

Class 9 (History) (Thursday Class)

Chapter: Fundamental Rights

Part III of the Indian Constitution deals with Fundamental Rights. These rights are essential for common good & are guaranteed under the Constitution. These rights stand enforceable by the court that means if an individual is not receiving his/her rights then that person can move to the court to claim it. Rights are of huge importance & they are necessary for shaping one's personality & democracy is meaningless if these rights are not provided. Moreover, the rights act as an instrument of check on the unjust acts of the government. The rights can be altered only by the amendment of the Constitution.

Questions:

- a) Why are the rights known as Fundamental rights?
- b) Which date is celebrated as Human Rights Day?
- c) Define the word Writ.
- d) State any two significance of these rights.

Ch-4 Basic Problems of Economy:

Class 9

Economics:

Q1: What are man made resources? Give 2 examples.

Q2: What is a human resource?

Q3: What are the principal resources of the world?

Q4: What is a sustainable development?

Q5: what is an economy?

Q6: What are the economic problems of our economy?

(Thu) CI-IX, EVS

Ch-5 Topic (Water and Thermal pollution)

Home Assignment...

- 1) What do you mean by water pollution?
- 2) State the causes and effects of water pollution.
- 3) What are the effects of thermal pollution?
- 4) Where is thermal pollution found?
- 5) How can thermal pollution be prevented?

.....(To be continued next class.....)

Class 9

Commercial application

Ch- 1 introduction to Commercial Organisations

Q1: What is trade?

Q2: What is an internal trade?

Q3: How many types of internal trade are there?

Q4: What is an external trade?

Q5: How many types of external trade are there?

Q6: How is an industry , commerce and trade interrelated to each other?

Q7: What are the difference between organisations, firm and company?

DREAMLAND SCHOOL

CLASS IX (Session- 2020-21)

PHYSICAL EDUCATION (6th Subject)

HOME WORK-1

GAME:- (CRICKET)

Cricket is a bat-and-ball game played between two teams of eleven players on a field at the centre of which is a 20-metre (22-yard) pitch with a wicket at each end, each comprising two bails balanced on three stumps. The batting side scores runs by striking the ball bowled at the wicket with the bat, while the bowling and fielding side tries to prevent this and dismiss each player (so they are "out"). Means of dismissal include being bowled, when the ball hits the stumps and dislodges the bails, and by the fielding side catching the ball after it is hit by the bat, but before it hits the ground. When ten players have been dismissed, the innings ends and the teams swap roles. The game is adjudicated by two umpires, aided by a third umpire and match referee in international matches. They communicate with two off-field scorers who record the match's statistical information.

Field Dimensions

- The cricket field is a large oval-shaped grassy ground of varying size. There is no standard measurement, though its diameter is usually between 450 feet (137 m) and 500 feet (150 m).
- The cricket pitch is 22 yards (20.12 m) long and 10 feet (3 m) wide, stretching between two sets of cricket stumps which are 28 inches (71 cm) high and 9 inches (about 23 cm) wide.
- The popping crease is 4 ft. (1.22 m) in front of the bowling crease.

All About Cricket Equipment

- Cricket is a game that requires a wealth of equipment in order to stay safe and reach optimum performance levels. This can include protective gear, cricket training equipment and cricket ground equipment.

BATSMEN STAY SAFE

Without the correct gear, cricket can be a dangerous sport and health and safety guidelines should be adhered to. Whether you are a professional cricketer facing 80mph-plus fast bowlers or a youngster starting out, there is a number of key cricket equipment that a batsman should consider essential:

- Cricket Bat
- Batting Leg-Guards (also known as pads)
- Batting Gloves
- Thigh Guard/Lower Body Protector

- Abdominal Protector/Box
- Batting Helmet



BASIC RULES OF CRICKET

- Cricket is played between two teams each made up of eleven players. (Sometime in junior competitions you will find 8 player teams).
- Games comprise of at least one innings where each team will take turns in batting and fielding/bowling.
- The fielding team will have a bowler bowl the ball to the batsman who tries to hit the ball with their bat.
- The fielding team tries to get the batsmen out by...
- Hitting the wickets with the ball when bowling
- Catching a batsman's shot on the full
- Hitting the batsman's leg in front of the wicket (LBW)
- Or hitting the wickets before the batsmen can run to the other end of the pitch
- The batmen try to score as many runs as possible before getting out by...
- Hitting the ball and running between the wickets and making it to the other end before the fielders can hit the wickets with the ball. Each time you run one full length of the pitch it equals 1 run.
- Hitting the ball to the boundary along the ground is 4 runs.
- Hitting the ball over the boundary on the full equals 6 runs.
- The fielding team must get 10 batsmen out before they can change over and start batting.
- The aim of the game is to score as many runs as possible before the fielding team takes 10 wickets. The team with the most runs wins.

ASSIGNMENT QUESTIONS:

1. In a team who many players playing on the field?
2. What is the measurement of Cricket field?
3. Write down the name of Cricket equipment.
4. Write down the basic rules of Cricket.

CHITTRITA BANERJEE

CLASS - 9
COMPUTER APPLICATION
VALUES AND DATA TYPES IN JAVA

Java Tokens

A **token** is the smallest element of a program that is meaningful to the compiler. Tokens can be classified as follows:

1. Keywords
2. Identifiers
3. Literals
4. Operators
5. Separators / punctuators

Keyword: Keywords are pre-defined or reserved words in a programming language. Each keyword is meant to perform a specific function in a program.

Few Example are as follows:

abstract,	boolean	byte	break	class
case	catch	char	continue	default
do	double	else	extends	final
finally	float	for	if	while

Identifiers: Identifiers are used as the general terminology for naming of variables, functions and arrays. These are user-defined names

There are some rules which you must follow while naming the identifiers such as:

- Identifiers must begin with a letter, dollar sign or underscore.
- Apart from the first character, an identifier can have any combination of characters.
- Identifiers in Java are case sensitive.
- Java Identifiers can be of any length.
- Any identifier name must not begin with a digit but can contain digits within.
- Most importantly, keywords can't be used as identifiers in Java.

Examples of valid identifiers :

- MyAge
- MYAGE
- myage
- x
- i
- x1

- i1
- _myage
- \$myage
- sum_of_array
- age12375

Literals:

Literals in Java are similar to normal variables but their values cannot be changed once assigned. In other words, literals are constant variables with fixed values. These are defined by users and can belong to any data type. Java supports literals which are as follows:

1. Integer
2. Floating Point
3. Character
4. String
5. Boolean

Operators:

An operator in Java is a special symbol that signifies the compiler to perform some specific mathematical or non-mathematical operations on one or more operands.

Operator	Examples
Arithmetic	+ , - , / , * , %
Unary	++ , -- , !
Assignment	= , += , -= , *= , /= , %= , ^=
Relational	== , != , < , > , <= , >=
Logical	&& ,
Ternary	(Condition) ? (Statement1) : (Statement2);
Bitwise	& , , ^ , ~
Shift	<< , >> , >>>

Separators / punctuators:

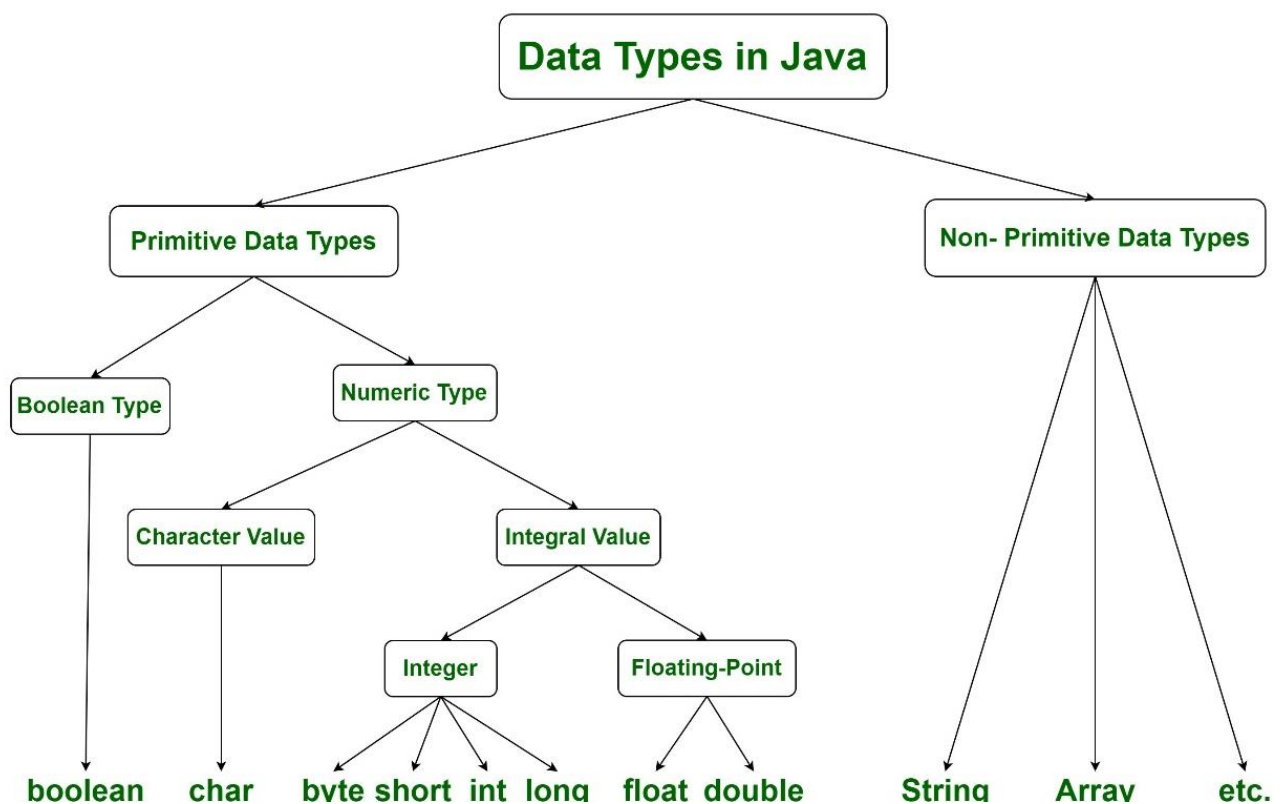
The following special symbols are used in Java having some special meaning and thus, cannot be used for some other purpose.

- **Brackets[]:** Opening and closing brackets are used as array element reference. These indicate single and multidimensional subscripts.

- **Parentheses():** These special symbols are used to indicate function calls and function parameters.
- **Braces{}:** These opening and ending curly braces marks the start and end of a block of code containing more than one executable statement.
- **comma (,):** It is used to separate more than one statements like for separating parameters in function calls.
- **semi colon :** It is an operator that essentially invokes something called an initialization list.
- **asterick (*):** It is used to create pointer variable.

Data types

Data types specify the different sizes and values that can be stored in the variable. There are two types of data types in Java:



Primitive data types:

A primitive data type is pre-defined by the programming language. The size and type of variable values are specified, and it has no additional methods.

TYPE	DESCRIPTION	DEFAULT	SIZE	EXAMPLE LITERALS	RANGE OF VALUES
boolean	true or false	false	1 bit	true, false	true, false
byte	twos complement integer	0	8 bits	(none)	-128 to 127
char	unicode character	\u0000	16 bits	'a', '\u0041', '\101', '\l', '\', '\n', '\b'	character representation of ASCII values 0 to 255
short	twos complement integer	0	16 bits	(none)	-32,768 to 32,767
int	twos complement integer	0	32 bits	-2, -1, 0, 1, 2	-2,147,483,648 to 2,147,483,647
long	twos complement integer	0	64 bits	-2L, -1L, 0L, 1L, 2L	-9,223,372,036,854,775,808 to 9,223,372,036,854,775,807
float	IEEE 754 floating point	0.0	32 bits	1.23e100f, -1.23e-100f, .3f, 3.14F	upto 7 decimal digits
double	IEEE 754 floating point	0.0	64 bits	1.23456e300d, -1.23456e-300d, 1e1d	upto 16 decimal digits

Non-Primitive Data Types:

These data types are not actually defined by the programming language but are created by the programmer. They are also called “reference variables” or “object references” since they reference a memory location which stores the data.

Escape sequences in Java:

A character preceded by a backslash (\) is an escape sequence and has a special meaning to the compiler.

The following table shows the Java escape sequences.

Escape Sequence	Description
\t	Inserts a tab in the text at this point.
\b	Inserts a backspace in the text at this point.
\n	Inserts a newline in the text at this point.
\'	Inserts a single quote character in the text at this point.
\"	Inserts a double quote character in the text at this point.
\\	Inserts a backslash character in the text at this point.

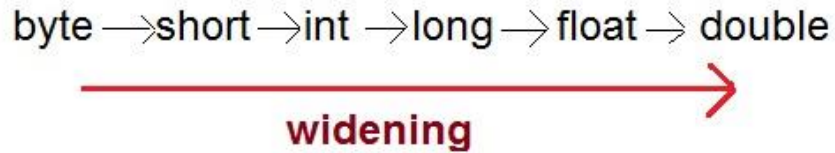
Type conversion in Java :

Type casting is nothing but assigning a value of one primitive data type to another. When you assign the value of one data type to another, you should be aware of the compatibility of the data type. If they are compatible, then Java will perform the conversion automatically known as Automatic Type Conversion and if not, then they need to be casted or converted explicitly.

In Java, type casting is classified into two types,

- **Widening Casting (Implicit)**

This type of casting takes place when two data types are automatically converted. It is also known as Implicit Conversion. This happens when the two data types are compatible and also when we assign the value of a smaller data type to a larger data type.



Example:

```
class Example
{
    public static void main(String[] args)
    {
        int i = 100;
        long l = i; //no explicit type casting required
        float f = l; //no explicit type casting required
        System.out.println("Int value "+i);
        System.out.println("Long value "+l);
        System.out.println("Float value "+f);
    }
}
```

Output:

```
Int value 100
Long value 100
Float value 100.0
```

- **Narrowing Casting (Explicit)**

In this case, if you want to assign a value of larger data type to a smaller data type, you can perform Explicit type casting or narrowing.



Example :

```
class Example2
{
    public static void main(String[] args)
    {
        double d = 100.04;
        long l = (long)d; //explicit type casting required
        int i = (int)l;    //explicit type casting required

        System.out.println("Double value "+d);
        System.out.println("Long value "+l);
        System.out.println("Int value "+i);
    }
}
```

Output:

```
Double value 100.04
Long value 100
Int value 100
```

ASSIGNMENT III (PART – 2)

6. Define token in java.
7. How many types of tokens are there in java?
8. What do you mean by literals in java?
9. Define data types.
10. How many primitive data types are there? Name them
11. What is type casting?
12. Differentiate between implicit and explicit type casting.

Debalina Dhar Chowdhury

Logarithm Properties

$$\log_a xy = \log_a x + \log_a y$$

$$\log_a \frac{x}{y} = \log_a x - \log_a y$$

$$\log_a x^n = n \log_a x$$

$$\log_a b = \frac{\log_c b}{\log_c a}$$

$$\log_a b = \frac{1}{\log_b a}$$

The following can be derived from the above properties.

$$\log_a 1 = 0$$

$$\log_a a = 1$$

$$\log_a a^r = r$$

$$\log_a \frac{1}{b} = -\log_a b$$

$$\log_{\frac{1}{a}} b = -\log_a b$$

$$\log_a b \log_b c = \log_a c$$

$$\log_{a^m} a^n = \frac{n}{m}, m \neq 0$$

Question 1.

Convert the following to logarithmic form:

(i) $5^2 = 25$

(ii) $a^5 = 64$

(iii) $7^x = 100$

(iv) $9^0 = 1$

(v) $6^1 = 6$

(vi) $3^{-2} = \frac{1}{9}$

(vii) $10^{-2} = 0.01$

(viii) $(81)^{\frac{3}{4}} = 27$

Solution:

(i) $5^2 = 25 \Rightarrow \log_5 25 = 2$

(ii) $a^5 = 64 \Rightarrow \log_a 64 = 5$

(iii) $7^x = 100 \Rightarrow \log_7 100 = x$

(iv) $9^0 = 1 \Rightarrow \log_9 1 = 0$

(v) $6^1 = 6 \Rightarrow \log_6 6 = 1$

(vi) $3^{-2} = \frac{1}{9} \Rightarrow \log_3 \frac{1}{9} = -2$

(vii) $10^{-2} = 0.01 \Rightarrow \log_{10} 0.01 = -2$

(viii) $(81)^{\frac{3}{4}} = 27 \Rightarrow \log_{81} 27 = \frac{3}{4}$

Question 2.

Convert the following into exponential form:

(i) $\log_2 32 = 5$

(ii) $\log_3 81 = 4$

(iii) $\log_{\frac{1}{3}} = -1$

(iv) $\log_3 4 = \frac{2}{3}$

(v) $\log_8 32 = \frac{5}{3}$

(vi) $\log_{10} (0.001) = -3$

(vii) $\log_2 0.25 = -2$

(viii) $\log_a \left(\frac{1}{a}\right) = -1$

Solution:

$$(i) \log_2 32 = 5 \Rightarrow 2^5 = 32$$

$$(ii) \log_3 81 = 4 \Rightarrow 3^4 = 81$$

$$(iii) \log_3 \frac{1}{3} = -1 \Rightarrow 3^{-1} = \frac{1}{3}$$

$$(iv) \log_8 4 = \frac{2}{3} \Rightarrow (8)^{\frac{2}{3}} = 4$$

$$(v) \log_8 32 = \frac{5}{3} \Rightarrow (8)^{\frac{5}{3}} = 32$$

$$(vi) \log_{10} (0.001) = -3 \Rightarrow 10^{-3} = 0.001$$

$$(vii) \log_2 0.25 = -2 \Rightarrow 2^{-2} = 0.25$$

$$(viii) \log_a \frac{1}{a} = -1 \Rightarrow a^{-1} = \frac{1}{a}$$

Question 3.

By converting to exponential form, find the values of:

(i) $\log_2 16$

(ii) $\log_5 125$

(iii) $\log_4 8$

(iv) $\log_9 27$

$$\begin{aligned}
 & \text{(i) Let, } \log_2 16 = x \\
 & \Rightarrow (2)^x = 16 \\
 & \Rightarrow (2)^x = 2 \times 2 \times 2 \times 2 \\
 & \Rightarrow (2)^x = (2)^4 \\
 & \therefore x = 4 \\
 & \text{(ii) Let, } \log_5 125 = x \Rightarrow (5)^x = 125 \\
 & \Rightarrow (5)^x = 5 \times 5 \times 5 \Rightarrow (5)^x = (5)^3 \\
 & \therefore x = 3 \\
 & \text{(iii) Let, } \log_4 8 = x \Rightarrow (4)^x = 8 \\
 & \Rightarrow (2 \times 2)^x = 2 \times 2 \times 2 \Rightarrow (2)^{2x} = (2)^3 \\
 & \Rightarrow 2x = 3 \\
 & \therefore x = \frac{3}{2} \\
 & \text{(iv) } \log_9 27 = x \\
 & \Rightarrow (9)^x = 27 \\
 & \Rightarrow (3 \times 3)^x = 3 \times 3 \times 3 \Rightarrow (3)^{2x} = (3)^3 \\
 & \Rightarrow 2x = 3 \\
 & \therefore x = \frac{3}{2}
 \end{aligned}$$

Home Work-

Q1.

Given $\log_{10} x = a$, $\log_{10} y = b$ and $\log_{10} z = c$,

(i) write down 10^{2a-3} in terms of x.

(ii) write down 10^{3b-1} in terms of y.

(iii) if $\log_{10} P = 2a + \frac{b}{2} - 3c$, express P in terms of x, y and z.

Q2.

Given $\log_{10} a = 2a$ and $\log_{10} y = -\frac{b}{2}$

(i) write 10^a in terms of x .

(ii) write 10^{2b+1} in terms of y .

(iii) if $\log_{10} P = 3a - 2b$, express P in terms of x and y .

Date – 30.04.2020

DESIGN

Instruments and tracing paper are allowed but you are advised to restrict their use as far as possible.

1. Create an attractive design for a bed sheet, you can use this type of design.



DREAMLAND SCHOOL
CLASS IX (session 2020-21)
BIOLOGY HOME WORK 5

CHAPTER 4 :POLLINATION AND FERTILIZATION(Contd..)

Quick Review of the chapter

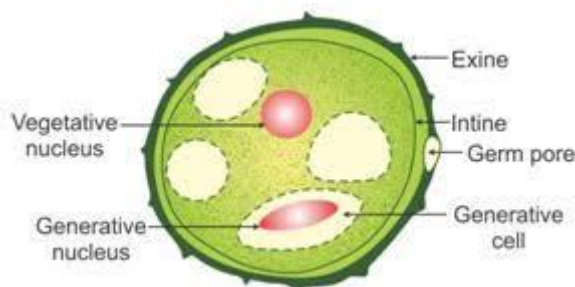
What is Fertilization?

- Fertilization is a process of sexual reproduction in plants, which occurs after pollination and germination.
- **Fertilization can be defined** as the fusion of the male gametes (pollen) with the female gametes (ovum) to form a diploid zygote. It is a physicochemical process which occurs after the pollination of the carpel. The complete series of this process takes place in the zygote to develop into a seed.
- In flowering plants male(pollen grain) and female gametes (ovule)are produced respectively in anther and ovary , so we will discuss the structure of pollen grain and the ovule.

Structure of the Pollen Grain-

Pollen grains represents the male gametophyte.

1. The pollen grain are surrounded by prominent two layered wall.
2. The hard outer thick layer is called exine, which can withstand against high temperature, enzymes and strong acids and alkali.
3. The exine is discontinuous at some places called germ pore
4. The inner thin wall of the pollen grain is called intine. It is made up of cellulose and pectin.



5. The cytoplasm of pollen grain is surrounded by plasma membrane.
6. Pollen grain consists of two cells, the vegetative cell and generative cell on maturity.

7. The vegetative cell is larger in size with large amount of reserve food material and a large irregularly shaped nucleus.

8. The generative cell is smaller in size.

9. Internally, each pollen grain possess two type of nucleus called **generative nucleus** and **tube nucleus**.

10. The **generative nucleus** divides and forms **two male gametes** nucleus and the tube nucleus develops pollen tube after pollination..

The Structure of the ovule

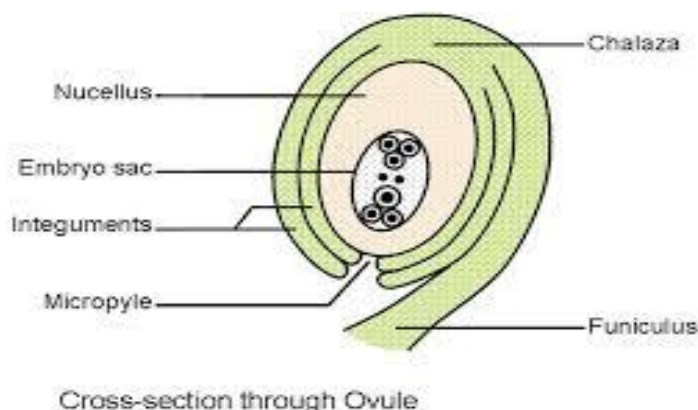
In seed plants, the **ovule** is the structure that gives rise to and contains the female reproductive cells.

It consists of three parts:

1. The integument, forming its outer layer, that works as protective covering of the ovule. The integument leave a small opening at one end for entry of the pollen tube called as, **micropyle**.

2. The nucellus –It is enclosed by the integument, a food laden part inside which embryo sac is present

3. Female gametophyte (formed from a haploid megaspore) in its center. The female gametophyte — specifically termed a *megagametophyte*— is also called the *embryo sac* in angiosperms. The megagametophyte produces an egg cell for the purpose of fertilization.



Description of Structure of of the embryo sac of a mature angiosperm

- The female gametophyte or embryo sac contains 8 nuclei(3+3+2)
- Six out of the eight nuclei are surrounded by cell walls.

- The egg apparatus comprises of two synergids and one egg cell, present at the micropylar end.
- Three cells called the antipodals are present at the chalazal end.
- The central cell is formed by the fusion of two polar nuclei.
- On maturity, the embryo sac of the angiosperms consists of 8 nuclei and 7 cells.

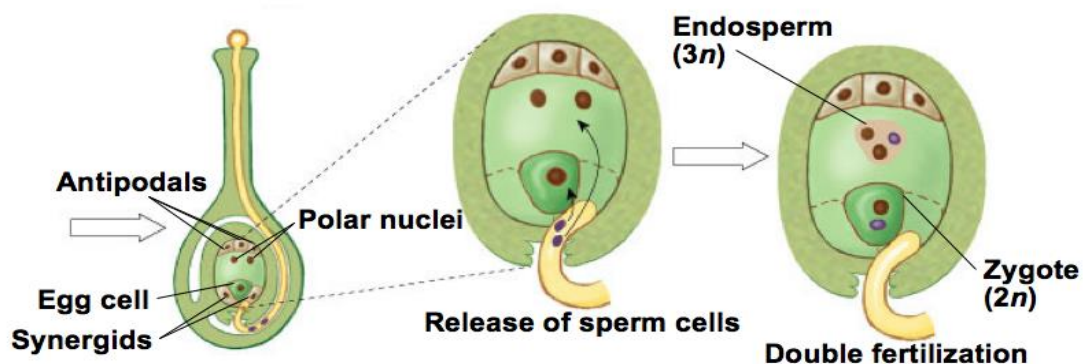
Role of Synergids

The synergids are responsible for the reproduction in an angiosperm. During fertilization, a pollen tube grows into one of the synergids. The tube ceases growth, ruptures, and releases two sperm cells.

The Process of double Fertilization

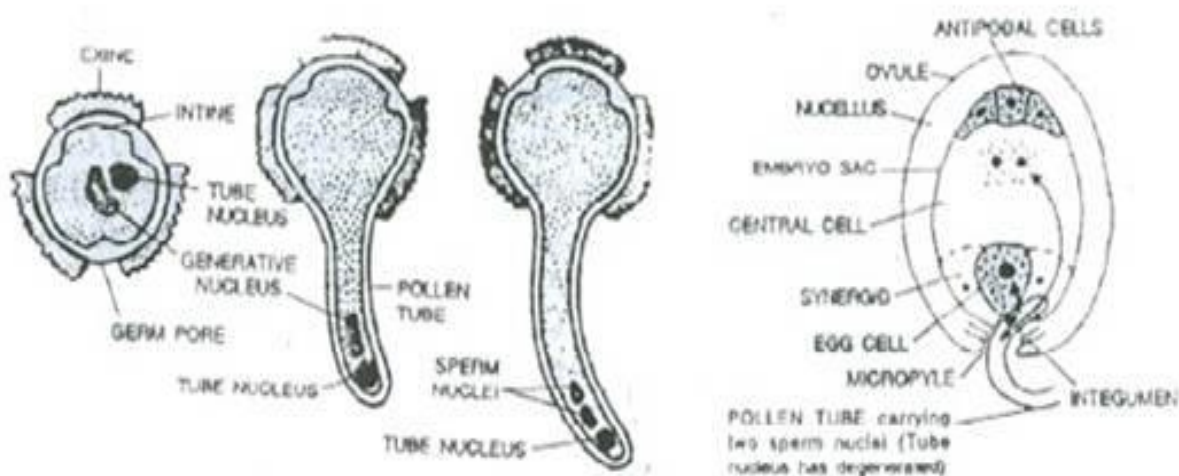
- Pollen grain germinates only if it is transferred to the stigma of the same plant species.
- After successful pollination pollen grain take up the sugar solution present at the

Double Fertilization



stigma head and germination starts as the exine bursts and pollen tube comes out through the germ pores.

- The pollen tube is directed towards the embryo sac by the synergids.
- At tip of the pollen tube the generative nucleus divides and forms two male gamete nuclei or sperm nuclei.
- Reaching the embryo sac by the micropylar end the tube nucleus is degenerated
- Once the pollen tube reaches the **micropyle**, or the opening of an ovule, it releases two haploid sperm nuclei into the embryo sac.
- One sperm nuclei(haploid) will fuse with the egg(haploid), resulting in a diploid zygote.
- The other sperm nuclei will fuse with the two polar nuclei(diploid), creating a **triploid (3n)** structure that will grow rapidly into the endosperm(also called PEN-primary endosperm nucleus).



Germination of pollen grain and the entry of pollen tube inside the ovule

Post Fertilization changes in a Flower

Once the fertilization occurs, there are many changes that occur in the structure of the flower.

- The ovary consequently becomes the fruit
- The ovule consequently becomes the seed.
- The integument of the ovules become the seed coat of the seed
- The sepals of the calyx and the petals of the corolla fall off

In a typical flower, the post-fertilization changes occur as follows:

Sepal	Fall off
Petal	Fall off
Stamen	Fall off
Zygote	Embryo
Primary endosperm nucleus	Endosperm (3n)
Synergid	Disintegrate
Antipodals	Disintegrate
Ovary	Fruit
Ovule	Seed
Ovary wall	Pericarp (epicarp+mesocarp + endocarp)
Integument	Seed coat (testa+tegmen)
Funicle of the ovule	Stalk of the seed
Micropyle	Seed pore

Assignment Questions-

a. Name the following

1. The pollination done by birds.
2. The male gamete in flower.
3. A barrier between male and female reproductive part in flower.

B.Explain the structures-

1. ovule
2. Stigma.
3. Pollen grain

C . Wtite the fate of the floral parts after fertilization.

D. why the fertilization in flowering plants is known as the double fertilization.

E Mention role of flower.

F. Explain the following-

1. Ornithophily.
2. Cleistogamy.
3. Artificial pollination.

Mathematics- Logarithm

Class-IX

Assignment:- Date:-30.04.20

Question 1.

Simplify the following :

$$(i) \log a^3 - \log a^2 \quad (ii) \log a^3 \div \log a^2$$

$$(iii) \frac{\log 4}{\log 2} \quad (iv) \frac{\log 8 \log 9}{\log 27}$$

$$(v) \frac{\log 27}{\log \sqrt{3}} \quad (vi) \frac{\log 9 - \log 3}{\log 27}$$

Solution:

$$(i) \log a^3 - \log a^2 = \log \left(\frac{a^3}{a^2} \right) \text{ (Quotient Law)}$$

$$= \log a$$

$$(ii) \log a^3 \div \log a^2 = 3 \log a \div 2 \log a \text{ (Power Law)}$$

$$= \frac{3 \log a}{2 \log a} = \frac{3}{2}$$

$$(iii) \frac{\log 4}{\log 2} = \frac{\log(2 \times 2)}{\log 2} = \frac{\log 2}{\log 2}$$

$$= \frac{2 \log 2}{\log 2} \text{ (Power Law)} = 2 (1) = 2$$

$$(iv) \frac{\log 8 \log 9}{\log 27} = \frac{\log 2^3 \cdot \log 3^2}{\log 3^3}$$

$$= \frac{(3 \log 2) \cdot (2 \log 3)}{(3 \log 3)} \text{ (Power Law)}$$

$$= \frac{(\log 2) \cdot (2)}{1} = 2 \log 2 = \log 2^2 = \log 4.$$

$$\begin{aligned} \text{(v)} \quad \frac{\log 27}{\log \sqrt{3}} &= \frac{\log(3 \times 3 \times 3)}{\log(3)^{1/2}} \\ &= \frac{\log(3)^3}{\log(3)^{1/2}} = \frac{3 \log 3}{\frac{1}{2} \log 3} \quad (\text{Power Law}) \end{aligned}$$

$$= \frac{3 \times 2}{1} \left(\frac{\log 3}{\log 3} \right) = 6(1) = 6$$

$$\begin{aligned} \text{(vi)} \quad \frac{\log 9 - \log 3}{\log 27} &= \frac{\log(3 \times 3) - \log 3}{\log(3 \times 3 \times 3)} \\ &= \frac{\log 3^2 - \log 3}{\log 3^3} = \frac{2 \log 3 - \log 3}{3 \log 3} \quad (\text{Power Law}) \\ &= \frac{\log 3}{3 \log 3} = \frac{1}{3} \end{aligned}$$

Question 2.

Evaluate the following:

$$\text{(i)} \log(10 + \sqrt[3]{10}) \quad \text{(ii)} 2 + \frac{1}{2} \log(10^{-3})$$

$$\text{(iii)} 2 \log 5 + \log 8 - \frac{1}{2} \log 4.$$

$$\text{(iv)} 2 \log 10^3 + 3 \log 10^{-2} - \frac{1}{3} \log 5^{-3} + \frac{1}{2} \log 4$$

$$\text{(v)} 2 \log 2 + \log 5 - \frac{1}{2} \log 36 - \log \frac{1}{30}$$

$$\text{(vi)} 2 \log 5 + \log 3 + 3 \log 2 - \frac{1}{2} \log 36 - 2 \log 10$$

Solution:

$$\begin{aligned} \text{(i)} \log \left(10 \div \sqrt[3]{10} \right) &= \log \left(10 \div (10)^{\frac{1}{3}} \right) \\ &= \log \left((10)^1 \div (10)^{\frac{1}{3}} \right) = \log \left(10^{1-\frac{1}{3}} \right) = \log \left(10^{\frac{2}{3}} \right) \\ &= \frac{2}{3} \log 10 = \frac{2}{3} (1) = \frac{2}{3} \end{aligned}$$

$$\begin{aligned} \text{(ii)} \quad 2 + \frac{1}{2} \log (10^{-3}) &= 2 + \frac{1}{2} \times (-3) \log 10 \\ &= 2 - \frac{3}{2} \log 10 = 2 - \frac{3}{2} (1) = 2 - \frac{3}{2} = \frac{4-3}{2} = \frac{1}{2} \end{aligned}$$

$$\begin{aligned} \text{(iii)} \quad 2 \log 5 + \log 8 - \frac{1}{2} \log 4 \\ &= \log (5)^2 + \log 8 - \frac{1}{2} \log (2)^2 \end{aligned}$$

$$= \log 25 + \log 8 - \frac{1}{2} \times 2 \log 2$$

$$= \log 25 + \log 8 - \log 2 = \log \left(\frac{25 \times 8}{2} \right)$$

$$= \log \left(\frac{25 \times 4}{1} \right) = \log (100) = \log (10)^2$$

$$= 2 \log 10 = 2 (1) = 2$$

$$\text{(iv)} \quad 2 \log 10^3 + 3 \log 10^{-2} - \frac{1}{3} \log 5^{-3} + \frac{1}{2} \log 4$$

$$\begin{aligned} &= 2 \times 3 \log 10 + 3 (-2) \log 10 - \frac{1}{3} (-3) \log 5 + \frac{1}{2} \\ &\quad \log (2)^2 \end{aligned}$$

$$\begin{aligned}
 &= 6 \log 10 - 6 \log 10 + \frac{3}{3} \log 5 + \frac{1}{2} \times 2 \log 2 \\
 &= 0 + 1 \log 5 + \log 2 = \log 5 + \log 2 = \log (5 \times 2) \\
 &= \log (10) = 1
 \end{aligned}$$

$$(v) \quad 2 \log 2 + \log 5 - \frac{1}{2} \log 36 - \log \frac{1}{30}$$

$$= \log (2)^2 + \log 5 - \frac{1}{2} \log (6)^2 - \log \left(\frac{1}{30} \right)$$

$$= \log 4 + \log 5 - \frac{1}{2} \times 2 \log 6 - \log \frac{1}{30}$$

$$= \log 4 + \log 5 - \log 6 - (\log 1 - \log 30)$$

$$= \log 4 + \log 5 - \log 6 - \log 1 + \log 30$$

$$= (\log 4 + \log 5 + \log 30) - (\log 6 + \log 1)$$

$$= \log (4 \times 5 \times 30) - \log (6 \times 1)$$

$$= \log \frac{4 \times 5 \times 30}{6 \times 1} = \log \frac{4 \times 5 \times 5}{1 \times 1} = \log 100$$

$$= \log (10)^2 = 2 \log 10 = 2(1) = 2$$

$$(vi) \quad 2 \log 5 + \log 3 + 3 \log 2 - \frac{1}{2} \log 36 - 2 \log 10$$

$$= \log (5)^2 + \log 3 + \log (2)^3 - \frac{1}{2} \log (6)^2 - 2 \log 10$$

$$= \log 25 + \log 3 + \log 8 - \frac{1}{2} \times 2 \log 6 - 2 \log 10$$

$$= \log 25 + \log 3 + \log 8 - \log 6 - \log (10)^2$$

$$= \log (25 \times 3 \times 8) - \log 6 - \log 100$$

$$= \log \left(\frac{25 \times 3 \times 8}{6 \times 100} \right) = \log \left(\frac{1 \times 3 \times 8}{6 \times 4} \right)$$

$$= \log \left(\frac{24}{24} \right) = \log 1 = 0.$$

Home Work-

Solve the following equations :

(i) $\log (2x + 3) = \log 7$

(ii) $\log (x + 1) + \log (x - 1) = \log 24$

(iii) $\log (10x + 5) - \log (x - 4) = 2$

(iv) $\log_{10} 5 + \log_{10} (5x + 1) = \log_{10} (x + 5) + 1$

(v) $\log (4y - 3) = \log (2y + 1) - \log 3$

(vi) $\log_{10} (x + 2) + \log_{10} (x - 2) = \log_{10} 3 + 31 \log_{10} 4.$

(vii) $\log (3x + 2) + \log (3x - 2) = 5 \log 2.$