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APPENDIX - I
Specimen Module for Each Subject

ENGLISH
A LEARNING MODULE ON NON-FINITE VERBS
FOR CLASS VIII STUDENTS

OVERVIEW

This study material is known as Module - a sort of self contained package dealing with the content of the 'Non-Finite Verbs' in English. It can be used in any setting convenient to the learner and may be completed at the learner's own pace. The module includes :-

a) Instruction
b) An entry Test
c) A Pre-test
d) Objectives
e) The study material
f) A Post-test

Supporting multimedia packages:

1. Audio and Video Cassettes
2. Chart showing Non-Finite verbs
3. Substitution Tables to drill and practise Non-Finite verbs
4. Flash Cards
INSTRUCTIONS

Dear Students,

Before you go through the module, please read the instructions given and follow them.

1) Take the entry test first. It includes 10 multiple choice items. Each consists of four alternatives. Indicate the best or the correct answer in a separate sheet.

2) The key for the entry test is given at the end of the module. Score your answer. If your score is at least five marks out of ten, please go through the module. Otherwise, equip yourselves before reading the module.

3) Read and understand the instructional objectives carefully.

4) Take the pre-test given. It consists of 10 multiple choice items.

5) The key for the pre-test is given at the end of the module. Score your answers and note them down.

6) Now you are free to read the learning module. You can take your own time to complete it. But total mastery is anticipated. Follow the instructions given. When you complete the module, take the post-test. Find out the score for it. Compare your achievement with the pre-test score.
ENTRY TEST

The students are expected to take the entry test. Each correct answer may be given a score. If the student scores a minimum of five marks, he can go through the learning module. Otherwise, he has to read and equip himself before he continues this module. Responses may be given in a separate sheet and scored separately as per key given:

1) There are _________ tense forms in English.
   a) three  b) six  c) nine  d) twelve

2) There are _________ parts of speech in English.
   a) five  b) ten  c) eight  d) four

3) There is no passive voice for _________ tense forms.
   a) three  b) four  c) two  d) six

4) There can be no sentence without _________
   a) subject  b) verb  c) object  d) predicate

5) If there is no _________ in a sentence, it cannot be changed into passive voice.
   a) object  b) subject  c) verb  d) complement

6) _________ is related to verb.
   a) subject  b) object  c) complement  d) adjunct

7) Complement is related to _________
   a) subject only  b) verb only  c) object only  d) either subject or object.

8) A verb that agrees with the subject in _________ is called a finite verb.
   a) time  b) number  c) number & person  d) person

9) Present participle always ends in _________ form
   a) en  b) ing  c) ed  d) t

10) _________ eats apples. Here the subject is
    a) either singular  b) singular  c) plural  d) third person
    or plural

    singular
PRE TEST

Below are given true or false items on verb. The student is expected to take the test before he reads the module. Each item consists of true or false alternatives. For each item the student is expected to tick true or false. Each item carries one mark. Scoring key is given at the end of module. After the test is taken, score the responses and find out your scores in the test. Use separate sheet for your answers.

1) A verb is transitive if the action does not stop with the agent, but passes from the agent to something else. True / false

2) A verb is intransitive when the action stops with the agent, and does not pass from the agent to anything else. True / false

3) There are three kinds of verbs. True / false

4) Object is related to subject. True / false

5) Complement is related to a verb. True / false

6) Finite verb agrees with the subject in number and person. True / false

7) A non-finite verb agrees with the subject in number and person. True / false

8) There are two kinds of non-finite verbs. True / false

9) Complement is related to either subject or object. True / false

10) Auxiliary verb helps to form tense or mood of some principal verb. True / false
OBJECTIVES

GENERAL OBJECTIVES

i) To help the students understand finite and non-finite verbs.

ii) To enable the students to understand the kinds of non-finite verbs.

SPECIFIC OBJECTIVES

i) To enable the students to understand the uses of Infinitive, Gerund and Participle.

ii) To enable them to understand the similarities in the uses of Gerund and Infinitive.

iii) To enable them to know the difference between Gerund and Participle.

LEARNING MATERIAL FOR OBJECTIVE - I

Finite Verb

A verb that agrees with the subject in number and person is called a finite verb.

Non-finite Verb

A verb that does not agree with the subject in number and person is called the Non-finite verb.

Study the following sentences:

1) a) I go to swim everyday.

b) He goes to swim everyday.

2) a) She often runs home, shouting with joy.

b) They often run home shouting with joy.

3) a) Guarded by the servant the boy sleeps inside.

b) Guarded by the servant the boys sleep inside.
In the above sentences go, goes, run, runs, sleep, sleeps are finite verbs, since these verbs agree with the subject in number and person. And the underlined verbs are non-finite verbs.

**Kinds of Non-finite Verbs**

Non-finite verbs are of three kinds. They are

i) the infinitive

ii) the participle

iii) the gerund

**EMBEDDED TEST - I**

1) A verb that agrees with the subject in number and person is called __________

2) A verb that does not agree with the subject in number and person is called __________

3) Non-finite verbs are of __________ kinds.

4) She goes to dance. In this sentence __________ is a finite verb.

5) She appears charming today. In this sentence __________ is a non-finite verb

**LEARNING MATERIAL FOR OBJECTIVE - II**

**Use of Infinitive**

1) Infinitive is used as subject to a verb e.g. To err is human.

2) Infinitive is used as object to a verb e.g. No one likes to die. I like to sing.

3) Infinitive is used as complement to a verb e.g. This house is to let.

4) Infinitive is used as object to a preposition e.g. I am about to start.
Forms of Infinitive

There are two forms of infinitive. They are

i) the present infinitive

ii) the perfect infinitive

e.g. i) I wish to help you (Present infinitive)

ii) He seems to have been rich (Perfect infinitive)

He appears to have told the truth (Perfect infinitive)

Use of Participle

\[ P = V + A \]

Participle = Verb + Adjective

Participle is a verbal adjective. It often does the work of an adjective.

The present participle always ends in 'ing'. The past participle of most verbs ends in 'ed', 'd', 't', 'en' and 'n'.

Uses of the Present Participle

i) Present participle is used with the verb 'to be' to form the continuous tenses, e.g. He is reading.

ii) Present participle is used as adjectives, e.g. A running stream, a sleeping beauty, a dying soldier.

iii) Present participle is used as a part of predicate with verbs like 'to be', 'to seem', 'to become', etc, e.g. This novel is interesting, She appears charming today.

iv) Present participle is used in comparative and superlative forms, e.g. Your story is more interesting than his.

v) Present participle is used governing an object, e.g. We saw two birds building a nest.
vi) Present participle is used as adverb equivalents
   e.g. The students ran home shouting with joy. Walking along the road I met my old friend

Use of Past participle

i) Past participle is used with the verb ‘to have’ to form perfect tenses
    e.g. He has beaten the boy. The match had begun

ii) Past participle is used with the verb ‘to be’ to form passive voice
    e.g. The dinner is served. The site has been selected

Use of Perfect participle

Perfect participle is used to show an action as completed at some past time
    e.g. Having finished my homework, I went to the Market

Gerund or Verbal Noun

G = V + N
Gerund = Verb + Noun

Gerund is a verbal noun. Gerund does the work of a noun

Uses of Gerund

1) Gerund is used as subject to a verb
   e.g. Teaching is my profession. Hunting is my favourite sports

2) Gerund is used as object to a verb
   e.g. Stop talking. I like dancing

3) Gerund is used as object to a preposition
   e.g. I am tired of walking.
       He is fond of eating

4) Gerund is used as complement to a verb
   e.g. Thinking is doing. Seeing is believing
EMBEDDED TEST - II

1) There are _____ forms of Infinitive.
2) Participle is a verbal _____
3) There are _____ forms of participle
4) Gerund is a verbal _____
5) Gerund and infinitive perform _____ functions.

PRACTICUM

I. Rewrite the following sentences using infinitive

1) I like swimming.
2) Walking is a good exercise.
3) It was nice meeting you after a long time.
4) Seeing is believing.
5) I hate reading up to midnight.

II. Rewrite the following sentences changing the underlined word into gerund.

1) To err is human.
2) To teach is her profession.
3) They like to hunt wild animals.
4) He delayed to pay his taxes.
5) I don't like to go there empty handed.

III. Rewrite the following sentences using participle changing the underlined part.

1) People who live in glass houses should not throw stone at others.
2) The girl who dances is my sister.
3) When I walked along the road I met my friend.
4) The soldier who was wounded was admitted to hospital.
5) A stone that rolls gathers no moss.
POST TEST

Take the following test now. Each item consists of four alternatives. You are expected to choose the best or the correct response and give your answers in a separate sheet. Each item carries one mark. Scoring key is given at the end of the module. After the test is over, score the answers and find out your scores on the test.

1) Non-finite verbs are of ______ kinds.
   a) two       b) three       c) four       d) five

2) There are ______ forms of infinitive.
   a) two       b) three       c) four       d) only one

3) There are ______ forms of participles.
   a) only one   b) two         c) three      d) four

4) This house is to let. Here the infinitive is used as.
   a) subject to a verb          b) object to a verb
   c) complement to a verb       d) object to a preposition

5) In which of the following sentences is Infinitive used as object to a preposition?
   a) They are about to start     b) they want to go on a picnic.
   c) He likes to draw            d) to forgive is divine.

6) To walk in the morning is pleasant. Here infinitive is used as
   a) subject to a verb           b) object to a verb
   c) object to a preposition    d) complement to a verb.

7) Seeing is believing. Here the gerund is used as
   a) subject to a verb           b) object to a verb
   c) complement to a verb       d) object to a preposition
8) In which of the following sentences is gerund used as object to a verb?
   a) I saw a man going to the post office
   b) The children came home shouting with joy
   c) He likes swimming
   d) She is fond of dancing

9) In which of the following sentences is gerund used as object to a preposition?
   a) He is tired of walking
   b) he went away crying
   c) She saw a man swimming across the river.
   d) He went there for eating.

10) She appears charming today. Here participle is used as
    a) adverb equivalent
    b) a part of predicate
    c) superlative
    d) adjective

11) In which of the following sentences is participle used as adjective?
    a) He is reading a good novel.
    b) The students ran home shouting with joy.
    c) We saw two birds building a nest.
    d) They took the wounded soldier to hospital.

12) Having finished my work, I went to play. What we find in this sentence is
    a) gerund
    b) present participle
    c) perfect participle
    d) past participle

BOOKS TO BE REFERRED FOR FURTHER LEARNING


J.C. Nesfield  1990  English Grammar, Composition and Usage; Macmillan India Ltd., Madras.
PROJECTS TO BE TAKEN UP AS FOLLOW UP WORK

i) Take one of your prose lessons and point out the non-finite verbs.

ii) Try to identify the function performed by the non-finite verb.

iii) Repeat the same with an unseen passage.

Key to the Entry Test

1-d, 2-c, 3-b, 4-b, 5-a, 6-b, 7-d, 8-c, 9-b, 10-d.

Key to Pre Test

1) True 2) True 3) True 4) False 5) False
6) True 7) False 8) False 9) True 10) True

Key to Embedded Test - I

1) Finite verb 2) Non-finite verb 3) three 4) goes 5) charming

Key to Embedded Test - II

1) two 2) adjective 3) three 4) noun 5) similar

Key to Post Test

1-b, 2-a, 3-c, 4-c, 5-a, 6-a, 7-c, 8-c, 9-a, 10-b, 11-d, 12-c.
OVERVIEW OF THE MODULE

This study material is known as Module - a sort of self contained package dealing with the content of Equations. It can be used in any setting convenient to the learners and may be completed at the learners' own pace. The module includes:

a) Instruction
b) An entry Test
c) A Pre-test
d) Objectives
e) The study material
f) A Post Test

Supporting multimedia packages:

1. Audio and Video Cassettes
2. Charts
3. Models
4. Ring ball
INSTRUCTIONS

Dear Students,

Before you go through this module, please read the instructions given and follow them.

1) Take the entry test first. It includes multiple choice items. Each consists of four alternatives. Indicate the best or the correct answer in a separate sheet.

2) The key for the entry test is given at the end of the module. Score your answer. If your score is at least five marks out of ten, you may go through the module. Otherwise, equip yourselves before reading the module.

3) Read and understand the instructional objectives carefully.

4) Take the pre-test given. It consists of ten multiple choice items.

5) The key for the pre-test is given at the end of the module. Score your answers and note them down.

6) Now you are free to read the learning module. You can take your own time to complete it. But, total mastery is anticipated. Follow the instructions given. When you complete the module take the post-test. Find out the score for it. Compare your achievement with the pre-test score.
ENTRY TEST

The students are expected to take the entry test, each correct answer may be given a score. If the students score a minimum of five marks, they can go through the learning module. Otherwise, they have to read and equip themselves before going through this module. Responses may be given in a separate sheet and scored separately as per the key given.

1) Natural numbers begin with
   a) 0  b) 1  c) -1  d) 2

2) Between 2 and 3 there are _____ number of real
   a) a fixed  b) nine  c) infinite  d) no

3) \( \frac{3}{4} \) is a _____ number
   a) rational  b) natural  c) integer  d) irrational

4) \( \sqrt{2} \) is a _____ number
   a) rational  b) natural  c) integer  d) irrational

5) \( x + 6 = 11 \), Here the value of \( x \) is
   a) 17  b) 5  c) -5  d) 66

6) \( x - 8 = 12 \), Here the value of \( x \) is
   a) 4  b) 96  c) 20  d) -4

7) \( 48 - x = 8 \), Here the value of \( x \) is
   a) 6  b) 40  c) 56  d) 8

8) \( x - 6 = -10 \), Here the value of \( x \) is
   a) 16  b) -4  c) -4  d) 14

9) \( 6x = 42 \), Here the value of \( x \) is
   a) 8  b) 7  c) 36  d) 48

10) \( x^2 = 25 \), Here the value of \( x \) is
    a) -5  b) 10  c) 50  d) 5
PRE-TEST

Below are given multiple choice items on equations. The student is expected to take the test before he reads the module. Each item consists of four alternatives. For each item student is expected to choose the best or the correct response. Each item carries one mark. Scoring key is given at the end of the module. After the test is taken, score the responses and find out your scores in the test. Use separate sheets for your answers.

1) 15 - 7x = 85. Here the value of x is
   a) -10     b) +10     c) 105     d) 70

2) The total cost of 5 pens and 1 pencil is Rs. 37. In equation it can be expressed as,
   a) 5a x 1b = 37     b) 5a + b = 37
   c) 5a - b = 37     d) 5 + ab = 37

3) The sum of two adjacent angles is 180. The equation for this is
   a) AB = 180°     b) 2A = 180°
   c) A + B = 180°     d) A - B = 180°

4) 50 + 17 + 13 = 40 + 31 + x, Here the value of x is
   a) 6     b) 8     c) 11     d) 9

5) Prabhu is 5 years older than Raju. The sum total of their ages is 25. What are their ages?
   a) 15 and 10     b) 20 and 5
   c) 20 and 15     d) 10 and 15

6) If the perimeter is 32 m, the edge of a square is ______
   a) 4 cm     b) 8 cm
   c) 8 m     d) 16 m

7) If the area of a circle is 49 cm², then the radius is ______
   a) 7 cm     b) 7 m
   c) 24.5 cm     d) 7 cm

8) 4 (3x -2) = 17. Here the value of x is
   a) 12 / 25     b) 17 / 4
   c) 17 / 12     d) 25 / 12
9) Perimeter of a rectangle is 68 m, Length is 24 m. Here the breadth is ________
a) 44 m  
b) 12 m  
c) 10 m  
d) 34 m

10) The side of a square is $x$, Perimeter is $P$. The formula for finding $P$ is
a) $x^2$  
b) $a^2$  
c) $P = a^2$  
d) $P = 4x$

OBJECTIVES

GENERAL OBJECTIVES:

i) To enable the students to understand the variables.

ii) To enable the students to know the application of variables.

SPECIFIC OBJECTIVES:

On completion of this module the students will be able to:

i) frame formula

ii) apply the formula

iii) solve the equations with single variable

iv) solve the equations with double variables

LEARNING MATERIAL FOR OBJECTIVE - I

A natural number when multiplied by 3 and seven added to it gives rise to 34. What is the number.

To solve this problem we have to assign a variable for the natural number. Variables are necessary to frame and solve equations. For certain calculations variables are a must. For example, the above problem can be expressed in equation using the variable ‘$x$’ as follows:

$$3x + 7 = 34$$

It can be solved as follows:

$$3x = 34 - 7$$

$$x = 27 / 3 = 9$$
EMBEDDED TEST I

1) _______ are necessary to frame equations.

2) Variables are necessary to frame and _______ equations.

3) Variables can be represented by any _______

4) 4 x X = 12. Here X is a _______

5) For certain calculations variables are a _______

LEARNING MATERIAL FOR OBJECTIVE - II

i) Framing formula:
The length of a rectangle is 'l' and the breadth is 'b'. If its area is 'A', what is the formula for finding 'A'? We know that area of rectangle = length x breadth. Hence the variable 'l' is assigned to length and the variable 'b' is assigned to breadth. So we can frame the formula as A = lb.

ii) Evaluation of formula for given values:
In A = lb if l = 20, b = 12 find the value of 'A'. Here the variables l and b are assigned the values 20 and 12. Now we can substitute these values and easily get the result.

   A = lb
   A = 20 x 12
   A = 240

iii) Solving the equations with single variable. Consider the problem.

   3 (3x - 7) = 5 (2x -3)

   Solution:
   9x - 21 = 10x - 15
   9x - 10x = 21 - 15
   -x = 6
   x = -6
iv) Solving the equations with double variable:

\[ x + y = 7 \]  \hspace{1cm} (1)  \\
\[ x - y = -3 \]  \hspace{1cm} (2)

Solution:

\[ x + y = 7 \]  \hspace{1cm} (1)  \\
\[ x - y = -3 \]  \hspace{1cm} (2)

(1) + (2),  \hspace{1cm} 2x = 4

\[ x = 2 \]

Put \( x = 2 \) in (1)

\[ 2 = y = 7 \]
\[ y = 7 - 2 = 5 \]

Solution: \( x = 2, \quad y = 5 \)

**EMBEDDED TEST - II**

1) \( x + 7 = 3 \)  \( x \) is _____
2) \( x - 8 = 7 \)  \( x \) is _____
3) \( 6x = 42 \)  \( x \) is _____
4) \( x / 7 = 10 \)  \( x \) is _____
5) \( 5x - 8 = 7 \)  \( x \) is _____

**POST TEST**

Take the following test now. Each item consists of four alternatives. You are expected to choose the correct or the best answer in a separate sheet. Each item carries one mark. Scoring key is given at the end of the module. After the test is over, score the answers and find out your scores in the test.

1) The side of a square is \( a \). If its area is 'A' what is the formula for finding 'A'?  
   a) \( A = a^2 \)  \hspace{1cm} b) \( a = A \)  \hspace{1cm} c) \( A = 2a \)  \hspace{1cm} d) \( A = a + a \)
2) The length of a rectangle is 'l'. Its breadth is 'b'. If its perimeter is 'P', what is the formula for finding 'P'? 
   a) P = lb       b) P = 2lb     c) P = 2(l+b)  d) 2l x 2b

3) The length of a cuboid is 'l'. Its breadth is 'b'. Its height is 'h'. If the volume is 'V', find the formula for finding 'V'. 
   a) V = l + b + h  b) V = l b h  c) V = 2h(l + b)  d) V = (l + b) x h

4) In A = 1/2 bh, if b = 40, h = 30, find the value of 'A'. 
   a) 1200    b) 70    c) 600    d) 35

5) In A = \pi r^2, if \pi = 22/7, r = 28, find the value of 'A'. 
   a) 196 b) 88 c) 616 d) 2464

6) In P = 2(l+b), if l = 10, b = 15, find the value of 'P'. 
   a) 25  b) 50  c) 150  d) 300

7) 10y + 100 = 80 Here the value of 'y' is 
   a) -2 b) +2 c) +20 d) -20

8) 3P = 7. Here the value of 'P' is 
   a) 3/7 b) 3 x 7 c) 7/3 d) 7 - 3

9) 5(4x - 7) = 10x. Here the value of 'x' is 
   a) 2/7 b) 35 c) 10/32 d) 7/2

10) x + y = 7
    x - y = -5. If so, the value of 'x' and 'y' are 
    a) x = 1 b) x = 6 c) x = -1 d) x = -6
    y = +6 y = 1 y = -6 y = -1

11) x + y = -7
    x - y = 3. If so, find the values of 'x' and 'y'.
    a) x = 5 b) x = -2 c) x = 2 d) x = -5
    y = 2 y = -5 y = 5 d) y = -2
12) \( x + y = 10, x - y = 0 \), If so, the values of \( x \) and \( y \) are

a) \( x = 7 \) \( \quad \) b) \( x = 5 \) \( \quad \) c) \( x = -5 \) \( \quad \) d) \( x = -5 \)

\( y = 3 \) \( \quad \) \( y = 5 \) \( \quad \) \( y = -5 \) \( \quad \) \( y = +5 \)

Key to Entry Test
1 - b, 2 - c, 3 - a, 4 - d, 5 - b, 6 - c, 7 - a, 8 - c, 9 - b, 10 - a

Key to Pre-test
1 - a, 2 - b, 3 - c, 4 - d, 5 - a, 6 - c, 7 - a, 8 - d, 9 - c, 10 - d.

Key to Embedded Test I
1 - Variable \( \quad \) 2 - Solve \( \quad \) 3 - Alphabet \( \quad \) 4 - Variable \( \quad \) 5 - Must

Key to Embedded Test II
1) \( -4 \), 2) \( +15 \), 3) \( +7 \) \( \quad \) 4) \( 70 \) \( \quad \) 5) \( 3 \)

Key to Post-test
1 - a, 2 - c, 3 - b, 4 - c, 5 - d, 6 - b, 7 - a, 8 - c, 9 - d, 10 - a, 11 - d, 12 - b.
A LEARNING MODULE ON CHROMOSOME

OVERVIEW OF THE MODULE:

This study material is known as 'Module' - a sort of self-contained and self-Instructional package dealing with the content of 'Chromosome'. It can be used in any setting convenient to the learners and may be completed at the learners' own pace.

The module includes:

a) Instruction
b) An Entry Test
c) A Pre-test
d) Objectives
e) The study material
f) Post-test

Supporting multimedia packages:

i) Video Cassettes I and II on Chromosomes procured from International Educational Research Centre, New Delhi.

ii) Audio and Video cassettes developed by the researcher.

iii) Microscope, Slides, etc.

iv) Colour charts

v) Models
ENTRY TEST

The students are expected to take the entry test. Each correct answer may be given a score. If the student scores a minimum of five marks, he can go through the learning module. Otherwise he has to read and equip himself before he continues this module. Responses may be given in a separate sheet and scored separately as per the key given.

1) Information about cell was first given by
   a) Robert Hook  b) Robert Brown  c) Herting  d) Huxley

2) Basic unit of all living things is ______
   a) Tissue  b) nucleus  c) cell  d) protoplasm

3) Basically plant cell and animal cell are
   a) same  b) different  c) similar  d) dissimilar

4) Which is the physical basis of life?
   a) Nucleus  b) protoplasm  c) cytoplasm  d) chromosome

5) What is the power house of a cell?
   a) nucleus  b) protoplasm  c) chloroplast  d) mitochondria

6) Centriol is present in
   a) Animal cell only  b) plant cell only  
   c) both plant and animal cell  d) virus

7) Nucleus is in the shape of
   a) Spherical  b) network  c) flattened  d) granular

8) Photosynthesis is the main function of
   a) Centriols  b) Chloroplast  c) Nucleus  d) Lysosomes

9) Which part of the cell regulates the entry and exist of any substance?
   a) Nucleus  b) chloroplast  c) cell wall  d) mitochondria

10) Lysosomes are called as
    a) Pigment producers  b) starch storagers
    b) liquid transporters  d) silicide bags
PRE TEST

Below are given multiple choice items on chromosome. The student is expected to take the test before he reads the module. Each item consists of four alternatives. For each item student is expected to choose the best or the correct response. Each item carries one mark. Scoring key is given at the end of the module. After the test is taken, score the responses and find out your score in the test. Use separate sheets for your answer.

1) _____ has hereditary materials in it.
   a) chromosome  b) protoplasm  c) cytoplasm  d) nucleus

2) The hereditary characters are transferred by
   a) Protoplasm  b) Chromosome  c) genes  d) nucleus

3) Which division is responsible for retaining the same number of chromosome in successive generations.
   a) meiosis  b) mitosis  c) amitosis  d) necrosis

4) The number of a strands in DNA helix is
   a) one  b) two  c) three  d) four

5) De-oxiribose sugar is present in
   a) M RNA  b) t RNA  c) r RNA  d) DNA

6) The primary wall of a cell is made up of
   a) Glucose  b) fructose  c) sucrose  d) cellulose

7) During resting stage _____ is found in network form
   a) nucleus  b) protoplasm  c) chromosome  d) cytoplasm

8) Chromosomes are visible
   a) in the resting stage  b) in the growing stage
   c) during cell division  d) during dorment stage

9) Chromosome is found in
   a) Nucleus  b) protoplasm  c) cytoplasm  d) chloroplast

10) The chloroplast of plant cells is
    a) yellow  b) brown  c) grey  d) green
OBJECTIVES

GENERAL OBJECTIVES

1) To help the students understand heredity of living things
2) To enable the students to appreciate inheritance.

SPECIFIC OBJECTIVES

On completion of this module the student will be able to:

1) Understand that chromosomes carry genetic information
2) Explain the structure of chromosomes
3) Recognise the chromosome number of various organisms
4) Differentiate autosomes and sex chromosomes.

LEARNING MATERIAL FOR OBJECTIVE - I

Nucleus is the vital inclusion of the cell. If it is removed, the cell cannot live. Nucleus containschromatin material which transmits hereditary characters. Every organism of a species has a particular number of paired chromosomes in all the cells of the body. The chromosome number of a species is constant in successive generations. Chromosomes were first discovered by Flemming. Chromosomes contain genes which transmits traits.

Embedded Test

1) _____ is the vital inclusion of the cell.
2) Nucleus contains _____ materials.
3) The chromosome number of a species is _____
4) Chromosomes were first discovered by _____
5) Chromosome contains _____ which transmits hereditary characters.

LEARNING MATERIAL FOR OBJECTIVES - II

when the nucleus is at resting stage chromatin material is found in the form of network. The chromosomes - the minute rod like structures - are produced
only during cell division. Different organisms have different number of chromosomes. But organisms of same species have same pairs of chromosomes. Chromosomes contain genes which transmit characters.

Chromosome has a centromere and two chromatids. Chromosomal fibres are found twisted in each chromatid. Only in these fibres the genes are located. There are two types of chromosomes. They are autosomes and sex chromosomes. The chromosomes which have the characters of both the sexes as well as other characters are called autosomes or Somatic Chromosomes. The chromosomes carrying the sex determiners are called sex chromosomes.

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Name of Plant</th>
<th>Chromosome Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Mushroom</td>
<td>2</td>
</tr>
<tr>
<td>2.</td>
<td>Cabbage</td>
<td>18</td>
</tr>
<tr>
<td>3.</td>
<td>Paddy</td>
<td>24</td>
</tr>
<tr>
<td>4.</td>
<td>Onion</td>
<td>16</td>
</tr>
<tr>
<td>5.</td>
<td>Cotton</td>
<td>52</td>
</tr>
</tbody>
</table>

Name of Animal

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Name of Animal</th>
<th>Chromosome Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Man</td>
<td>46</td>
</tr>
<tr>
<td>2.</td>
<td>Fruit fly</td>
<td>-8</td>
</tr>
<tr>
<td>3.</td>
<td>Cow</td>
<td>78</td>
</tr>
<tr>
<td>4.</td>
<td>Silk moth</td>
<td>56</td>
</tr>
<tr>
<td>5.</td>
<td>Gold fish</td>
<td>100</td>
</tr>
</tbody>
</table>
EMBEDDED TEST - II

1) Chromosomes are visible during _____
2) Organisms of the same species have _____ pairs of Chromosomes
3) Centromere is found in _____
4) Chromosome contains two _____
5) There are _____ types of chromosomes
6) Chromosomes carrying sex determiners are called _____
7) Autosomes are also called _____

PRACTICUM

Do you want to see the chromosomes? Take the young roots of onion fixed with necessary organic solutions. Prepare a microslide with necessary stain. See it under the microscope. The chromotids of Chromosome are prominently visible.

Look at the chart showing the structure of chromosome and try to retain the name of parts in your mind.

POST TEST

Take the following test now. Each item consists of four alternatives. You are expected to choose, the best or the correct response and give your answers. The key is given at the end of the module. After the test is over, score your answers and find your scores in the test.

1) What is the vital inclusion of cell?
   a) protoplasm   b) cytoplasm   c) nucleus   d) cell wall

2) Chromosomes were first discovered by
   a) Flemming   b) Robert Hooks   c) Hucley   d) Robert Brown

3) Chromosome contains _____ which transmits traits
   a) protoplasm   b) Cytoplasm   c) membrane   d) genes
4) If what is removed, the cell cannot remain alive
   a) protoplasm  b) nucleus  c) cytoplasm  d) chloroplast

5) When the nucleus is at resting stage _____ is found in the form of network.
   a) protoplasm  b) cytoplasm
   c) chloroplast  d) chromatin material

6) The minute rod like structures are called
   a) chloroplast  b) chromosomes  c) nucleus  d) protoplasm

7) Chromosome has ______chromotids
   a) one  b) two  c) three  d) four

8) There are _____ types of chromosomes
   a) two  b) three  c) four  d) one

9) Chromosomes having characters of both the sexes are called
   a) sex chromosomes  b) autosomes
   c) centromere  d) chromatin

10) Autosomes are otherwise known as
    a) chromotid  b) chromatin
    c) sex chromosomes  d) somatic chromosomes

11) Every organism of a species has a particular number of paired _____.
    a) nucleus  b) protoplasm  c) chromosome  d) chloroplast

12) Chromosome number of a species is _____ in successive generations
    a) decreases  b) varies  c) increases  d) constant

Projects to be taken up as follow up work

1) Why has study of chromosomes become very significant in the field of biology?
2) Try to prepare models of chromosome with beads.

3) Try to list out the chromosome number of some plants and animals not mentioned in your book.

Books to be referred for further learning


Key to the Entry Test

1 - a, 2 - c, 3 - c, 4 - b, 5 - d, 6 - a, 7 - a, 8 - b, 9 - c, 10 - d.

Key to the Pre-test

1 - a, 2 - c, 3 - a, 4 - b, 5 - d, 6 - d, 7 - c, 8 - c, 9 - a, 10 - d.

Key to Embedded Test I

1 - Nucleus 2 - Chromatin 3 - constant 4 - Flemming 5 - Genes

Key to Embedded Test II

1. Cell division 2. same 3. chromosome 4. chromotide

5. two 6. sex chromosome 7. somatic chromosomes.

Key to the Post test

1 - c, 2 - a, 3 - d, 4 - b, 5 - d, 6 - b, 7 - b, 8 - a, 9 - b, 10 - d, 11 - c, 12 - d.
SOCIAL SCIENCE
UNIT - DEFENCE SYSTEM IN INDIA
Sub-unit I - Module I - Defence Organisation in India

A LEARNING MODULE ON DEFENCE ORGANISATION IN INDIA

AN OVERVIEW:

This study material is known as Module - a sort of self contained and self instructional package dealing with the content of 'Defence Organisation in India'. It can be used in any setting convenient to the learners and may be completed at the learners' own pace. The module includes:

a) Instruction
b) An entry test
c) A pre test
d) Objectives
e) The study material
f) Post-test

Supporting multimedia packages:

1. Audio and Video cassettes
2. Charts, globe, maps
3. Viewing the live telecast of parade of 26th January
4. Observing N.C.C. and A.C.C activities
5. Pictures of Social Reformers
ENTRY TEST

1) In the past, there were _____ divisions in the army
   a) one   b) two   c) three   d) four

2) So far _____ world wars have occurred
   a) one   b) two   c) three   d) four

3) Chinese aggression took place in
   a) 1942   b) 1964   c) 1962   d) 1967

4) We have had _____ wars with Pakistan
   a) One   b) two   c) three   d) No

5) Now there are _____ main divisions in our defence system
   a) one   b) two   c) three   d) four

6) The first man to invade India was
   a) Alexander   b) Chengis Khan   c) Gori   d) Babur

7) Our northern border is
   a) Jammu and Kashmir (b) Assam   c) Sikkim   d) Himalayas

8) _____ is the latest division in defence force in the world
   a) army   b) air force   c) navy   d) cavalry

9) The first general of our independent India was
   a) Cariappa   b) Thimmayya   c) Manekshaw   d) Chakraborthy

10) The first atom bomb was dropped by _____
    a) Germans   b) Japanese   c) British   d) Americans

11) The first atom bomb was dropped on _____
    a) Nagasaki   b) Tokyo   c) Hiroshima   d) Pearl Harbour

12) India's military power was made known to the world in _____ war
    a) second world   b) 1964   c) 1971   d) 1962
PRE TEST

1) The supreme commander of our defence forces is
   a) Prime Minister  b) President  c) Defence minister  d) Home Minister

2) Indian National Army was established by _____
   a) Subash Chandra Bose  b) General Cariappa
   c) General Montgomery  d) Nehru

3) The head of our army is called
   a) Admiral  b) general  c) Marshal  d) captain

4) The head of our navy is called
   a) Admiral  b) general  c) marshal  d) captain

5) The head of our Air-force is called
   a) admiral  b) general  c) air-chief marshal  d) captain

6) Our Indian army is _____ largest in the world
   a) first  b) second  c) third  d) fourth

7) Our air force proved its mettle to the world in _____ war
   a) 1947  b) 1962  c) 1965  d) 1971

8) One of the defence organisations found in schools and colleges is
   a) scout  b) N S S  c) N C C  (d) Junior Red Gross

9) N C C stands for
   a) National Cadet Corps  b) North Command Centre
   c) national Certificate Course  d) none of the above

10) A C C stands for
    a) Army Cadet Corps  b) Airforce cadet groups
    c) Air control cadre  d) Air command centre
OBJECTIVES

GENERAL OBJECTIVES

1) To enable the students to understand the defence system in India
2) To enable them to understand who the supreme commander of the forces is
3) To make them understand powers and functions of the political affairs committee of the Union Cabinet and of the three Chiefs

SPECIFIC OBJECTIVES

After reading this module the students will be able

1) to understand the organisation and function of the Indian army
2) to understand and appreciate the organisation and function of the navy and air force
3) to make a comparative study of rank order in the three services

STUDY MATERIAL FOR OBJECTIVE - I

One of the primary duties of any Government is to protect the country from foreign invasion. For that, we have an efficient defence system in our country. It is necessary for every Indian citizen to know about the organisation of the defence services in India.

The President is the supreme commander of the defence forces in India. The political affairs committee of the Union Cabinet is responsible for our country’s defence. Prime Minister is the Chairman of this committee. The Defence Minister formulates policy within the limits laid down by this committee. This policy is executed by the three services, the Army and Navy and the Air-Force. General, Admiral, Air Chief Marshal are the three chiefs of the services respectively. They advise the Government on defence policies. For close contact...
between the heads of these services and the Government the Headquarters of these services are situated at Delhi.

**Embedded Test - I**

1) _____ is the supreme commander of the defence forces in India.
2) _____ is responsible for our country's defence.
3) _____ formulates defence policy within the limits laid down political affairs committee.
4) _____ is the Chairman of the political affairs committee.
5) Our defence policy is executed by _____
6) The Chief of the Army is _____
7) The Chief of the Navy is _____
8) The Chief of the Airforce is _____
9) The chiefs advise Govt. on _____
10) Headquarters of the defence forces are in Delhi for maintaining _____ between the chiefs and the Government.

**STUDY MATERIAL FOR OBJECTIVE - II**

**The Indian Army**

At present there are five army commands. They are shown below with their headquarters.

<table>
<thead>
<tr>
<th>Army Commands</th>
<th>Their Headquarters</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Southern Command</td>
<td>Poona</td>
</tr>
<tr>
<td>The Eastern Command</td>
<td>Calcutta</td>
</tr>
<tr>
<td>The Western Command</td>
<td>Simla</td>
</tr>
<tr>
<td>The Northern Command</td>
<td>Udhampur</td>
</tr>
<tr>
<td>The Central Command</td>
<td>Lucknow</td>
</tr>
</tbody>
</table>
Each Command is headed by an officer of the rank of Lieutenant-General. These commands are further divided into areas and sub-areas. Areas are headed by Major-Generals and sub-areas are headed by Brigadiers.

Recruitment to the armed forces is open to all classes of people. New recruits are given rigorous weapon training and outdoor exercises. For this, there are many training centres in different parts of the country.

EMBEDDED TEST - I I

1) At present there are _____ commands in our army
2) Each command is headed by _____ General.
3) _____ is the area commander.
4) Sub-area commander is _____
5) Recruitment to army is open to _____
6) The Headquarters of Southern Command is _____
7) _____ is the Headquarters of Western Command
8) _____ is the Headquarters of Eastern Command
9) The Headquarters of Northern Command is _____
10) The Headquarters of Central Command is _____

The Indian Navy

The Naval Headquarters is at Delhi. The Chief of Naval staff is Admiral.

There are 3 Naval Commands:

<table>
<thead>
<tr>
<th>Commands</th>
<th>Their Headquarters</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The Western Command</td>
<td>Bombay</td>
</tr>
<tr>
<td>2. The Eastern Command</td>
<td>Vishahapatinam</td>
</tr>
<tr>
<td>3. The Southern Command</td>
<td>Cochin</td>
</tr>
</tbody>
</table>

Besides these three commands, there are two fleets: One in the Bay of Bengal and the other in the Arabian Sea.
EMBEDDED TEST - III

1) The Chief of the Naval Staff is ______
2) The H.O. of Western Command is ______
3) The H.O. of Eastern Command is ______
4) The H.O. of Southern Command is ______
5) In addition to the commands, there are _____ fleets.

The Indian Air-force

The H.Q. of the Indian Air-force is at Delhi The Chief of the Air staff is the Air Chief marshal The Air-force is organised into five operational commands:

<table>
<thead>
<tr>
<th>Air Commands</th>
<th>Their Headquarters</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The Central Command</td>
<td>Allahabad</td>
</tr>
<tr>
<td>2. The Eastern Command</td>
<td>Shillong</td>
</tr>
<tr>
<td>3. The Southern Command</td>
<td>Trivandrum</td>
</tr>
<tr>
<td>4. The South Wester Command</td>
<td>Jodhpur</td>
</tr>
<tr>
<td>5. The Western Command</td>
<td>Delhi</td>
</tr>
</tbody>
</table>

Besides these, there are two functional commands They are the maintenance command with Nagpur as H.Q. and the Training Command with Bangalore as H.Q.

EMBEDDED TEST - IV

1) Air-force is organised into ______ Operational Commands
2) Besides 5 operational commands, Air-force has ______ functional commands
3) The H.Q. of Eastern Air Command is ______
4) The H.Q. of the Training Command is ______
5) ______ is the H.Q. of Western Command
The Ranks of the Three Services

The Army          The Navy          The Air-force
General           Admiral           Air Chief Marshal
Lt. General       Vice-Admiral    Air Marshal
Major General     Rear-Admiral    Air Vice-Marshal
Brigadier         Commodore      Air Commodore
Colonel           Captain          Group Captain
Lt. Colonel       Commander       Wing Commander
Major             Lt. Commander   Squadron Leader
Captain           Lieutenant      Flight Lieutenant
Lieutenant        Sub Lieutenant  Flying Officer
Second Lieutenant Acting Sub Lt. Pilot Officer

EMBEDDED TEST - V

1. Lt. General is ___________ to Major General.
2. In Navy Captain is ___________ to Commander.
3. Vice-Admiral is ___________ to Rear Admiral.
4. Flight Lieutenant is ___________ to Flying Officer.
5. Group Captain is ___________ to Wing Commander.

PRACTICUM

If you happen to meet a person serving in defence force, how will you identify whether he is in Army, Navy or Air-force.

Observe a N C.C. parade and try to understand the rank order among the cadets.
POST - TEST

1) Who is the supreme commander of the defence forces:
   a) President  b) Prime Minister  c) Defence Minister  d) Home Minister

2) Who formulates the defence policy within the limits laid down by the political affairs committee:
   a) President  b) Prime Minister  c) Defence Minister  d) General

3) The Chief of the Navy is called
   a) General  b) Admiral  c) Marshal  d) Commodore

4) There are __________ army Commands
   a) two  b) three  c) four  d) five

5) An area command is headed by
   a) General  b) Lt. General  c) Major General  d) Brigadier

6) Sub areas are headed by
   a) Brigadiers  b) Colonels  c) Majors  d) Lt. Colonels

7) The H.Q. of Western Army Command is
   a) Poone  b) Bombay  c) Jaipur  d) Simla

8) There are __________ Naval Commands
   a) one  b) two  c) three  d) four

9) In addition to three Naval commands we have __________ fleets
   a) two  b) three  c) four  d) five

10) The H.Q. of Southern Naval command is
    a) Madras  b) Cochin  c) Tuticorin  d) Trivandrum

11) Airforce is organised into __________ operational commands
    a) two  b) three  c) four  d) five

12) Besides five operational commands we have __________ functional commands
    a) one  b) two  c) three  d) four
PROJECT WORK TO BE TAKEN UP AS FOLLOW UP WORK

1. Try to list out the rank order among the soldiers and the officers in the army
2. Try to list out the rank order among the mariners and the officers in the Navy
3. List out the ranks order in the Air-force
4. Differentiate the uniform patterns and the other insignia.

Key to the Entry test
1-d, 2-b, 3-c, 4-b, 5-c, 6-a, 7-d, 8-b, 9-a, 10-d, 11-c, 12-c.

Key to the Pre-test
1-b, 2-a, 3-b, 4-a, 5-c, 6-a, 7-d, 8-c, 9-c, 10-a.

Key to the Embedded Test
1-President, 2-Political Affairs Committee, 3-Prime Minister, 4-Defence Minister, 5-The three services, 6-General, 7-Admiral, 8-Air Chief Marshal, 9-Defence policies, 10-close contact

Key to Embedded Test - II
1-five, 2-Lt General, 3-Major General, 4-Brigadier, 5-all classes of people, 6-Poona, 7-Calcutta, 8-Simla, 9-Udhampur, 10-Lucknow

Key to Embedded Test - III
1-Admiral, 2-Bombay, 3-Vishagapattnam, 4-Cochin, 5-Senior

Key to Embedded Test - IV
1-five, 2-two, 3-Shillong, 4-Bangalore, 5-Delhi

Key to Embedded Test - V
1-Senior Supervisor, 2-Senior, 3-Senior, 4-Senior, 5-Senior

Key to Post-test
1-a, 2-c, 3-b, 4-d, 5-c, 6-a, 7-d, 8-c, 9-a, 10-b, 11-d, 12-b.
APPENDIX - II

List of HTIM and LTIM Materials Used in the Experiments

**HTIM MATERIALS**
1. Video cassette on 'Chromosome', Part I
2. Video cassette on 'Chromosome', Part II
3. Video cassette on 'Equations'
4. Video cassette on 'Science Experiments', Part I
5. Video cassette on 'Science Experiments', Part II
6. Video cassette on 'Photosynthesis'
7. Video cassette on 'Wild Life'
8. Video cassette prepared by the investigator
9. Audio cassette on 'Cell'
10. Audio cassette on 'Magnetism'
11. Audio cassettes prepared by the investigator
12. Overhead projector
13. Micro slide of onion peel (Plant cell)
14. Micro slide of amoeba (single celled animal)
15. Micro slides showing various stages of mitotic cell division
16. Micro slides showing various stages of meiotic cell division
17. Micro slide of ciliated epithelium
18. Micro slide of blood smear
19. Micro slide of parenchyma
20. Micro slide of collenchyma
21. Micro slide of sclerenchyma
22. Projection slides of cell (plant and animal)
23. Projection slides of cell inclusions (About 15 Nos.)

**LTIM MATERIALS**
1. Bar Magnet
2. Needle Magnet
3. Horse shoe magnet
4. Iron filings
5. Iron pin  
6. Mariners compass (working model)  
7. Compass needle  
8. Chart showing magnetic lines of force (North pole pointing north)  
9. Chart showing magnetic lines of force (between two unlike poles)  
10. Chart showing magnetic lines of force (North pole pointing south)  
11. Chart showing magnetic lines of force (between two like poles)  
12. Chart showing magnetising property of Iron and steel  
13. Chart showing closed chain of tiny magnets and their setting in magnetic field.  
14. Chart showing the laboratory preparation of CO₂  
15. Chart showing the formation of CO₂  
16. Chart showing the heating of calcium carbonate  
17. Chart showing the CO₂ as non-supporter of combustion  
18. Chart showing the burning of Mg. in CO₂  
19. Chart showing various types of fire extinguishers  
20. Test tubes for preparing CO₂  
21. A delivery tube  
22. Lime water  
23. Blue litmus paper  
24. Red litmus paper  
25. Dry ice  
26. Soda water  
27. Burning candle  
28. Deflagrating spoon  
29. Magnesium ribbon  
30. Lime stone  
31. Marble  
32. Sodium bi carbonate  
33. Calcium carbonate  
34. Dil hydro chloric acid  
35. Spirit lamp  
36. Gas jar  
37. Thistle funnel  
38. Flat bottomed Flask
39. Model showing the structure of CO₂
40. Various fire extinguishers
41. Chart showing Animal cell
42. Chart showing Plant cell
43. Chart showing the Structure of Chromosomes
44. Chart showing amitotic cell division
45. Chart showing ciliated epithelium
46. Chart showing connective tissues
47. Chart showing different types of blood cells in man
48. Chart showing nerve cell
49. Chart showing amitosis, mitosis and meiosis
50. Thermocol model of cell
51. Auxanometer apparatus
52. Chromosome model made of beads
53. Chart showing circular ring
54. Ring ball (for circular ring)
55. Chart showing cube and cuboid
56. Cube and cuboid models
57. Pictures showing war planes, war ships and submarines
58. Charts showing insignia of the three forces
59. Pictures of all the social reformers in the syllabus.
60. Chart showing the rank order in the three services.
# APPENDIX - III

## Item Analysis of Achievement Test

<table>
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<th>SI No</th>
<th>P Value</th>
<th>D Value</th>
<th>SI No</th>
<th>P Value</th>
<th>D Value</th>
<th>SI No</th>
<th>P Value</th>
<th>D Value</th>
<th>SI No</th>
<th>P Value</th>
<th>D Value</th>
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Note - * deleted on the basis of P and / or D Value(s)
## APPENDIX - IV

**Final form of the Achievement Test**

**ACHIEVEMENT TEST**  
**class VIII**

<table>
<thead>
<tr>
<th>Name of the student</th>
<th>Time</th>
<th>Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2 Hours</td>
<td>100</td>
</tr>
</tbody>
</table>

### I. Answer the following choosing the best option. Indicate your answer using tick (✓) mark.

1. Which of the following is an example for SVC pattern?
   a) He ate some apples  
   b) She came yesterday  
   c) He is kind  
   d) They praised him very much

2. She gave him her workbook. The pattern in this sentence is
   a) SVOC  
   b) SVIODO  
   c) SVDOIO  
   d) SVO

3. We elected him our president. The pattern in this sentence is
   a) SVDOIO  
   b) SVIODO  
   c) SVOC  
   d) SVOA

4. Which of the following belongs to SVC pattern?
   a) The DEO asked many questions  
   b) He is a teacher  
   c) The boy draws a diagram  
   d) The birds fly swiftly

5. He is about to start. Here the infinitive is used as
   a) subject to a verb  
   b) object to a verb  
   c) complement to a verb  
   d) object to a preposition

6. Seeing is believing. Here the infinitive is used as
   a) subject to a verb  
   b) object to a verb  
   c) complement to a verb  
   d) object to a preposition

7. The dancing girl is my sister. Here ‘dancing’ is
   a) gerund  
   b) present participle  
   c) past participle  
   d) perfect participle

8. The children are fond of playing. Here ‘playing’ is
   a) present participle  
   b) past participle  
   c) perfect participle  
   d) gerund

9. They are ______ pure vowels in English
   a) 20  
   b) 12  
   c) 8  
   d) 5

10. There are _________ gliding vowels in English
    a) 20  
    b) 12  
    c) 8  
    d) 5
II. Fill up the blanks by appropriate word / words or phrases

1. The teacher showed the chart to the students. Here the sentence pattern is ________.
2. He made me mad. Here the sentence pattern is ________.
3. You will be given a gift tomorrow. The sentence pattern in the sentence is ________.
4. He wants to sing. Here infinitive is used as ________ to a verb.
5. She is fond of dancing. In this sentence Gerund is used as object to a ________.
6. Both Gerund and Infinitive can be used as complement to a ________.
7. The Charming lady is my mother. Here charming is ________.
8. The wounded soldier was taken to the hospital. In this sentence 'wounded' is ________.
9. /æl/ is a ________ vowel.
10. /au/ is a ________ vowel.

III. Match the following [select the correct answer from section B for the questions in Section A] and write the answers below.

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
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</thead>
<tbody>
<tr>
<td>1. Object is related to Verbal noun</td>
<td>Verbal noun</td>
</tr>
<tr>
<td>2. Complement is related to Verbal adjective</td>
<td>Verbal adjective</td>
</tr>
<tr>
<td>3. There can be no sentence without Verb</td>
<td>Verb</td>
</tr>
<tr>
<td>4. Gerund is Subject or object</td>
<td>Subject or object</td>
</tr>
<tr>
<td>5. Participle is Verb</td>
<td>Verb</td>
</tr>
</tbody>
</table>

1. Object is related to ________.
2. Complement is related to ________.
3. There can be no sentence without ________.
4. Gerund is ________.
5. Participle is ________.
பகுதி - 2 - கணிதம்

I.

1. எண் தோற்றங்கள் அல்லது கோபுரங்கள் என்றும் கூறுவது என்பது எந்த வழிக்கோணங்களாகிறது?

2. A = a^2 என்றால் a = A^2 என்றால் A = 2a என்றால் A = a+a

3. P=2 (1+b), 1 = 10, b = 15 என்றால் P-ன் மதிப்பு என்றால்?

4. 7x-6 < 15 என்றால் x என்றால்?

5. 4x^2-20 என்றால் x என்றால்?

6. 5x-8 < 15 என்றால் x என்றால்?

7. a < b < c என்றால் a + c b + c

II.

1. 4x = 12 கூறுவது x தொகுதியில் என்றால்

2. x + 7 = 3 என்றால் x =

3. 5x - 8 = 7 என்றால் x =

4. a < b என்றால் a + c b + c
5. $a > b$ என்றால் $a \times c$ __________ $b \times c$

6. காணும் பற்றிகள் பரப்பக் __________

7. எளிதாக பற்றிகள் பரப்பக் __________

8. ஒரு தனி துறவு உள்ள எண்மத் தகுதியில் கண்டெடுப்பு அளவு __________

9. ஒரு தனி துறவு உள்ள எண்மாதிரியில் 64 விளக்க கண்டெடுப்பு அளவு __________

10. ஒரு தனி துறவு உள்ள எண்மத் தகுதியில் 1 விளக்க, 2 விளக்க, 3 விளக்க கண்டெடுப்பு அளவு __________

III. முதல் தொடர்வழி எண்ம ஒளிப்பின் தகுதியில் ஒரு துறவு உள்ள எண்மாதிரியில் ஒரு துறவு விளக்கை காட்டுவதாக வருகை.

(1) (2)

| 1. $a$ உள்ள எண்மத் தகுதி பரப்பக் | 1b |
| 2. $a$ உள்ள எண்மாதிரியில் கல்வியது | $2(1 + b)$ |
| 3. கல்வி $a$ உள்ள எண்மாதிரியில் கல்வி அளவு | $a^2$ |
| 4. எளிதாக பற்றிகள் பரப்பக் | $4a$ |
| 5. எளிதாக பற்றிகள் பரப்பக் | $a^3$ |

பதிப்பு-3 அநியல்வரை

| 1. எளிதாக பற்றிகள் பரப்பக் விளக்காக கல்வி அளவு விளக்கை வருகை |
| 2. கல்வி $a$ உள்ள எண்மாதிரியில் கல்வி அளவு | $4a$ |
| 3. எளிதாக பற்றிகள் பரப்பக் | $a^3$ |
3. கொண்டாட்டப்பொருள் குறி பொருளின் பிரிவில்லை?
   (அ) விளக்கம் ஆணிலியால்
   (ஆ) விளக்கம் மற்றவியல்
(இ) கொண்டாட்டப் பொருள்
(ற) கொண்டாட்டப் பொருள்

4. நூற்றாண்டு ஆண்டு பாத்திரம்
   (அ) விளக்கம் ஆணிலியால்
   (ஆ) விளக்கம் மற்றவியல்
(இ) நூற்றாண்டு பாத்திரம்
(ற) நூற்றாண்டு பாத்திரம்

5. கொண்டாட்டக் குறி விளக்கம் பொருளில் என்ன?
   (அ) விளக்கம் ஆணிலியால்
   (ஆ) விளக்கம் மற்றவியல்
(இ) கொண்டாட்டக் குறி விளக்கம்
(ற) கொண்டாட்டக் குறி விளக்கம்

6. நூற்றாண்டு குறி கொண்டாட்டம்
   (அ) கொண்டாட்டக் குறி கொண்டாட்டம்
   (ஆ) கொண்டாட்டக் குறி கொண்டாட்டம்
(இ) நூற்றாண்டு குறி கொண்டாட்டம்
(ற) நூற்றாண்டு குறிக்கொண்டாட்டம்

7. விளக்கமே மையமே என்றாக சொல்லப்படக் கண்டுபிடிக்கவும்
   (அ) கொண்டாட்டம் மையம்
   (ஆ) கொண்டாட்டம் மையம்
(இ) நூற்றாண்டு மையம்
(ற) நூற்றாண்டு மையம்

8. மீண்டும் குறி விளக்கம் நூற்றாண்டு என்றாக சொல்லப்படக் கண்டுபிடிக்கவும்
   (அ) கொண்டாட்டம் நூற்றாண்டு
   (ஆ) கொண்டாட்டம் நூற்றாண்டு
(இ) கொண்டாட்டம் கொண்டாட்டம்
(ற) கொண்டாட்டம் கொண்டாட்டம்

9. காண்பவும் விளக்கம் என்றாக சொல்லப்படக் கண்டுபிடிக்கவும்
   (அ) விளக்கம் விளக்கம்
   (ஆ) விளக்கம் விளக்கம்
(இ) விளக்கம் விளக்கம்
(ற) விளக்கம் விளக்கம்

10. குறிக்கொண்டாட்டம் கொண்டாட்டப் பொருளிலே கண்டுபிடிக்கவும்
    (அ) கொண்டாட்டம் கொண்டாட்டம்
    (ஆ) கொண்டாட்டம் கொண்டாட்டம்
(இ) விளக்கம் விளக்கம்
(ற) விளக்கம் விளக்கம்

II. கொண்டாட்டப் பொருளில் குறிப்பிட்டுகோள்:
1. கொண்டாட்டம் குறியீட்டு என்றாக சொல்லப்படக் கண்டுபிடிக்கவும்
2. கொண்டாட்டம் குறியீட்டு என்றாக சொல்லப்படக் கண்டுபிடிக்கவும்
3. கொண்டாட்டம் குறியீட்டு என்றாக சொல்லப்படக் கண்டுபிடிக்கவும்
4. கொண்டாட்டம் குறியீட்டு என்றாக சொல்லப்படக் கண்டுபிடிக்கவும்
5. கொண்டாட்டம் குறியீட்டு என்றாக சொல்லப்படக் கண்டுபிடிக்கவும்
6. கொண்டாட்டம் குறியீட்டு என்றாக சொல்லப்படக் கண்டுபிடிக்கவும்
7. கொண்டாட்டம் குறியீட்டு என்றாக சொல்லப்படக் கண்டுபிடிக்கவும்
8. கொண்டாட்டம் குறியீட்டு என்றாக சொல்லப்படக் கண்டுபிடிக்கவும்
9. சொத்துக்கக்காறு குறிமத்து காதல்விளக்க பாதுகாப்பு திறன்

10. பாதுகாப்பு திறன்

III. காலத்தில் காணப்பட்டது காலத்தில் காணப்பட்டது காலத்தில்

<table>
<thead>
<tr>
<th>(1)</th>
<th>(2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. குறிப்பிட்டுபாட கோள்</td>
<td>குறிப்பிட்டுபாட கோள்</td>
</tr>
<tr>
<td>2. குறிப்பிட்டுபாட கோள்</td>
<td>குறிப்பிட்டுபாட கோள்</td>
</tr>
<tr>
<td>3. குறிப்பிட்டுபாட கோள்</td>
<td>குறிப்பிட்டுபாட கோள்</td>
</tr>
<tr>
<td>4. குறிப்பிட்டுபாட கோள்</td>
<td>குறிப்பிட்டுபாட கோள்</td>
</tr>
<tr>
<td>5. பிரிவு கிளை</td>
<td>பிரிவு கிளை</td>
</tr>
</tbody>
</table>

பகுதி - 4 நூற்றாண்டு ஆண்டு வருடம்

I. விளக்கத்தை குறிப்பிட்டு விளக்கத்தை குறிப்பிட்டு விளக்கத்தை குறிப்பிட்டு விளக்கத்தை குறிப்பிட்டு:

1. குறிப்பிட்டு விளக்கத்தை குறிப்பிட்டு விளக்கத்தை குறிப்பிட்டு விளக்கத்தை குறிப்பிட்டு

2. குறிப்பிட்டு விளக்கத்தை குறிப்பிட்டு விளக்கத்தை குறிப்பிட்டு விளக்கத்தை குறிப்பிட்டு

3. குறிப்பிட்டு விளக்கத்தை குறிப்பிட்டு விளக்கத்தை குறிப்பிட்டு விளக்கத்தை குறிப்பிட்டு
<table>
<thead>
<tr>
<th>தலைப்பு</th>
<th>வருடம்</th>
<th>குறிப்பிட்டுப் பணி</th>
<th>நூற்றாண்டு குறிப்பிட்டுப் பணி</th>
</tr>
</thead>
<tbody>
<tr>
<td>4. தின்பாரம் லைப்பசைல்பூர் விடுதிக்கு அசலவாட்டாள்கள் கல்விக்குறிப்பிட்டுப் பணி</td>
<td>(அ) 1950</td>
<td>(எ) விளாட்டு</td>
<td>(சு) விளாட்டு</td>
</tr>
<tr>
<td>5. கிருட்டோசூல் கோபாரத்மகம் பணி</td>
<td>(அ) 1949</td>
<td>(எ) 1962</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(இ) 1950</td>
<td>(ச) 1965</td>
<td></td>
</tr>
<tr>
<td>6. தலைமுறை பத்தாண்டு பணி</td>
<td>பிள்ளைக்குடும்பத்து</td>
<td>(அ) பத்தாண்டு</td>
<td>(சு) பத்தாண்டு</td>
</tr>
<tr>
<td></td>
<td>(இ) விளாட்டு</td>
<td>(ச) விளாட்டு</td>
<td></td>
</tr>
<tr>
<td>7. தின்பாரம் நாட்டு</td>
<td>விளாட்டு விளாட்டு</td>
<td>விளாட்டு விளாட்டு</td>
<td>(அ) அசன்றுக்குறிச்சி</td>
</tr>
<tr>
<td></td>
<td>(இ) முக்கிய விளாட்டு</td>
<td>(ச) விளாட்டு குறிச்சியும்</td>
<td></td>
</tr>
<tr>
<td>8. வருட்குடும்பத்து விளாட்டு விளாட்டு</td>
<td>விளாட்டு விளாட்டு</td>
<td>(அ) அசன்றுக்குறிச்சி</td>
<td>(எ) விளாட்டு குறிச்சியும்</td>
</tr>
<tr>
<td></td>
<td>(இ) முக்கிய விளாட்டு</td>
<td>(ச) விளாட்டு குறிச்சியும்</td>
<td></td>
</tr>
<tr>
<td>9. சிங்கப்பூர் பட்டியல் விளாட்டு விளாட்டு</td>
<td>விளாட்டு விளாட்டு</td>
<td>(அ) அசன்றுக்குறிச்சி</td>
<td>(எ) விளாட்டு குறிச்சியும்</td>
</tr>
<tr>
<td></td>
<td>(இ) முக்கிய விளாட்டு</td>
<td>(ச) விளாட்டு குறிச்சியும்</td>
<td></td>
</tr>
<tr>
<td>10. 1875இல் கொண்டு</td>
<td>அசன்றுக்குறிச்சி</td>
<td>விளாட்டு விளாட்டு</td>
<td>(அ) அசன்றுக்குறிச்சி</td>
</tr>
<tr>
<td></td>
<td>(இ) முக்கிய விளாட்டு</td>
<td>(ச) விளாட்டு குறிச்சியும்</td>
<td></td>
</tr>
</tbody>
</table>

II. உள்நாட்டு தலைமுறை பிரிவு: 

7. கணவாரச் செய்யப்பட்ட விளக்கத்திற்கு அடிப்படையாக விளக்கம் பெறுவதியும் குறிப்பிட்டல் முன் முன்புள்ள குறிப்பிட்டல் முன் அனுப்பதின் காட்சியாக
8. பல்லவர்களுக்கு விளக்கம் புரட்சியாக அவர்களின் புரட்சிகள் புரட்சிகள்
9. மூட்டுகளுக்கு விளக்கம் புரட்சியாக அவர்களின் புரட்சிகள் புரட்சிகள்
10. விளக்கம் புரட்சியாக அவர்களின் புரட்சிகள் புரட்சிகள்

III. நடைக்குரிய கோர்வோடான விளக்கம் கோர்வோடான விளக்கம் கோர்வோடான விளக்கம் கோர்வோடான விளக்கம்

(1) (2)

1. குறுக்கு வகை
2. வருணாக்க
3. விளக்கம் விளக்கம் விளக்கம்
4. கிளைல்
5. குல சூழல்

(3) (4) (5) (6) (7)
APPENDIX - V

English Version of the Achievement Test in respect of Maths,
Science, and Social Science Subjects

PART - II MATHEMATICS

Answer the following choosing the best option, Indicate your answer using (✓) mark.

1. The side of a square is a. If the area is A, What is the formula for finding A?
   a) \( A = a \)  
   b) \( a = A \)  
   c) \( A = 2a \)  
   d) \( A = a + a \)

2. In \( P = 2(l+b) \) if \( l = 10, \ b = 15 \) find the value of \( P \)
   a) 25  
   b) 50  
   c) 150  
   d) 300

3. The solution of \( 7x - 6 < 15 \) in integers is
   a) 2, 3  
   b) 2, 1  
   c) 3, 4, 5  
   d) 3, 2

4. The solution of \( 4x > -20 \) in integers is
   a) -5, -4, -3  
   b) 5, 4, 3  
   c) -5, -6, -7  
   d) -4, -3

5. If the outer and inner radii of circular ring are 38 cm and 31 cm, then the width is
   a) 7m  
   b) 7cm  
   c) 3.5cm  
   d) 3.5m

6. If the outer and inner circumferences of a circular ring are 132 cm and 88 cm, its width is
   a) 7cm  
   b) 6m  
   c) 7m  
   d) 8cm

7. If the volume of a cube is 125 cm\(^3\), its side is
   a) 5 cm  
   b) 25 cm  
   c) 5 dm  
   d) 15m

8. If the side of a wooden cube is 14 cm, its total surface area is
   a) 1716 cm\(^2\)  
   b) 1167 cm\(^2\)  
   c) 1176 cm\(^2\)  
   d) 1276 cm\(^2\)

9. If the edge of a cuboid are 26 cm, 2 1 m, 1.6 m then the volume is
   a) 3786 cm\(^3\)  
   b) 8736 dm\(^3\)  
   c) 7836 dm\(^3\)  
   d) 8376 dm\(^3\)

10. If in a cuboid, volume is 68208 cm\(^3\), length 42 cm breadth is 24cm, then the height is
    a) 56 cm  
    b) 65 cm  
    c) 68 cm  
    d) 54 cm
II. Fill in the blanks with suitable answers.
1. $4x = 12$ Here $x$ is a _____
2. $x + 7 = 3$ $x$ is _____
3. $5x - a = 7$ $x$ is _____
4. If $a < b$, then $a + c$ ____ $b + c$
5. If $a > b$, then $axc$ ____ $bxc$
6. Area of a Circular ring is _____
7. Area of the outer circle is _____
8. If the side of a cube is 2cm, then the volume is _____
9. If the volume of a cube 64M, then the side is _____
10. If the edges of a cuboid are 1cm, 3cm, 2cm, then the volume is _____

III. Maths the following choosing the right answer from column 2 for each of the items number column 1

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Area of a square is</td>
<td>1b</td>
</tr>
<tr>
<td>2. Perimeter of a square is</td>
<td>2 (l+b)</td>
</tr>
<tr>
<td>3. Volume of cube is</td>
<td>$a^2$</td>
</tr>
<tr>
<td>4. Area of a rectangle is</td>
<td>4a</td>
</tr>
<tr>
<td>5. Perimeter of a rectangle is</td>
<td>a</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>1. Area of a square is _____</th>
<th>2. Perimeter of a square is _____</th>
</tr>
</thead>
<tbody>
<tr>
<td>3. Volume of cube is _____</td>
<td>4. Area of a rectangle is _____</td>
</tr>
<tr>
<td>5. Perimeter of a rectangle is _____</td>
<td></td>
</tr>
</tbody>
</table>

Part - III SCIENCE

I. Answer the following choosing the best option, Indicate your answer using (✓) mark.
1. The power house of the cell is ______ a) nucleus   b) protoplasm   c) chloroplast   d) mitochondria
2. Chromosome contains ______ which transmits traits
   a) Protoplasm    b) cytoplasm    c) membrane    d) genes
3. Which divides first in cell division?
   a) protoplasm    b) nucleus    c) cytoplasm    d) chromosome
4. Blood ______ materials
   a) protects    b) transmits    c) stores    d) consumes
5. The chemical name of marble is ______
   a) magnesium carbonate    b) magnesium sulphate
   c) calcium carbonate    d) calcium sulphate
6. What is soda water?
   a) CO₂ dissolved in water    b) air dissolved in water
   c) O₂ dissolved in water    d) SO₂ dissolved in water
7. ______ gas is used to produce artificial rain
   a) carbon dioxide    b) hydrogen    c) ammonia    d) nitrogen
8. ______ is used to produce permanent magnets
   a) steel    b) copper    c) broze    d) iron
9. Magnets are of ______ kinds
   a) two    b) three    c) four    d) five
10. ______ is not attracted by magnet
    a) iron    b) nickel    c) cobalt    d) aluminium

II
Fill in the blanks with suitable answers.
1. Cell walls are found in ______ cells
2. Centrioles are found only in ______ cells
3. Chromosome contains two ______
4. Amitosis is found only in ______ and ______
5. Growth tissue is found at the tip of ______ and ______
6. ______ acid is used in the laboratory preparation of CO₂
7. CO₂ is ______ than air
8. Solid CO₂ is called ______
9. The space surrounding a magnet in which magnetic force is exerted is called ______
10. Earth is like a ______
Match the following choosing the right answer from column a for each of the items under column 1

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Lime stone</td>
<td>reduction division</td>
</tr>
<tr>
<td>2. Magnesite</td>
<td>indirect division</td>
</tr>
<tr>
<td>3. Amitosis</td>
<td>calcium carbonate</td>
</tr>
<tr>
<td>4. Mitosis</td>
<td>magnesium Carbonate</td>
</tr>
<tr>
<td>5. Meiosis</td>
<td>direct cell division</td>
</tr>
</tbody>
</table>

1. Lime stone _____
2. Magnesite _____
3. Amitosis _____
4. Mitosis _____
5. Meiosis _____

PART - IV SOCIAL SCIENCE

Answer the following choosing the best option, Indicate your answer using ( ✓ ) mark.

1. _____ is the supreme commander of the defence forces.
   a) President    b) Prime Minister  c) Defence Minister d) Home Minister
2. There are _____ commands in our Army.
   a) two            b) three            c) four            d) five
3. _____ formulates the defence policy of our country.
   a) President    b) Prime Minister  c) Defence Minister d) Chief of the Army Staff.
4. _____ is the H.Q. of the southern navel command.
   a) Madras      b) Cochin      c) Trivandrum  d) Tuticorin
5. The Border Security Force was formed in _____
   a) 1949            b) 1962            c) 1950            d) 1965
6. N.C.C. has _____ divisions.
   a) two            b) three            c) four            d) five
7. The pioneer of the reform movement in India was _____
   a) Raja Rammohan Roy  b) Dr. Ambedkar
   c) Vivekananda       d) Periyar
8. _____ founded Ramakrishna Mission
   a) Ramakrishna Paramahamsa  b) Dayanand Saraswathi
   c) Vivekananda  d) Periyar
9. _____ started the self respect movement for social uplift
   a) Dr. Ambedkar  b) Vidyasagar  c) Gandhiji  d) Periyar
10. The Anglo Oriental College established at Aligarh in 1875 by Sir Syed Ahmad Khan became _____ university later.
   a) Agra  b) Usmania  c) Aligarth Muslim  d) Utkal

II Fill in the blanks will suitable answers
1. Raja Rammohan Roy translated _____ and _____ in Bengale language.
2. _____ helped in passing an Act for abolition of 'Devadasi' system
3. 'Sarede Sadan' was established by _____
4. The H.Q. of western command of our Indian Army is _____.
5. The territorial Army is a _____ organisation.
6. Asiatic lions are found in _____ forest in _____.
7. The mangrove forests of Ganges and Brahmaputra Delta is known as _____.
8. The plants found in desert areas belong to _____ group.
9. The plants found in Scrub forests have thorns to protect them from _____.
10. _____ is Indian national Bird.

III Match the following:
1. Narayana Guru - Naval officer
2. Veeresalingam - Air force Officer
4. Commodore - The first Telegu novelist
5. Group Captain - Established temple without God.

1. Narayana Guru ________
2. Veeresalingam ________
3. Vidyasagar ________
4. Commodore ________
5. Group Captain ________
## APPENDIX - VI
Scoring Key of the Final Form of Achievement Test

<table>
<thead>
<tr>
<th>Subject</th>
<th>Section</th>
<th>S/No</th>
</tr>
</thead>
</table>
| **English** | I | 1. c) He is kind  
2. b) SVIODO  
3. c) SVOC  
4. b) He is a teacher  
5. d) Object to a preposition  
6. c) Complement to a verb  
7. b) Present Participle  
8. d) Gerund  
9. b) 12  
10. c) 8 |

| II | 1. SVDOIO  
2. SVOC  
3. SVOA  
4. Object to a verb  
5. Object to a preposition  
6. Verb  
7. Present Participle  
8. Past Participle  
9. Pure  
10. Gliding |

| III | 1. Object is related to verb  
2. Complement is related to subject or object  
3. There can be no sentence without verb  
4. Gerund is verbal noun  
5. Participle is verbal adjective. |
Part  |  Section  |  S.No.
---|---|---
2.  |  I  | 1. (A) \(A - a^2\)
    |     | 2. (A) \(50\)
    |     | 3. (a) \(3.2, \ldots\)
    |     | 4. (A) \(-5, -4, -3, \ldots\)
    |     | 5. (A) \(7 \text{ cm}^2\)
    |     | 6. (A) \(7 \text{ cm}^2\)
    |     | 7. (A) \(5 \text{ cm}^2\)
    |     | 8. (a) \(1176 \text{ cm}^2\)
    |     | 9. (a) \(8736 \text{ cm}^2\)
    |     | 10. (A) \(56 \text{ cm}^2\)
II  |     | 1. \(X = 3\)
    |     | 2. \(X = -4\)
    |     | 3. \(X = 3\)
    |     | 4. \(a + c < b + c\)
    |     | 5. \(a \times c > b \times c\)
    |     | 6. \((R^2 - r^2) \text{ or } (R+r) \text{ (R-r)}\)
    |     | 7. \(R^2\)
    |     | 8. \(8 \text{ cm}^3\)
    |     | 9. \(4 \text{ M}\)
    |     | 10. \(6 \text{ cm}^3\)
III |     | 1. \(\frac{3}{2} \text{ cm}^2\) \(\text{pyramid base} \times \text{a}^2\)
    |     | 2. \(\frac{3}{2} \text{ cm}^2\) \(\text{height} \times 4\text{a}\)
    |     | 3. \(\frac{2}{3} \text{ cm}^2\) \(\text{cone volume} \times \text{a}^3\)
    |     | 4. \(\frac{2}{3} \text{ cm}^2\) \(\text{cone volume} \times \text{lb}\)
    |     | 5. \(\frac{2}{3} \text{ cm}^2\) \(\text{cone volume} \times 2 \text{ (l+b)}\)
3.  |  I  | 1. (a) \(\frac{3}{2} \text{ cm}^2\) \(\text{cone base} \times \text{a}\)
    |     | 2. (a) \(\frac{3}{2} \text{ cm}^2\) \(\text{cone height}\)
    |     | 3. (a) \(\frac{3}{2} \text{ cm}^2\) \(\text{cone base}\)
    |     | 4. (a) \(\frac{3}{2} \text{ cm}^2\) \(\text{cone height}\)
    |     | 5. (a) \(\frac{3}{2} \text{ cm}^2\) \(\text{cone volume}\)
    |     | 6. (a) \(\frac{3}{2} \text{ cm}^2\) \(\text{cone volume}\)
4. நிலையா
5. கல்வியோக்கமைத்து முன்னணி
6. கூறுப்பாட்டுகள் அல்லது குறிப்பிட்டியோ
7. குறிப்பிட்டு முன்னணி
8. குறிப்பிட்டு முன்னணி
9. குறிப்பிட்டு முன்னணி
10. முன்னணி

III
1. பாரம்பரியா குறு - குறு கிளம் சுருங்கம் முன்னணி
2. கிருத்மா குறு - கிருத்மா முன்னணி குறு
3. கிருத்மா குறு - குறு புகழ் புகழ்
4. குறு - குறு புகழ் அறுக்கானி
5. குறு - குறு புகழ் - குறு புகழ் அறுக்கானி
## APPENDIX - VII
### English Version of the Key of the Achievement Test
**In respect of Mathematics, Science, and Social Studies Subjects**

<table>
<thead>
<tr>
<th>Subject</th>
<th>Section</th>
<th>S/No</th>
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<td>Maths</td>
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<td>II</td>
<td>1. $x = 3$</td>
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<td>4. $a + c &lt; b + c$</td>
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<td>5. $a \times c &gt; b \times c$</td>
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<td>6. $\pi (R^2 - r^2)$ or $\pi (R+r) R-r$</td>
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<td>1. Area of a Square is $a^2$</td>
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<td>2. Perimeter of a square is $4a$</td>
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<td>3. Volume of a cube is $a^3$</td>
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<td>4. Area of a rectangle is $lb$</td>
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<td>5. Perimeter of a rectangle is $2(l+b)$</td>
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Science I
1. d) mitochondria
2. d) Genes
3. b) Nucleus
4. b) carries
5. c) Calcium Carbonate
6. a) CO₂ dissolved in water
7. d) CO₂
8. d) steel
9. b) Three
10. d) Aluminium

Science II
1. Plant
2. Animal
3. Chromotids
4. Bacteria and Protozoa
5. root and step tip
6. diluted HCL
7. Heavier
8. Dry ice
9. Magnetic field
10. Magnet

Science III
1. Lime stone - Calcium Carbonate
2. Magnesite - magnesium carbonate
3. Amitosis - direct division
4. Mitosis - indirect division
5. Meiosis - reduction division

Social Science I
1. a) President
2. d) five
3. c) Defence Minister
4. b) Cochin
5. d) 1965
6. b) Three
7. a) Raja Ram Mohan Roy
8  c) Vivekananda
9  d) E V R Periyar
10  c) Aligar

II
1  Vedas and upanishads
2  Dr Muthulakshmi Reddy
3  Rama Bai
4  Simla
5  Voluntary
6  In Gir forest in kathiawar
7  Sundarbh an
8  Xerophytic group
9  Grarging animals
10  Peacock

III
1. Narayan Guru - Established temple without God
2  Vidyasagar - Helped in passing widow's remarriage Act
3  Veerasalingam - The first Telegu novelist
4  Commodare - Noval Officer
5  Group Captain - Airforce Officer
### APPENDIX - VIII

**Pre-test, Post-test and Retention Test Scores of Control Group**

**Experimental Group and Normal Group**

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# APPENDIX - IX

Subject-wise Scores of Control Group Students in the Pre-test and Post-test.

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* Girls
APPENDIX - X
Subject-wise Scores of Experimental Group Students in the Pre-test and Post-test.

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APPENDIX - XI
Subject-wise Scores of Normal Group Students in the Pre-test and Post-test.

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