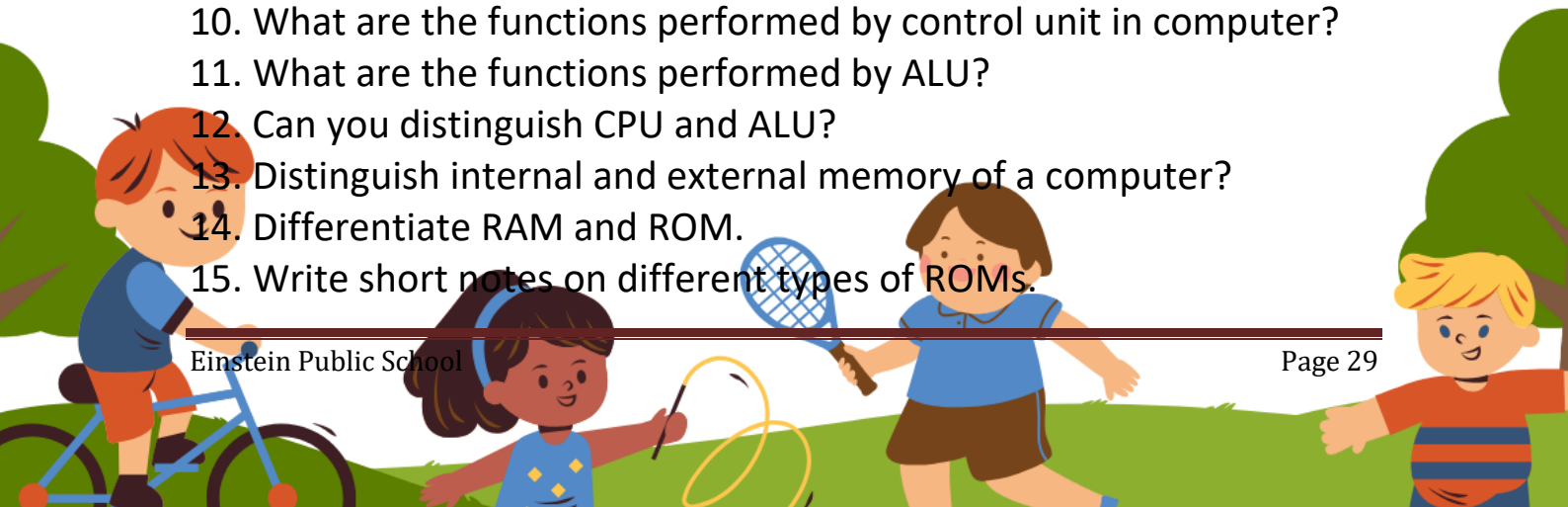
**** PART -B***

i.Prepare the project on any game of your choice. Project has to be written on the basis of following guidelines:-
1- History of the game
2- Draw the diagram of court/field of related game
Specifications of Latest general rules of the game
3- Fundamental skills of the game
4- Terminology

5- Important tournaments of related game
ii. Write down the current affairs related to sports of the year2023-2024

Computer Science

1. What is the basic building block of any computer?
2. Explain the basic architecture of a computer?
3. What is the role of CPU in a computer?
4. What is the function of memory in computer?
5. What is the role of input unit in a computer?
6. What is the role of output unit in a computer?
7. Give some examples of input devices of computer?
8. Give some examples of output devices of computer?
9. What are the functions of input and output unit of a computer?
10. What are the functions performed by control unit in computer?
11. What are the functions performed by ALU?
12. Can you distinguish CPU and ALU?
13. Distinguish internal and external memory of a computer?
14. Differentiate RAM and ROM.
15. Write short notes on different types of ROMs.



16. Write any four memory units
17. What are the basic components of any typical mobile system?
18. What are the various categories of software?
19. What is application software?
20. What is system software?
21. What is operating system and how it is important for any computer?
22. What is software library and how it is useful?
23. Write names of some software libraries of Python.
24. Draw the basic building block of any typical mobile system
25. Do you feel mobile phones are replacing computers, if yes then why?
26. Differentiate compiler and interpreter

Biology

Topic: BIOLOGICAL CLASSIFICATION

Multiple choice questions

1. All eukaryotic unicellular organisms belong to
   a. Monera b. Protista c. Fungi d. Bacteria
2. The five kingdom classification was proposed by
   a. R.H. Whittaker b. C.Linnaeus c. A. Roxberg d. Virchow
3. Organisms living in salty areas are called as
   a. Methanogens b. Halophiles
   c. Heliophytes d. Thermoacidophiles
4. Naked cytoplasm, multinucleated and saprophytic are the characteristics of
   a. Monera b. Protista c. Fungi d. Slime molds
5. An association between roots of higher plants and fungi is called
   a. Lichen b. Fern c. Mycorrhiza d. BGA
6. A dikaryon is formed when
   a. Meiosis is arrested
   b. The two haploid cells do not fuse immediately
   c. Cytoplasm does not fuse

d. None of the above

7. Contagium vivum fluidum was proposed by
   a. D.J. Ivanowsky b. M.W. Beijerinek c. Stanley d. Robert Hook
8. Mycobiont and Phycobiont are found in
   a. Mycorrhiza b. Root c. Lichens d. BGA
9. Difference between Virus and Viroid is
   a. Absence of protein coat in viroid but present in virus
   b. Presence of low molecular weight RNA in virus but absent in viroid
   c. Both a and b
   d. None of the above
10. With respect to fungal sexual cycle, choose the correct sequence of events
    a. Karyogamy, Plasmogamy and Meiosis b. Meiosis, Plasmogamy and Karyogamy
    c. Plasmogamy, Karyogamy and Meiosis d. Meiosis, Karyogamy and Plasmogamy
11. Viruses are non-cellular organisms but replicate themselves once they infect the host cell. To which of the following kingdom do viruses belong to?
    a. Monera b. Protista c. Fungi d. None of the above
12. Members of phycomycetes are found in
    i. Aquatic habitats
    ii. On decaying wood
    iii. Moist and damp places
    iv. As obligate parasites on plants
    Choose from the following options
    a. None of the above b. i and iv
    c. ii and iii d. All of the above

Very short answer type questions

13. What is the principle underlying the use of cyanobacteria in agricultural fields for crop improvement?
14. Suppose you accidentally find an old preserved permanent slide without a label. In your effort to identify it, you place the slide under microscope and observe the following features :-
    a. Unicellular
    b. Well defined nucleus
    c. Biflagellate–one flagellum lying longitudinally and the other transversely.
15. What would you identify it as? Can you name the kingdom it belongs to?
16. How is the five–kingdom classification advantageous over the two kingdom classification?
17. Polluted water bodies have usually very high abundance of plants like Nostoc and Oscillitoria. Give reasons.

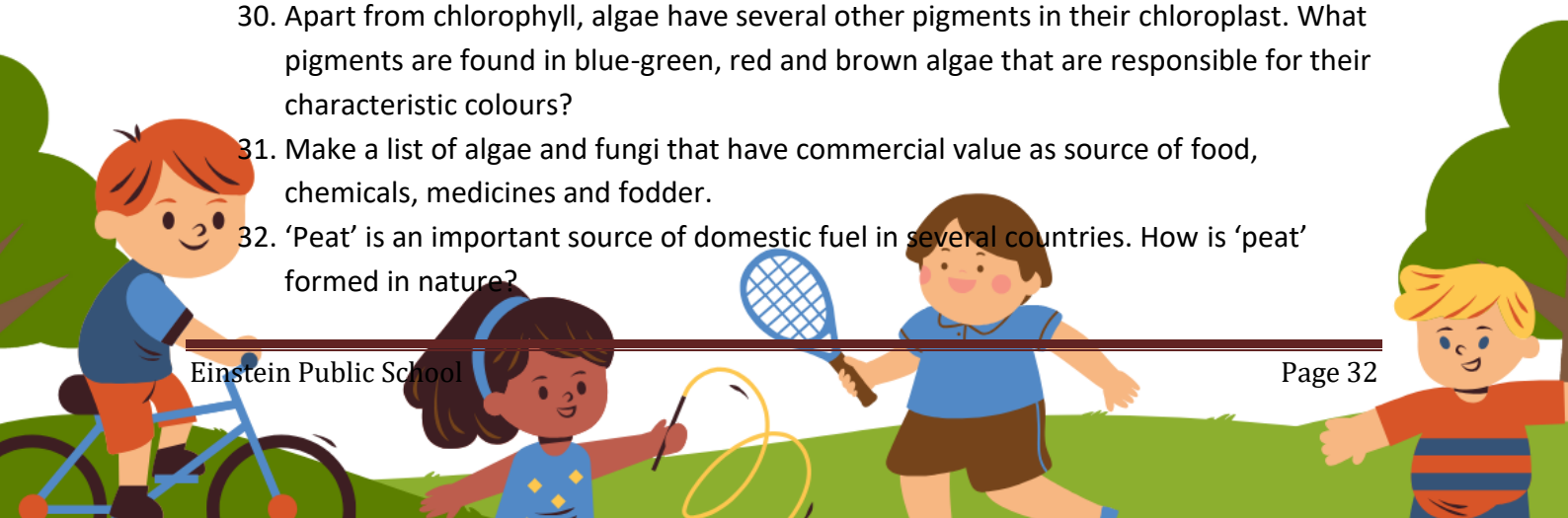
18. Are chemosynthetic bacteria-autotrophic or heterotrophic?
19. The common name of pea is simpler than its botanical (scientific) name Pisum satirum. Why then is the simpler common name not used instead of the complex scientific/ botanical name in biology?
20. A virus is considered as a living organism and an obligate parasite when inside a host cell. But virus is not classified along with bacteria or fungi. What are the characters of virus that are similar to non-living objects?
21. In the five kingdom system of Whittaker, how many kingdoms are eukaryotes?

Short answer type questions

22. Diatoms are also called as 'pearls of ocean', why? What is diatomaceous earth?
23. There is a myth that immediately after heavy rains in forest, mushrooms appear in large number and make a very large ring or circle, which may be several metres in diameter. These are called as 'Fairy rings'. Can you explain this myth of fairy rings in biological terms?
24. Neurospora - an ascomycetes fungus has been used as a biological tool to understand the mechanism of plant genetics much in the same way as Drosophila has been used to study animal genetics. What makes Neurospora so important as a genetic tool?
25. Cyanobacteria and heterotrophic bacteria have been clubbed together in Eubacteria of kingdom Monera as per the "Five Kingdom Classification" even though the two are vastly different from each other. Is this grouping of the two types of taxa in the same kingdom justified? If so, why?
26. At a stage of their cycle, ascomycetes fungi produce the fruiting bodies like apothecium, perithecium or cleistothecium. How are these three types of fruiting bodies different from each other?
27. What observable features in Trypanosoma would make you classify it under kingdom Protista?
28. Fungi are cosmopolitan, write the role of fungi in your daily life.

Long answer type questions

29. Algae are known to reproduce asexually by variety of spores under different environmental conditions. Name these spores and the conditions under which they are produced.
30. Apart from chlorophyll, algae have several other pigments in their chloroplast. What pigments are found in blue-green, red and brown algae that are responsible for their characteristic colours?
31. Make a list of algae and fungi that have commercial value as source of food, chemicals, medicines and fodder.
32. 'Peat' is an important source of domestic fuel in several countries. How is 'peat' formed in nature?



33. Biological classification is a dynamic and ever evolving phenomenon which keeps changing with our understanding of life forms. Justify the statement taking any two examples.

Chemistry

1. Which of the following are homogeneous mixtures?

(a) Salt solution (b) Sugar solution (c) Air (d) All of these

2. Which of the following is not characteristics of pure substances?

(a) P ure substances have fixed composition

(b) P ure substances have fixed melting and boiling points

(c) E lements and compounds are pure substances

(d) A lloys are pure substance

3. Which of the following statement(s) is not correct?

(a) T he constituent of compounds can be separated only by chemical methods

(b) T hose properties which can be measured without changing identity of substance are physical

(c) T hose properties which are observed after chemical change are chemical properties.

(d) Length, area, volume etc are qualitative in nature

4. Which of the following is incorrect statements?

(a) S.I. unit of length is metre, mass is kilogram and time is second

(b) S.I. unit of electric current is coloumb, temperature is °C.

(c) S.I. unit of amount of substance is mole, luminous intensity is candela.

(d) S.I. unit of electric current is Ampere, temperature is Kelvin.

5. S.I. unit of energy, density respectively are

(a) E rgs, g cm^{-3} (b) Joule, kg m^{-3} (c) E rgs, kg m^{-3} (d) Joule, g cm^{-3}

6. The number of significant figures in 0.001620 are

(a) 4 (b) 3 (c) 6 (d) 2

7. 5.607892 expressed to four significant figures in standard form is

(a) 5.607 (b) 5.608 (c) 5.600 (d) 5.6079

8. Which of the following measurement is more precise?

(a) 4.0 (b) 4.00 (c) 4.000 (d) 4.0000

9. 2L of milk in m^3 is equal to

(a) 2000 m^3 (b) 2×10^{-3} m^3 (c) 2×10^{-3} m^3 (d) 2×10^{-6} m^3

10. One of the statements of Dalton's atomic theory is given below:

"Compounds are formed when atoms of different elements combine in a fixed ratio".

Which of the following law is related to this statements?

(a) Law of conservation of mass. (b) Law of definite proportion.

(c) Gay Lussac's Law (d) A vogadro's Law

Assertion/Reason

11. In the following question, a statement of assertion followed by statement of a reason is given. Choose the correct answer out of the following choices.

(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.

Assertion (A): Molarity does have unit, i.e. mol L^{-1}

Reason (R): Molarity does not change with temperature.

Very Short Answer Type Questions -:

12. Calculate the volume of 34 g of NH3 at STP.

13. A hydrocarbon was found to contain 75% by mass of carbon and 25% by mass of hydrogen. What is empirical formula of the compound?

(a) C_2H_4 (b) C_2H_6 (c) CH_4 (d) C_6H_6

14. The mass of one mole a chloride formed by metal 'X' is 111.0 g. Which one could be formula of chloride?

(a) XCl (b) XCl_2 (c) XCl_3 (d) XCl_4

15. What is mass silicon in 100 g of sodium silicate, Na2SiO3? [Na = 23, Si = 28, O = 16u]

(a) 16.7% (b) 23.0% (c) 28.0% (d) 82.0 %

16. What is the SI unit of mass? How is it defined?

17. Calculate the atomic mass (average) of chlorine using the following data:

	% Natural Abundance	Molar Mass
35Cl	75.77	34.9689
37Cl	24.23	36.9659

18. Compute the mass of one molecule and the molecular mass of C6H6 (benzene)

(At. Mass of C = 12, H = 1 u).

19. Calculate the number of grams of oxygen in 0.10 mol of $Na_2CO_3.10H_2O$.

20. How many grams of Cl_2 are required to completely react with 0.4 g of H_2 to yield HCl? Also, calculate the amount of HCl formed.

Short Answer Type Questions -:

21. A solution is prepared by adding 2 g of a substance A to 18 g of water. Calculate the mass per cent of the solute.

22. Hydrogen reacts with nitrogen to produce ammonia according to the equation:

$3H_2(g) + N_2(g) \rightarrow 2NH_3(g)$

Determine how much ammonia would be produced if 100 g of N_2 reacts?

23. Calculate the amount of water(g) produced by the combustion of 16 g of methane.

24. How many moles of methane are required to produce 22 g of $CO_2(g)$ after combustion?

25. A compound contains 4.07% hydrogen, 24.27% carbon and 71.65% chlorine. Its molar mass is 98.96 g. What are its empirical and molecular Formulae?

Case based -:

26. Read the following passage and answer the questions that follow:

Chemistry play an important role in human needs for food, health care products and improving life.

Cis platin and taxol are used in chemotherapy, AZT (Azidothymidine) is used for AIDS. SI units are international units of measurement. Matter is classified into elements, compounds and mixtures, which can be homogeneous as well as heterogeneous. A mixture can be separated by physical methods, compounds can be separated by chemical methods only. Atomic mass is average of masses of isotopes depending upon their natural abundance. Empirical formula is

calculated with the help of percentage composition of elements in a compound and molecular mass helps to calculate molecular formula. A chemical equation must be balanced so as to follow laws of chemical combination

(a) What is percentage of Na in Na_2CO_3? (Na = 23u, C = 12, O = 16u)

(b) $^{35}_{17}Cl$ and $^{37}_{17}Cl$ are in ratio of 3 : 1 in nature. What is atomic mass of Cl?

(c) (i) Chlorophyll contains 2.68% magnesium atoms. Calculate mass of magnesium atoms in 2 g of chlorophyll.

Or

(ii) Calculate the mass of 1 atom of carbon. [C = 12 u]

27. Read the passage given below and answer the following questions:

Mole concept is most important in all aspects of chemistry. 1 mole of every gas at STP occupies volume equal to 22.4 L. Amount of product formed in a chemical reaction depends upon limiting reagent which is present in smaller amount than required by balanced chemical equation.

1 mole of substance containing 6.022×10^{23} particles. Atomic mass expressed in 'u' is mass of 1 atom whereas atomic mass expressed in grams represents 6.022×10^{23} atoms. Molarity equation $M_1V_1 = M_2V_2$ is not universally applicable in neutralisation reaction. It depends upon basicity of acid and acidity of base.

(a) How many Helium atoms are present in 52 g of He? [He = 4u]

(b) What is mass of 5.6 L of O_3 at STP?

(c) 8.0 g of Mg is burnt in 2.0 g of O_2. How much MgO will be formed? [Mg = 24 u, O = 16 u]

Or

What volume of 10.6 g L^{-1} aqueous solution of sodium carbonate will be required to react with 25.0 mL of 0.1 H_2SO_4?

28. Read the passage given below and answer the following questions:

Stoichiometry deals with composition of compounds and calculations based on chemical equations.

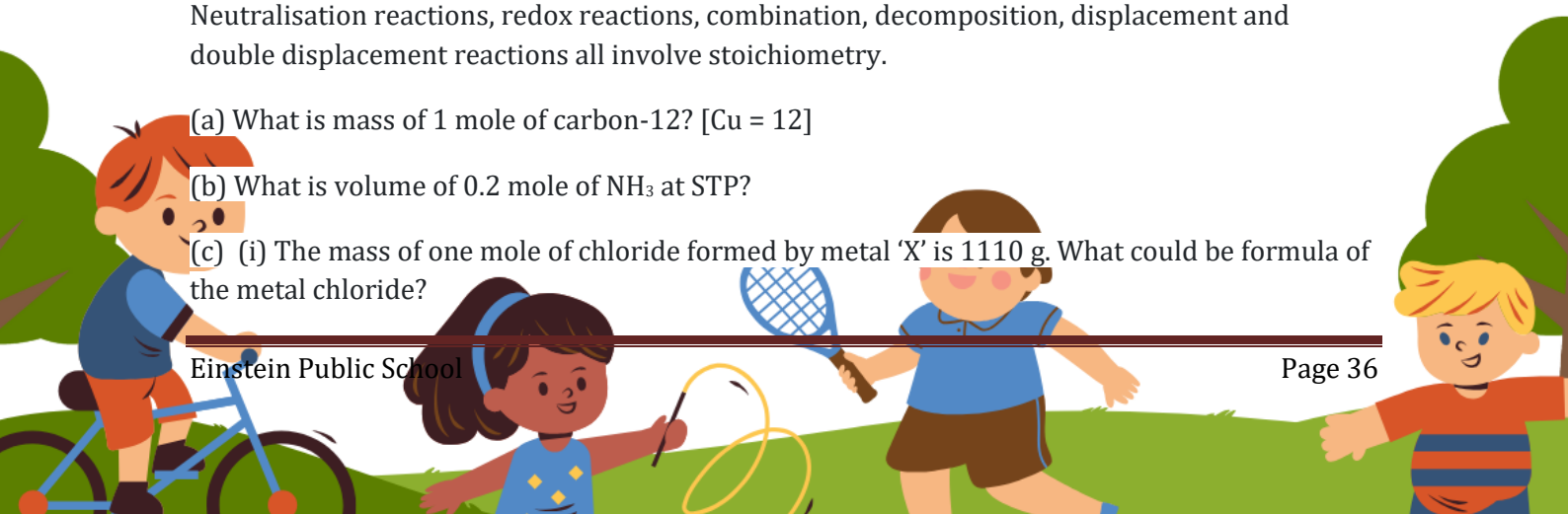
It involves mole concept and limiting reagent. It also involves laws of chemical combinations.

Neutralisation reactions, redox reactions, combination, decomposition, displacement and double displacement reactions all involve stoichiometry.

(a) What is mass of 1 mole of carbon-12? [Cu = 12]

(b) What is volume of 0.2 mole of NH_3 at STP?

(c) (i) The mass of one mole of chloride formed by metal 'X' is 1110 g. What could be formula of the metal chloride?



Or

(ii) The cost of NaCl is ₹ 32 per kg. What is cost of 1 mole of NaCl? [Na = 23 u, Cl = 35.5 u]

Long Answer Type Questions -:

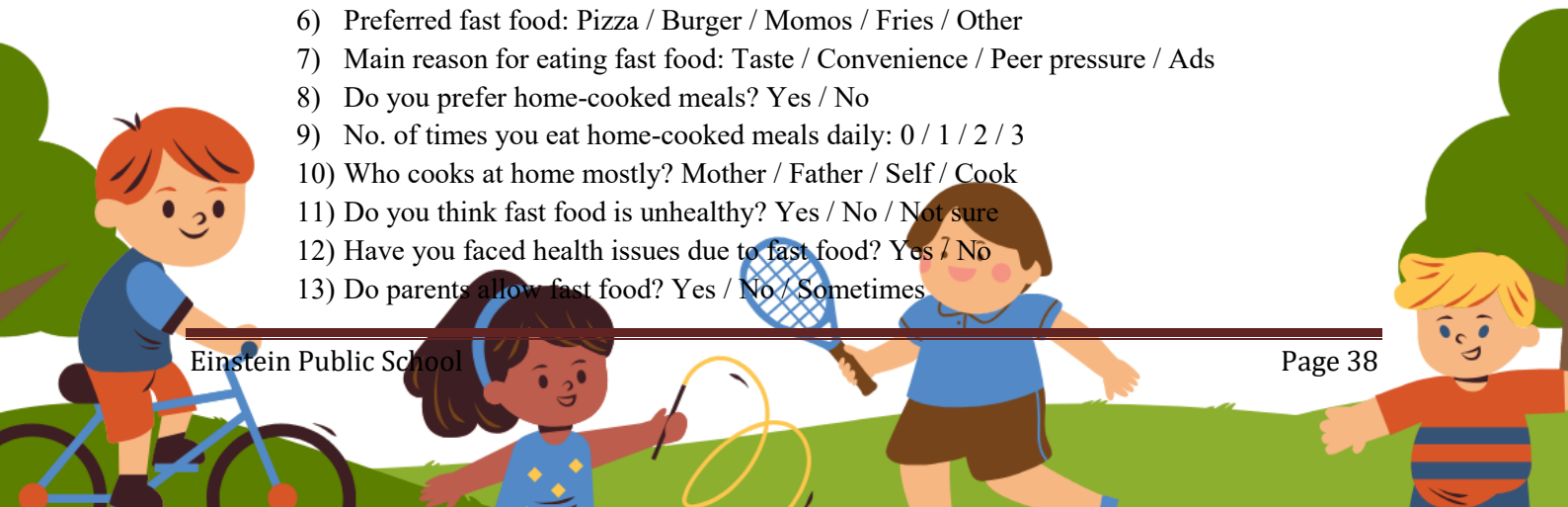
29. A vessel contains 1.6 g of dioxygen at STP (273.15 K, 1 atm pressure). The gas is now transferred to another vessel at constant temperature where pressure becomes half of the original pressure. Calculate
(i) volume of the new vessel.
(ii) number of molecules of dioxygen.

30. A box contains some identical red coloured balls, labelled as A, each weighing 2 grams. Another box contains identical blue coloured balls, labelled as B, each weighing 5 grams. Consider the combinations AB, AB_2, A_2B and A_2B_3 and show that the law of multiple proportion is applicable.

Economics

Do any five surveys and collect given information in the questionnaire form your locality and make project file on it.

1. **Project 1**
   A Statistical Study of Daily Screen Time and Its Impact on Study Hours of Class XI Students.
   Questionnaire
   1) Gender: M / F / Prefer not to say
   2) Age: 15 / 16 / 17 / 18
   3) Class: XI Science / XI Commerce / XI Arts
   4) Do you own a smartphone? Yes / No
   5) Avg daily screen time on phone: <1 hr / 1-2 hrs / 2-4 hrs / >4 hrs
   6) Avg daily screen time on laptop/TV: <1 hr / 1-2 hrs / 2-4 hrs / >4 hrs
   7) Main reason for screen use: Study / Social media / Gaming / OTT
   8) Do you use screen 1 hour before sleeping? Yes / No / Sometimes
   9) Avg daily study hours: <1 / 1-2 / 2-3 / >3
   10) Do you feel screen time reduces your study time? Yes / No / Not sure
   11) Marks in last Economics test: <50% / 50-70% / 70-90% / >90%
   12) Do you use apps to limit screen time? Yes / No
   13) Do parents restrict your screen time? Yes / No
   14) Preferred study mode: Books / Mobile / Laptop
   15) Do you multitask while studying? Yes / No / Sometimes
   16) Hours of sleep per night: <6 / 6-7 / 7-8 / >8
   17) Do you feel tired in class due to late screen use? Yes / No
   18) Which app do you use most? Instagram / YouTube / WhatsApp / Games
   19) Do you take breaks during screen use? Yes / No
   20) Will you reduce screen time if marks drop? Yes / No / Maybe
2. **Project 2**
   Consumer Preference for Fast Food vs Home-Cooked Meals Among Teenagers in My Locality
   Questionnaire
   1) Age: 13-15 / 16-18 / 19-21
   2) Gender: M / F
   3) Do you eat fast food? Yes / No
   4) Frequency of fast food per week: 0 / 1-2 / 3-4 / >4
   5) Monthly pocket money spent on fast food: <₹200 / ₹200-500 / ₹500-1000 / >₹1000
   6) Preferred fast food: Pizza / Burger / Momos / Fries / Other
   7) Main reason for eating fast food: Taste / Convenience / Peer pressure / Ads
   8) Do you prefer home-cooked meals? Yes / No
   9) No. of times you eat home-cooked meals daily: 0 / 1 / 2 / 3
   10) Who cooks at home mostly? Mother / Father / Self / Cook
   11) Do you think fast food is unhealthy? Yes / No / Not sure
   12) Have you faced health issues due to fast food? Yes / No
   13) Do parents allow fast food? Yes / No / Sometimes



14) Where do you usually eat fast food? Restaurant / Street / Home delivery
15) Do you check calories before eating? Yes / No
16) Does social media influence your food choice? Yes / No
17) Would you shift to home food if given choice? Yes / No
18) Average cost of one fast food meal: <₹100 / ₹100-200 / >₹200
19) Do you carry tiffin to school? Yes / No / Sometimes
20) Which is tastier according to you? Fast food / Home food / Both equal

3. **Project 3**

Analysis of Monthly Pocket Money and Spending Patterns of Students in My School

Questionnaire

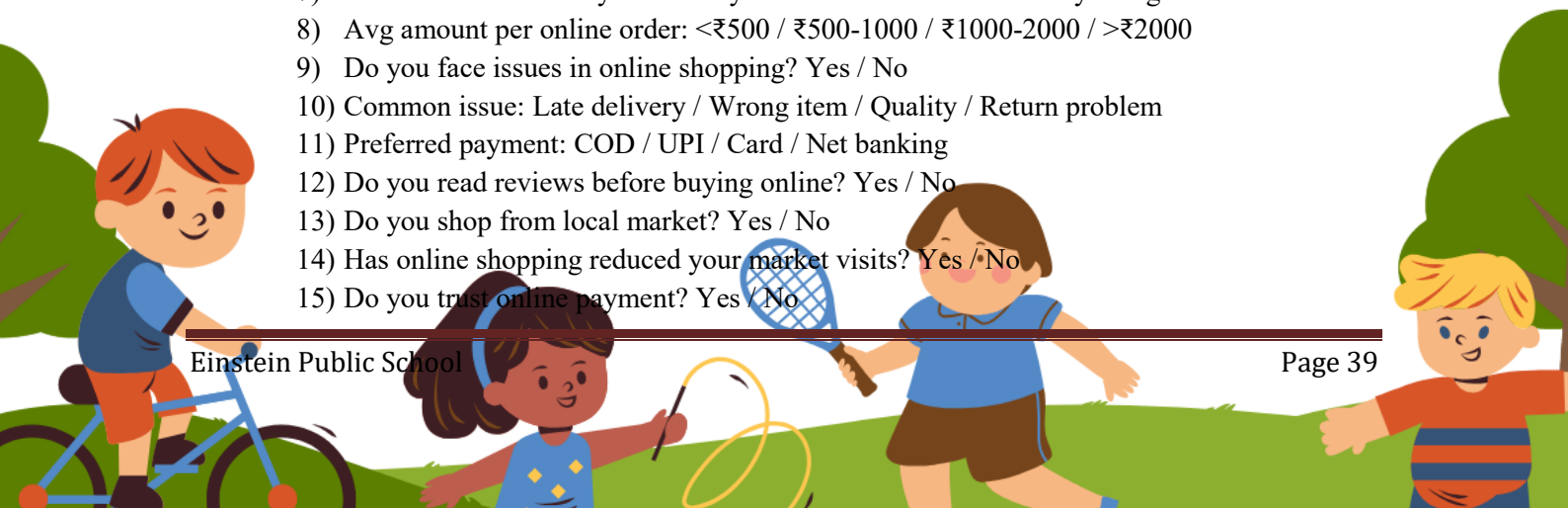
1) Class: XI / XII
2) Gender: M / F
3) Do you get pocket money? Yes / No
4) Monthly pocket money: <₹500 / ₹500-1000 / ₹1000-2000 / >₹2000
5) Source: Parents / Relatives / Part-time work
6) Do you save money? Yes / No / Sometimes
7) % saved monthly: 0% / <25% / 25-50% / >50%
8) Major expense: Food / Transport / Mobile recharge / Entertainment / Other
9) Do you keep record of spending? Yes / No
10) Do you spend more online or offline? Online / Offline / Both equal
11) Do you use UPI for spending? Yes / No
12) Do parents ask for expense details? Yes / No
13) Do you run out of money before month-end? Yes / No / Sometimes
14) Do you borrow money from friends? Yes / No
15) Have you done impulse buying? Yes / No
16) Do you compare prices before buying? Yes / No
17) Do you prefer cash or digital payment? Cash / Digital
18) Do you spend on education-related items? Yes / No
19) Are you satisfied with your pocket money? Yes / No
20) If pocket money increased, spending would: Increase / Save more / Same

4. **Project 4**

Online vs Offline Shopping: A Survey of Buying Behaviour of Households in My Area

Questionnaire

1) Respondent: Student / Parent / Working adult
2) Age group: <18 / 18-30 / 30-45 / >45
3) Preferred mode: Online / Offline / Both
4) Frequency of online shopping per month: 0 / 1-2 / 3-5 / >5
5) Most bought item online: Clothes / Electronics / Groceries / Books
6) Reason for online: Discounts / Convenience / Variety / Home delivery
7) Reason for offline: Try before buy / Trust / Instant / No delivery charge
8) Avg amount per online order: <₹500 / ₹500-1000 / ₹1000-2000 / >₹2000
9) Do you face issues in online shopping? Yes / No
10) Common issue: Late delivery / Wrong item / Quality / Return problem
11) Preferred payment: COD / UPI / Card / Net banking
12) Do you read reviews before buying online? Yes / No
13) Do you shop from local market? Yes / No
14) Has online shopping reduced your market visits? Yes / No
15) Do you trust online payment? Yes / No



16) Which app do you use most? Amazon / Flipkart / Meesho / Myntra
17) Do you return items often? Yes / No
18) Are you satisfied with offline bargaining? Yes / No
19) Which gives better deals? Online / Offline / Same
20) Future preference: More online / More offline / Balanced

5. **Project 5.**

Transport Choices of Students: Public Transport vs Private Vehicles - A Case Study

Questionnaire

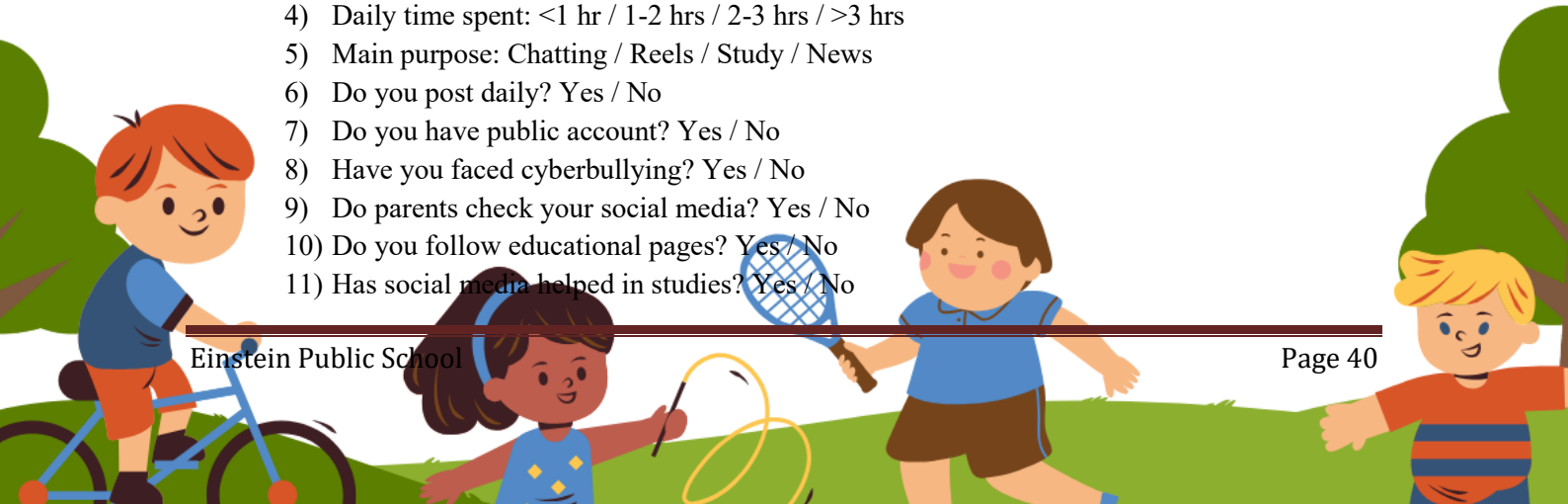
1) Distance from home to school: <1 km / 1-3 km / 3-5 km / >5 km
2) Mode of transport used: Walk / Cycle / School bus / Public bus / Private vehicle
3) Time taken to reach school: <15 min / 15-30 min / 30-45 min / >45 min
4) Monthly transport cost: ₹0 / <₹500 / ₹500-1000 / >₹1000
5) Reason for choosing mode: Cost / Safety / Time / Comfort
6) Do you travel alone? Yes / No
7) Is your mode eco-friendly? Yes / No / Not sure
8) Would you shift to cycle if distance <2 km? Yes / No
9) Do you face traffic problems? Yes / No
10) Do you prefer AC transport? Yes / No
11) Do parents drop you? Yes / No / Sometimes
12) Is public transport available? Yes / No
13) Is public transport safe? Yes / No / Not sure
14) Do you carpool? Yes / No
15) Do you get late due to transport? Yes / No / Sometimes
16) Would you use school bus if cheaper? Yes / No
17) Does weather affect your mode? Yes / No
18) Do you use metro/train? Yes / No
19) Preferred future mode: Electric vehicle / Public / Cycle
20) Are you satisfied with current mode? Yes / No

6. **Project 6**

Use of Social Media Platforms: A Statistical Analysis of Preferences Among Class XI Students

Questionnaire

1) Do you use social media? Yes / No
2) No. of platforms used: 1 / 2-3 / 4-5 / >5
3) Most used platform: Instagram / YouTube / WhatsApp / Snapchat / Other
4) Daily time spent: <1 hr / 1-2 hrs / 2-3 hrs / >3 hrs
5) Main purpose: Chatting / Reels / Study / News
6) Do you post daily? Yes / No
7) Do you have public account? Yes / No
8) Have you faced cyberbullying? Yes / No
9) Do parents check your social media? Yes / No
10) Do you follow educational pages? Yes / No
11) Has social media helped in studies? Yes / No



12) Do you believe everything on social media? Yes / No
13) Do you use it during study hours? Yes / No / Sometimes
14) Do you feel addicted? Yes / No / Not sure
15) Do you take social media breaks? Yes / No
16) Time of max usage: Morning / Afternoon / Evening / Night
17) Do you share personal info online? Yes / No
18) Is social media necessary for teens? Yes / No
19) Have you deleted social media ever? Yes / No
20) Will you reduce usage during exams? Yes / No

7. Project 7

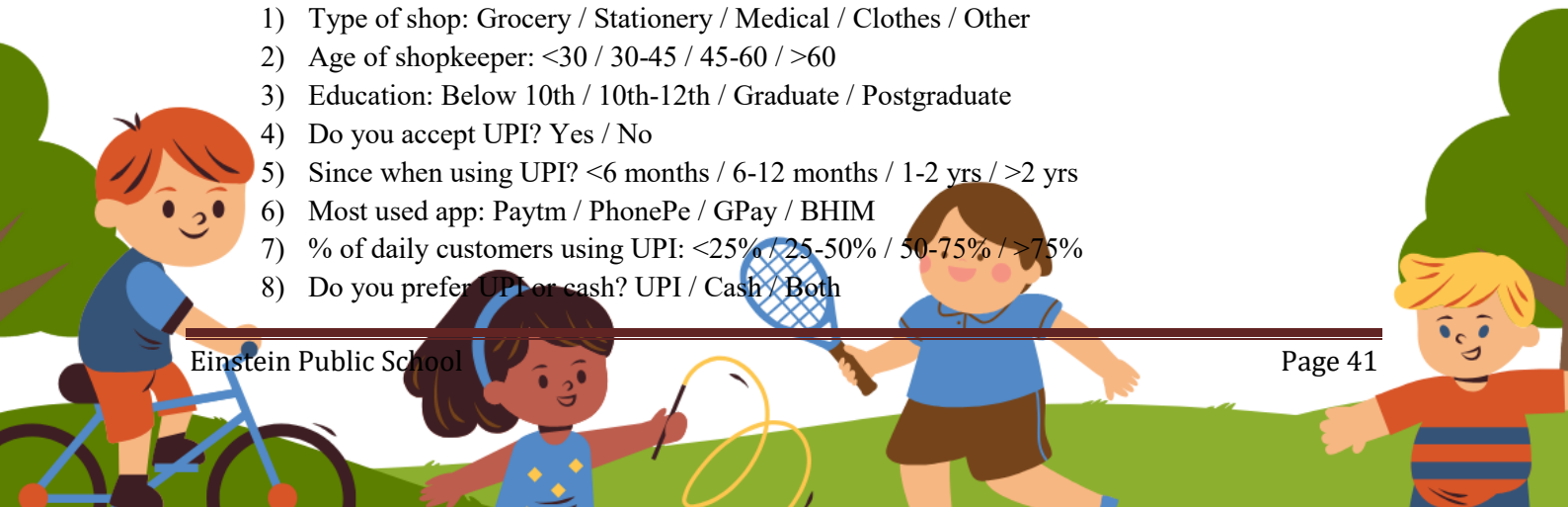
A Study on Breakfast Habits and Concentration Levels of Students During School Hours
Questionnaire

1) Do you eat breakfast daily? Yes / No / Sometimes
2) Time of breakfast: Before 7 am / 7-8 am / 8-9 am / After 9 am
3) Usual breakfast: Paratha / Bread / Cereal / Fruits / Nothing
4) Who prepares breakfast? Self / Mother / Father / Cook
5) Time taken to eat: <10 min / 10-20 min / >20 min
6) Do you feel hungry before lunch? Yes / No
7) Do you feel sleepy in first 2 periods? Yes / No
8) Do you carry tiffin? Yes / No
9) Do you eat junk for breakfast? Yes / No
10) Does skipping breakfast affect concentration? Yes / No / Not sure
11) Marks in first unit test: <60% / 60-80% / >80%
12) Do you drink milk daily? Yes / No
13) Do you eat fruits for breakfast? Yes / No
14) Do parents force you to eat breakfast? Yes / No
15) Do you skip breakfast due to late waking? Yes / No
16) Energy level till lunch: High / Medium / Low
17) Do you buy food from canteen in morning? Yes / No
18) Is breakfast important for students? Yes / No
19) Would you eat breakfast if given choice? Yes / No
20) Do you know benefits of breakfast? Yes / No

8. Project 8

Awareness and Use of UPI/Digital Payments Among Shopkeepers in My Local Market
Questionnaire

1) Type of shop: Grocery / Stationery / Medical / Clothes / Other
2) Age of shopkeeper: <30 / 30-45 / 45-60 / >60
3) Education: Below 10th / 10th-12th / Graduate / Postgraduate
4) Do you accept UPI? Yes / No
5) Since when using UPI? <6 months / 6-12 months / 1-2 yrs / >2 yrs
6) Most used app: Paytm / PhonePe / GPay / BHIM
7) % of daily customers using UPI: <25% / 25-50% / 50-75% / >75%
8) Do you prefer UPI or cash? UPI / Cash / Both



9) Reason for UPI: Easy / Safe / No change problem / Customer demand
10) Problem faced in UPI: Network / Failed txn / Fraud / None
11) Do you have QR code displayed? Yes / No
12) Do customers ask for UPI? Yes / No / Sometimes
13) Do you maintain digital transaction record? Yes / No
14) Are you aware of UPI charges? Yes / No
15) Has UPI increased your sales? Yes / No / Not sure
16) Do you offer discount for UPI? Yes / No
17) Is cash handling reduced? Yes / No
18) Do you trust UPI payments? Yes / No
19) Do you need help to use UPI? Yes / No
20) Will you continue using UPI? Yes / No

9. Project 9

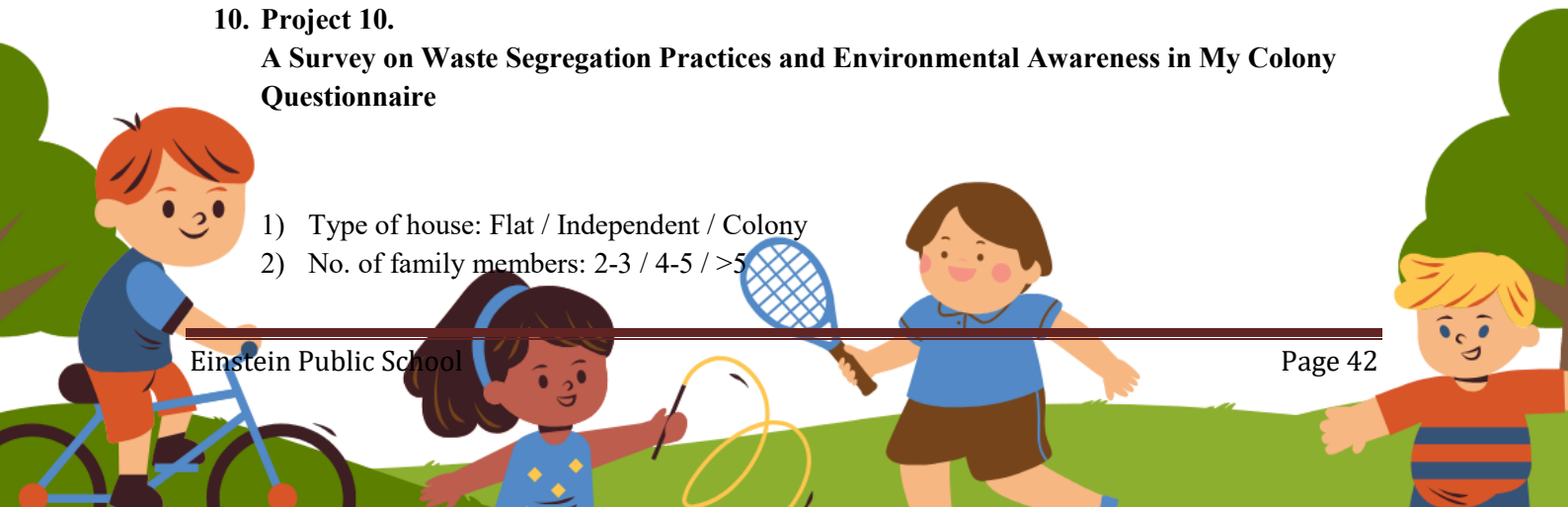
Time Spent on Sports/Physical Activity and Academic Performance: A Correlation Study Questionnaire

1) Do you play sports daily? Yes / No / Sometimes
2) Time spent on physical activity daily: 0 / <30 min / 30-60 min / >60 min
3) Preferred activity: Cricket / Football / Badminton / Yoga / Gym / None
4) Do you play for school team? Yes / No
5) Do you feel fresh after playing? Yes / No
6) Avg study hours daily: <1 / 1-2 / 2-3 / >3
7) Marks in last exam: <60% / 60-80% / >80%
8) Do parents support sports? Yes / No
9) Does sports reduce study time? Yes / No
10) Do you play during exam days? Yes / No
11) Do you think sports improve concentration? Yes / No
12) Do you have PE period daily? Yes / No
13) Do you participate in annual sports day? Yes / No
14) Do you feel stressed without sports? Yes / No
15) Preferred time for sports: Morning / Evening
16) Do you use sports apps/watches? Yes / No
17) Do you follow a fitness routine? Yes / No
18) Are sports facilities good in school? Yes / No
19) Would you choose sports as career? Yes / No / Maybe
20) Does physical activity help in academics? Yes / No / Not sure

10. Project 10.

A Survey on Waste Segregation Practices and Environmental Awareness in My Colony Questionnaire

1) Type of house: Flat / Independent / Colony
2) No. of family members: 2-3 / 4-5 / >5



3) Do you segregate waste at home? Yes / No / Sometimes
4) No. of dustbins at home: 1 / 2 / 3 / >3
5) Do you know about wet & dry waste? Yes / No
6) Do you have compost pit? Yes / No
7) How is kitchen waste disposed? Municipal van / Compost / Throw openly
8) Do you use plastic bags? Yes / No / Sometimes
9) Do you carry cloth bag for market? Yes / No
10) Is waste collected daily? Yes / No
11) Do you know about e-waste? Yes / No
12) How do you dispose old batteries? Dustbin / E-waste center / Don't know
13) Do you burn waste? Yes / No
14) Have you attended awareness program? Yes / No
15) Does your colony have segregation rules? Yes / No
16) Do you reuse items? Yes / No
17) Is your area clean? Yes / No
18) Who is responsible for cleanliness? Govt / Citizens / Both
19) Will you start segregating if not doing? Yes / No
20) Is waste segregation important? Yes / No

How to use these in your project:

1) Print/survey with 25-30 people
2) Make 2 graphs: bar diagram + pie chart for any 2 questions
3) Write 1-page analysis: "60% students use >2 hrs screen time" etc.

Political Science

Assignment Structure & Guidelines:

- Part A: 10 Multiple Choice Questions (MCQs) [Q1 – Q10]
- Part B: 05 Assertion-Reason Questions [Q11 – Q15]
- Part C: 10 Short Answer Questions (3-4 Marks) [Q16 – Q25]
- Part D: 10 Long Answer Questions (5-6 Marks) [Q26 – Q35]
- Part E: 05 Map-Based Questions [Q36 – Q40]

Instructions: All questions are compulsory. Answers should be written neatly in the dedicated Political Science holiday homework notebook. For the map work, locate and label the states on an outline political map of India, and securely paste it into your notebook.

Part A: Multiple Choice Questions (MCQs)

Choose the most appropriate option for each of the following questions.

Book 1: Indian Constitution at Work (Constitution: Why and How?)

1. Who chaired the Drafting Committee of the Indian Constitution?

(a) Dr. Rajendra Prasad

(b) Jawaharlal Nehru

(c) Dr. B.R. Ambedkar

(d) Sardar Vallabhbhai Patel

2. The idea of Fundamental Rights in the Indian Constitution was borrowed from which country?

(a) United Kingdom

(b) United States of America

(c) Ireland

(d) Soviet Union

3. The Constitution of India was formally adopted on which date?

(a) 15th August 1947

(b) 26th November 1949

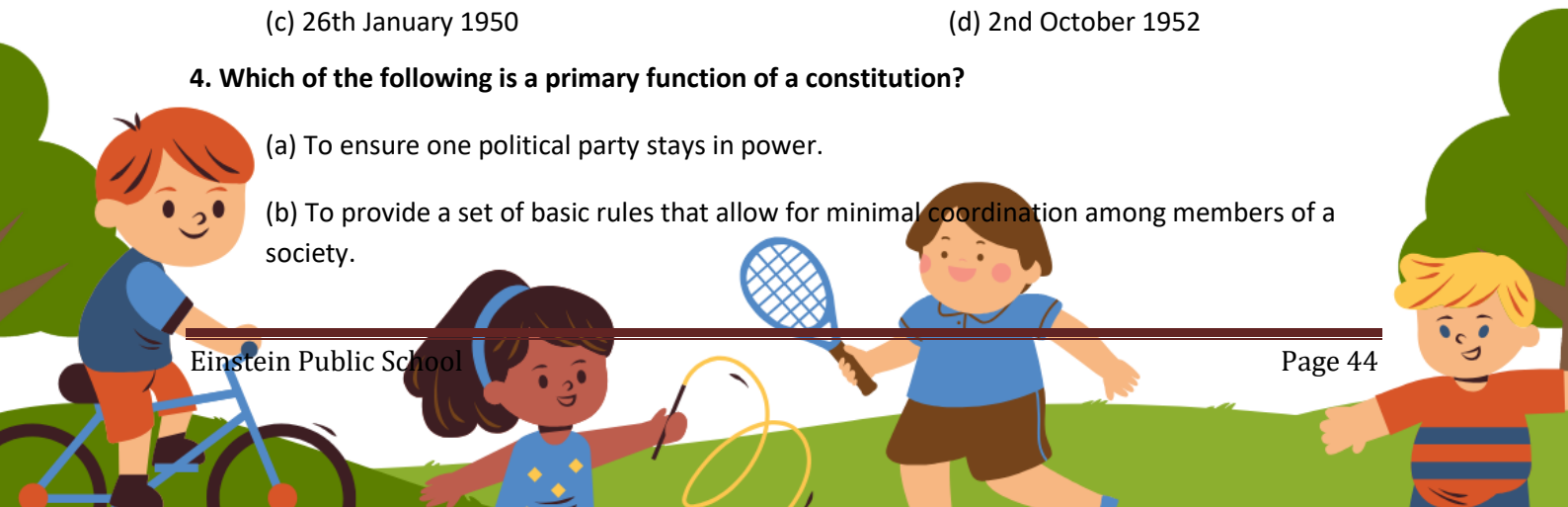
(c) 26th January 1950

(d) 2nd October 1952

4. Which of the following is a primary function of a constitution?

(a) To ensure one political party stays in power.

(b) To provide a set of basic rules that allow for minimal coordination among members of a society.



(c) To eliminate the judiciary's power.

(d) To dictate the personal lifestyle choices of citizens.

5. The Constituent Assembly took approximately how long to finish its historic task?

(a) 1 Year (b) Nearly 3 Years (c) 5 Years (d) 6 Months

Book 2: Political Theory (Political Theory: An Introduction)

6. The term 'Politics' is derived from the Greek word 'Polis', which means:

(a) Police (b) State / City-State (c) People (d) King

7. Who among the following is considered an ancient political thinker who extensively discussed the examination of justice?

(a) Karl Marx (b) Plato (c) John Locke (d) Jean-Jacques Rousseau

8. Which of the following statements best describes the primary objective of political theory?

(a) It is only about winning regional elections and managing party politics.

(b) It trains citizens to think rationally about political life and core values like freedom and equality.

(c) It is a purely mathematical study of administrative governance.

(d) It is meant exclusively for career politicians and diplomats.

9. The historical book 'Hind Swaraj' was written by:

(a) Subhas Chandra Bose (b) Mahatma Gandhi

(c) Dr. B.R. Ambedkar (d) Rabindranath Tagore

10. Political theory comprehensively deals with the foundational ideas and principles that shape:

(a) Only international corporate business

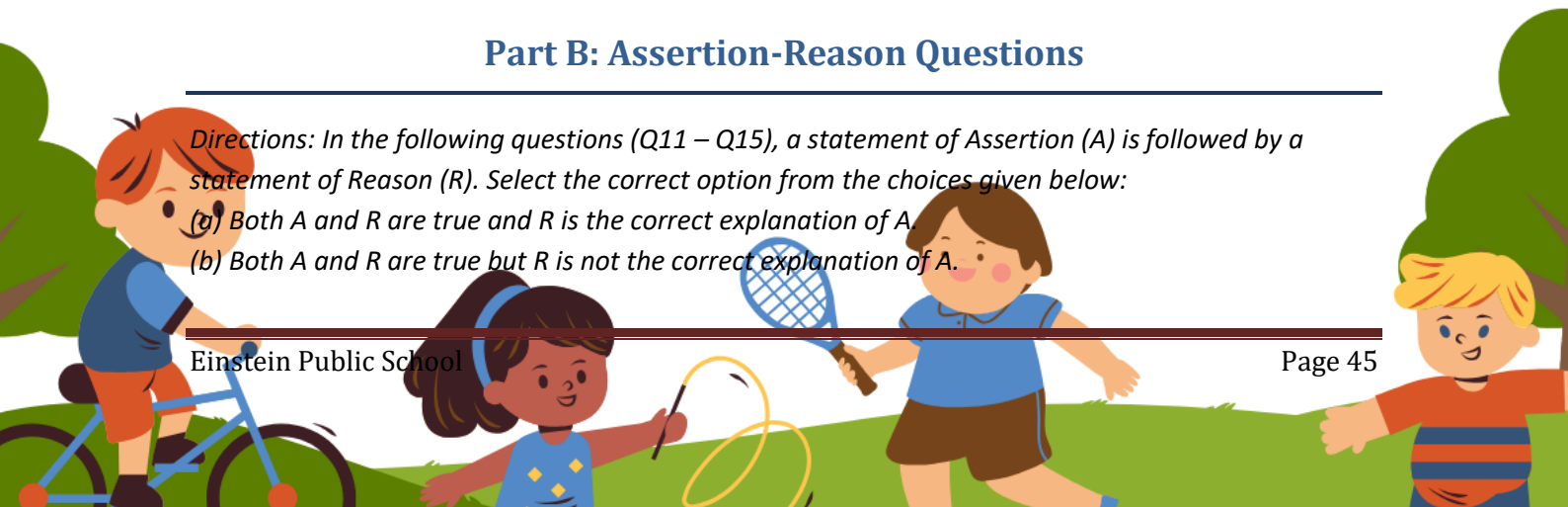
(b) Constitutions, governments, and social life

(c) Scientific inventions and discoveries

(d) Global sports management and ethics

Part B: Assertion-Reason Questions

Directions: In the following questions (Q11 – Q15), a statement of Assertion (A) is followed by a statement of Reason (R). Select the correct option from the choices 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 but R is true.

11. Assertion (A): The Indian Constitution is widely acknowledged as a 'living document'.
Reason (R): It possesses the flexibility to be amended and adapted according to changing social realities, expectations, and needs over time.

12. Assertion (A): The Constituent Assembly of India was not elected directly by universal adult franchise.
Reason (R): The Cabinet Mission plan of 1946 proposed an indirect method of election through the members of the existing Provincial Legislative Assemblies.

13. Assertion (A): Political theory is completely irrelevant for school students because they have not reached the voting age.
Reason (R): Political theory systematically helps clarify the structural meaning of concepts like liberty, equality, and justice which we regularly encounter in daily life.

14. Assertion (A): A robust constitution sets definite limits on what a government can impose or dictate to its citizens.
Reason (R): These constitutional limits are fundamental in the sense that the government may never trespass them, particularly concerning fundamental rights.

15. Assertion (A): Human beings are highly unique living entities because they possess the capacity for reason, critical thinking, and language.
Reason (R): Animals participate actively in public political debates and form systematic structures of institutional governments.

Part C: Short Answer Questions (3-4 Marks)

Answer the following questions in about 60–80 words each.

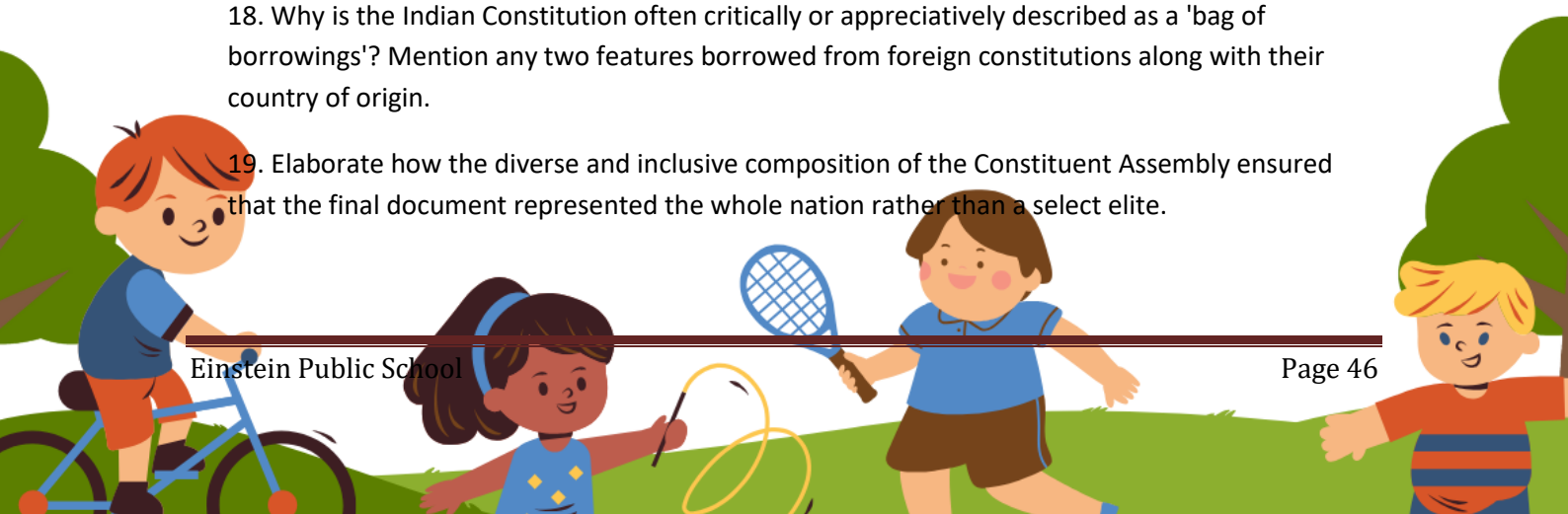
Book 1: Indian Constitution at Work

16. Explain what is meant by the 'Objectives Resolution' moved by Pt. Jawaharlal Nehru. Why is it considered a foundational milestone in our constitutional history?

17. State and succinctly describe any three basic functions that a constitution performs for a diverse society.

18. Why is the Indian Constitution often critically or appreciatively described as a 'bag of borrowings'? Mention any two features borrowed from foreign constitutions along with their country of origin.

19. Elaborate how the diverse and inclusive composition of the Constituent Assembly ensured that the final document represented the whole nation rather than a select elite.



20. What is meant by the 'authority of a constitution'? What specific factors make a constitution authoritative and effective in real practice?

Book 2: Political Theory: An Introduction

21. Define political theory in your own words. Provide two primary reasons why senior secondary students should study it.

22. Differentiate between 'politics' as practiced by politicians, political parties, or government officials, and 'politics' studied as a systematic academic discipline.

23. 'Political values are not static; their meanings evolve and change over time.' Explain this statement with a suitable modern example.

24. In what concrete ways does a structured understanding of political theory help individuals become better, more vigilant, and more responsible citizens?

25. Briefly explain the philosophical significance of the dialogue between Socrates and Cephalus / Polemarchus regarding the core meaning of 'justice' as discussed in Plato's Republic.

Part D: Long Answer Questions (5-6 Marks)

Answer the following questions in about 120–150 words each. Provide balanced points and structured arguments.

Book 1: Indian Constitution at Work

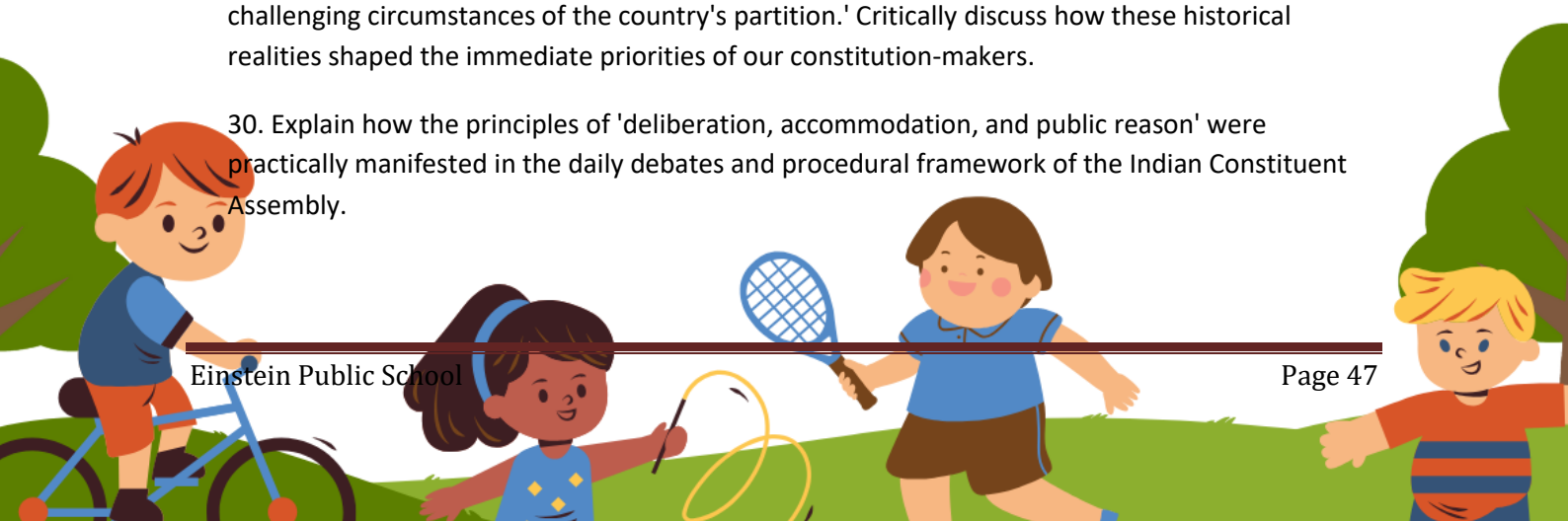
26. Analyse the principal reasons why the Indian Constitution has enjoyed an exceptionally high degree of legitimacy, continuity, and stability since 1950, whereas many other post-colonial nations faced constitutional collapses.

27. Elaborate on the substantive provisions required for a stable constitution. Discuss how the Indian Constitution carefully balances institutional design (among the Legislature, Executive, and Judiciary) to effectively prevent institutional tyranny.

28. Discuss in detail the profound role, visionary contribution, and leadership of Dr. B.R. Ambedkar in his capacity as the Chairman of the Drafting Committee of the Indian Constitution.

29. 'The Indian Constitution was meticulously crafted under extraordinary, traumatic, and deeply challenging circumstances of the country's partition.' Critically discuss how these historical realities shaped the immediate priorities of our constitution-makers.

30. Explain how the principles of 'deliberation, accommodation, and public reason' were practically manifested in the daily debates and procedural framework of the Indian Constituent Assembly.



Book 2: Political Theory: An Introduction

31. Comprehensively define the concept of 'Politics'. Why is there a widespread public skepticism, cynicism, or highly negative perception surrounding politics in contemporary times? Suggest measures to correct this perception.

32. Discuss how political theory systematically examines abstract values like freedom, equality, secularism, and justice, and explain how it critically links these concepts to our everyday social actions and experiences.

33. 'Should the study of political theory be confined exclusively to bureaucrats, policy makers, lawyers, and politicians?' Strongly defend your stance with sound arguments.

34. Explain how rapid globalization, digital technology, mass media, and sophisticated information networks are raising entirely new ethical questions and structural challenges that contemporary political theorists need to urgently address.

35. Critically examine and discuss the core ideological perspectives or differences between the political thought of Mahatma Gandhi (focusing on freedom and Swaraj) and Dr. B.R. Ambedkar (focusing strictly on structural social equality and caste eradication).

Part E: Map-Based Questions

Instructions: Carefully study an outline political map of India. Identify the specific states based on the historical, geographical, and constitutional clues provided below (Q36 – Q40). In your answer sheet, draw the corresponding table format and record the serial number of the clue, the identified state name, and the appropriate alphabet alphabetized on your map.

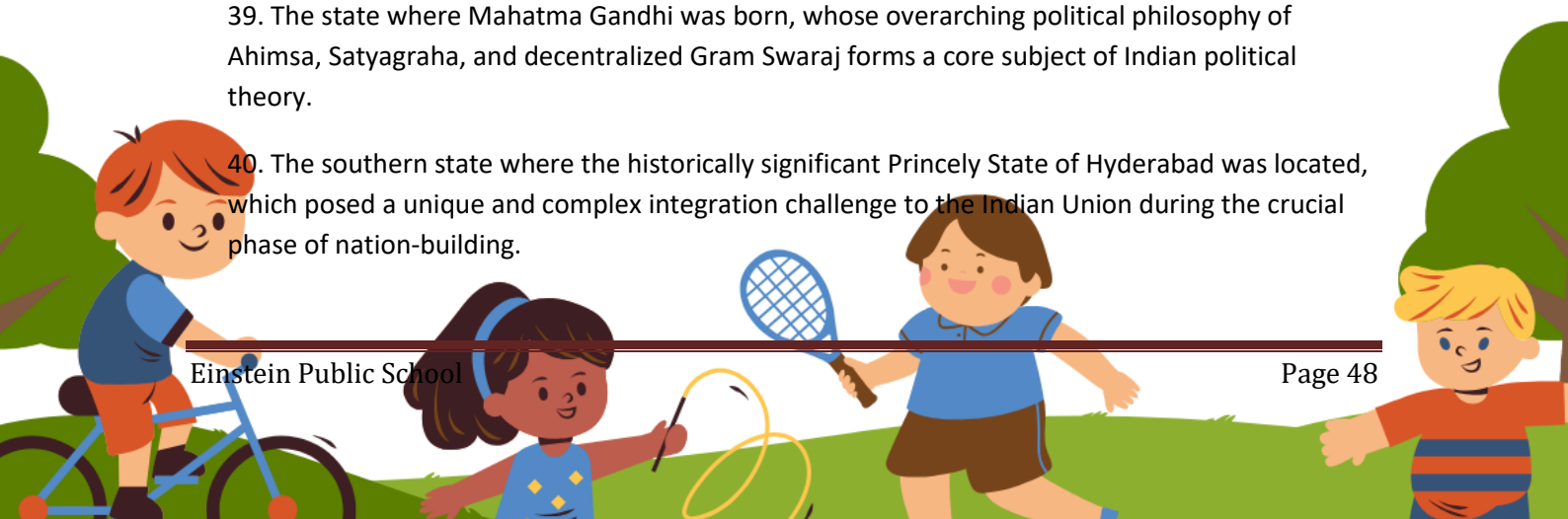
36. The specific Indian state to which the highly respected President of the Constituent Assembly, Dr. Rajendra Prasad, originally belonged.

37. A prominent border state that witnessed intense communal violence, displacement, and demographic disruption during the 1947 Partition, profoundly affecting the social backdrop of early constitutional deliberations.

38. The western Indian state associated with Bardoli, where a prominent and influential Constituent Assembly member, Sardar Vallabhbhai Patel, successfully led a landmark peasant Satyagraha.

39. The state where Mahatma Gandhi was born, whose overarching political philosophy of Ahimsa, Satyagraha, and decentralized Gram Swaraj forms a core subject of Indian political theory.

40. The southern state where the historically significant Princely State of Hyderabad was located, which posed a unique and complex integration challenge to the Indian Union during the crucial phase of nation-building.



Clue Number	Identified Indian State	Corresponding Alphabet on Map
36		
37		
38		
39		
40		

Geography

Section A: Multiple Choice Questions (10 Marks)

Choose the correct option for each of the following questions.

Q1. Who among the following coined the term 'Geography' first?

(a) Herodotus (b) Eratosthenes (c) Aristotle (d) Ptolemy

Q2. Which one of the following features can be termed as a 'physical feature'?

(a) Port (b) Road network (c) Plain (d) Water canal

Q3. The Big Bang Theory explains the origin of which of the following?

(a) Continents (b) Oceans (c) Universe (d) Solar System

Q4. Which of the following is an example of a terrestrial planet?

(a) Jupiter (b) Saturn (c) Mars (d) Neptune

Q5. By which process did the Earth separate into distinct layers based on density?

(a) Degassing (b) Differentiation (c) Photosynthesis (d) Accretion

Q6. What is the southernmost point of the Indian Union?

(a) Indira Col (b) Kanyakumari (c) Indira Point (d) Kibithu

Q7. Which standard meridian is chosen for India to calculate Indian Standard Time (IST)?

(a) 82^{o} 30′ E (b) 84^{o}30′ E (c) 68^{o}7′ E (d) 97^{o} 25′ E

Q8. The Tropic of Cancer does NOT pass through which of the following Indian states?

(a) Rajasthan (b) Tripura (c) Odisha (d) Chhattisgarh

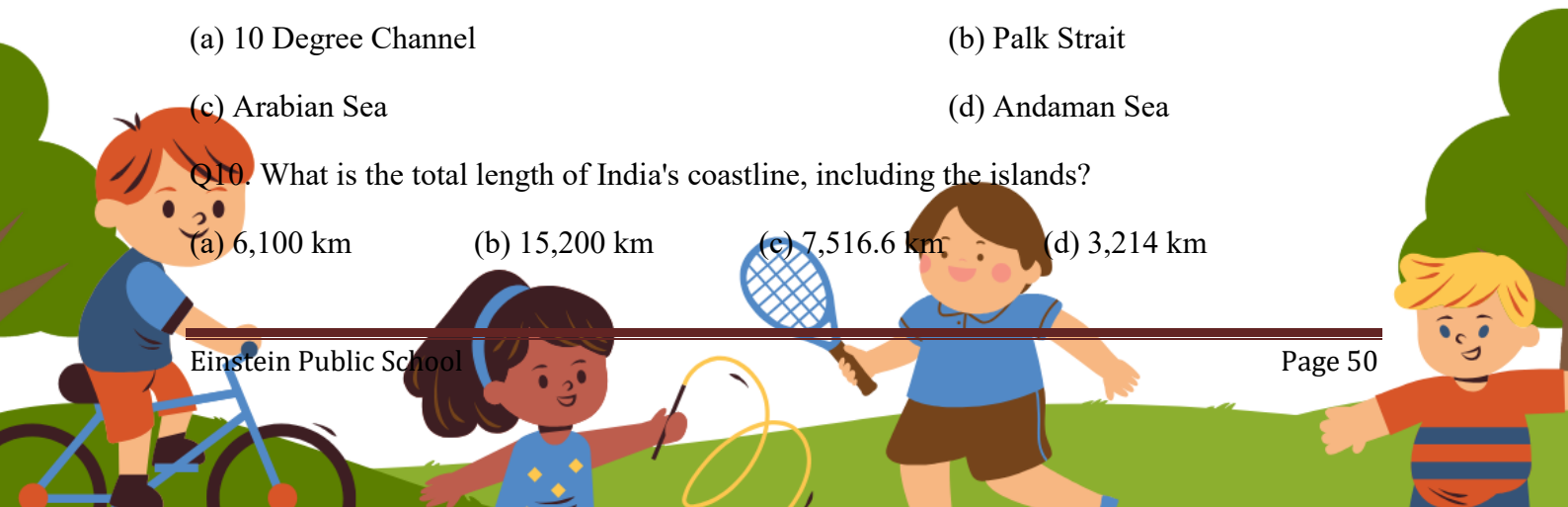
Q9. Which water body separates India from Sri Lanka?

(a) 10 Degree Channel (b) Palk Strait

(c) Arabian Sea (d) Andaman Sea

Q10. What is the total length of India's coastline, including the islands?

(a) 6,100 km (b) 15,200 km (c) 7,516.6 km (d) 3,214 km



Section B: Assertion & Reason (5 Marks)

In the following questions, a statement of Assertion (A) is followed by a statement of Reason (R). Mark the correct choice as:

(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.

Q11. Assertion (A): Geography is an interdisciplinary subject.
Reason (R): Geography studies the spatial distribution of both natural and human phenomena, drawing insights from natural and social sciences.
Q12. Assertion (A): The inner planets (Mercury, Venus, Earth, Mars) are rocky and have high densities.
Reason (R): They were formed close to the parent star, where it was too warm for gases to condense into solid particles, and solar winds blew away most of their lighter gases.
Q13. Assertion (A): The early atmosphere of Earth was rich in oxygen.
Reason (R): Living organisms contributed to the atmospheric oxygen through the process of photosynthesis over a long period.
Q14. Assertion (A): India has a vast longitudinal extent of nearly 30^{o} , causing a time difference of about two hours between its easternmost and westernmost points.
Reason (R): India uses the standard meridian $82^{o}30'$ E to avoid confusion and maintain a uniform time throughout the country.
Q15. Assertion (A): No country has a longer coastline on the Indian Ocean than India.
Reason (R): India's eminent position in the Indian Ocean justifies the naming of an ocean after it.

Section C: Short Answer Questions (10 Marks)

Answer the following questions in about 60–80 words.

Q16. Explain the three core questions that geography attempts to answer (the What, Where, and Why).

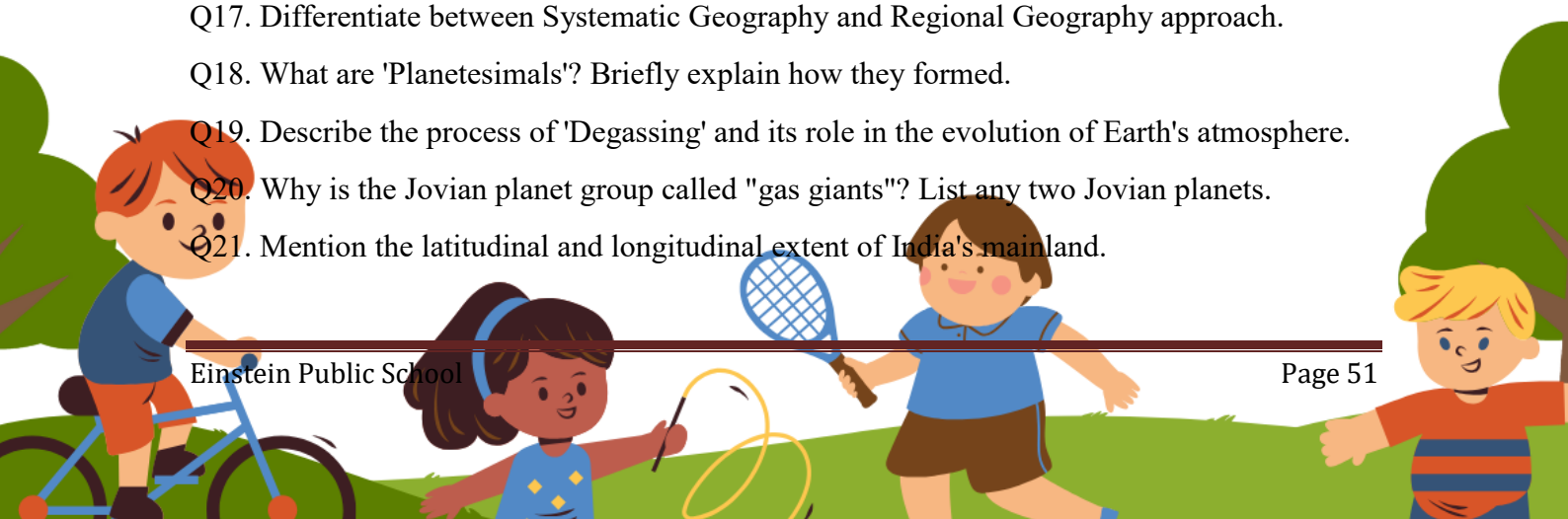
Q17. Differentiate between Systematic Geography and Regional Geography approach.

Q18. What are 'Planetesimals'? Briefly explain how they formed.

Q19. Describe the process of 'Degassing' and its role in the evolution of Earth's atmosphere.

Q20. Why is the Jovian planet group called "gas giants"? List any two Jovian planets.

Q21. Mention the latitudinal and longitudinal extent of India's mainland.



Q22. Why did India choose 82º 30′ E as its Standard Meridian? What would happen if we didn't have a standard meridian?
Q23. Name the countries that share land boundaries with India. Which country shares the longest border?

Q24. Explain how India's central location at the head of the Indian Ocean has historically helped its trade and cultural relations.

Q25. Briefly mention the significance of the Suez Canal in shortening India's maritime distance from Europe.

Section D: Long Answer Questions (10 Marks)

Answer the following questions in about 120–150 words.

Q26. Geography is often described as a discipline of "integration". Elaborate on this statement by showing its relationship with other natural and social sciences.

Q27. Discuss the various branches of Physical Geography and explain why studying them is essential for humans.

Q28. Critically analyze the Nebular Hypothesis regarding the origin of the Earth and the solar system. Who modified it?

Q29. Explain the Big Bang Theory in detail, outlining the stages of the expansion of the universe.

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Explore

Q30. Describe the internal structure of the Earth by explaining how it evolved into a layered structure (Crust, Mantle, and Core).

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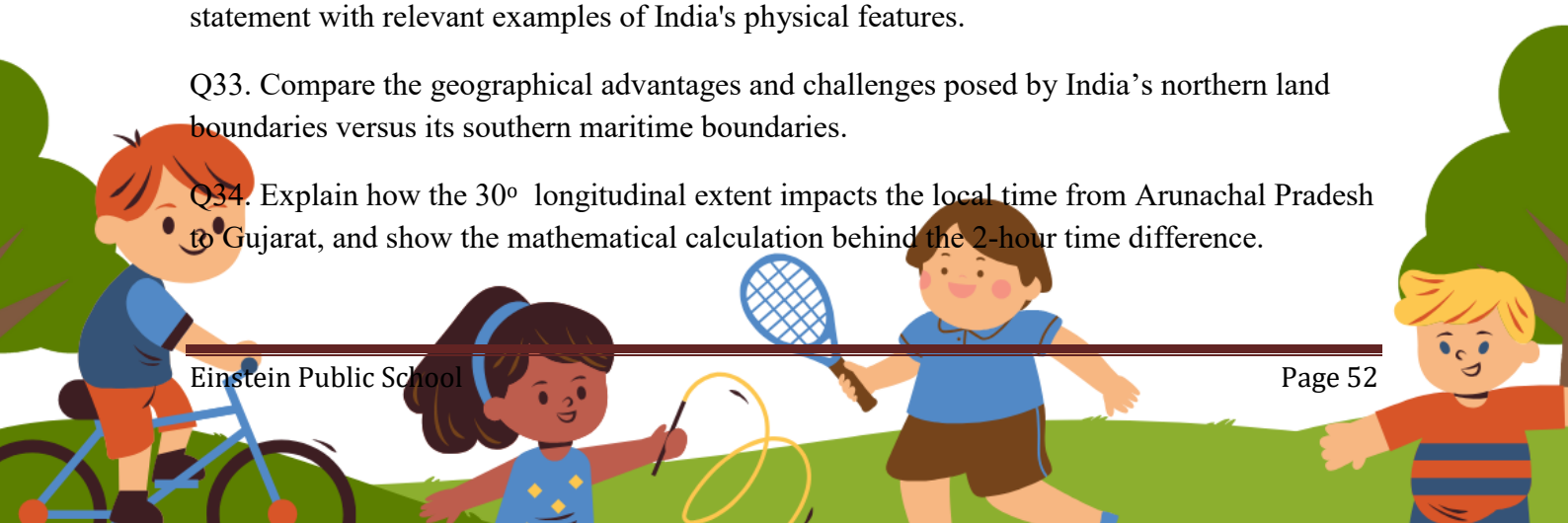
Q31. Detail the origin and evolution of life on Earth. How did life change the composition of the atmosphere?

Q32. "The size of India has endowed her with a great physical diversity." Justify this statement with relevant examples of India's physical features.

Q33. Compare the geographical advantages and challenges posed by India's northern land boundaries versus its southern maritime boundaries.

Q34. Explain how the 30º longitudinal extent impacts the local time from Arunachal Pradesh to Gujarat, and show the mathematical calculation behind the 2-hour time difference.



Q35. Discuss India's geopolitical relations with its neighboring countries in South Asia, emphasizing SAARC or the concept of the Indian subcontinent.

Section E: Map Based Questions (5 Marks)

On an outline political map of India, locate, label, and mark the following features accurately:

Q36. The Standard Meridian of India (82° 30′ E line).

Q37. The Tropic of Cancer (23° 30′ N line) and any two states it passes through.

Q38. The southernmost tip of the Indian mainland (Kanyakumari) and the northernmost point (Indira Col).

Q39. The neighboring island countries of India (Sri Lanka and Maldives).

Q40. The water bodies bounding the Indian peninsula: The Arabian Sea, the Bay of Bengal, and the Indian Ocean.

History

Write proper long answer of given questions.

1-How did the Roman Empire maintain control over such a vast territory?

2-Explain the causes responsible for the fall of the western Roman Empire.

3-Describe the contribution of Romans in architecture and engineering.

4-Discuss the spread and impact of Christianity in the Roman Empire.

5-Compare the eastern and western parts of the Roman Empire.

6-How did trade and transport contribute to the prosperity of Mesopotamian cities?

7-Explain the importance of religion in Mesopotamian society.

8-Describe the achievements of Mesopotamian civilisation.

9-Discuss the causes behind the rise of cities in Mesopotamia.

10-Explain the role of kings, temples, and trade in Mesopotamian civilisation.

Map work

1-Locate and mark these.

- Important Rivers
- Tigris River
- Euphrates River

2-Important Cities

- Ur
- Uruk
- Babylon
- Mari
- Nineveh

3-Important Seas

- Mediterranean Sea
- Black Sea
- Red Sea

4-Important Cities

- Rome
- Constantinople
- Alexandria
- Jerusalem
- Antioch