

## COMPUTER SCIENCE

### BOOLEAN ALGEBRA

Boolean Algebra is used to analyze and simplify the digital (logic) circuits. It was invented by George Boole. Boolean algebra is the category of algebra in which the variable's values are the truth values, true and false, denoted by 1 and 0 respectively. It is used to analyze and simplify digital circuits.

Boolean algebra has only two mathematical operations, addition and multiplication. These operations are associated with the OR gate and the AND gate, respectively.

Following are the important rules used in Boolean algebra.

- Variable used can have only two values. Binary 1 for HIGH and Binary 0 for LOW.
- The complement of a variable is represented by an overbar. Thus, complement of variable B is represented as  $B^{\bar{}}$ . Thus if  $B = 0$  then  $B^{\bar{}} = 1$  and  $B = 1$  then  $B^{\bar{}} = 0$ .
- OR of the variables is represented by a plus (+) sign between them. For example OR of A, B, C is represented as  $A + B + C$ .
- Logical AND of the two or more variable is represented by writing a dot between them such as  $A.B.C$ . Sometimes the dot may be omitted like  $ABC$ .

Logical Addition:

$$0 + 0 = 0$$

$$0 + 1 = 1$$

$$1 + 0 = 1$$

$$1 + 1 = 1$$

Logical Multiplication:

$$0 . 0 = 0$$

$$0 . 1 = 0$$

$$1 . 0 = 0$$

$$1 . 1 = 1$$

#### **Basic Duality in Boolean Algebra:**

1. Changing each OR (+) sign to an AND (.) sign
2. Changing each AND (.) sign to an OR (+) sign.
3. Complementary each 0 and 1

For instance

$$A + 0 = A$$

The dual relation is  $A \cdot 1 = A$

### **Fundamental Laws and Theorems of Boolean Algebra:**

Double negation law:	$((A)')' = A$	
Commutative	$A + B = B + A$	$A \cdot B = B \cdot A$
Associative	$A + (B + C) = (A + B) + C$	$A \cdot (B \cdot C) = (A \cdot B) \cdot C$
Distributive	$A \cdot (B + C) = A \cdot B + A \cdot C$	$A + (B \cdot C) = (A + B) \cdot (A + C)$
Involution	$(A')' = A$	
Absorption	$A + (A \cdot B) = A$	$A \cdot (A + B) = A$
De Morgan's	$(A + B)' = A' \cdot B'$	$(A \cdot B)' = A' + B'$
Complement law:	$A + A' = 1$	$A \cdot A' = 0$
Identity law:	$A \cdot 1 = A$	$A + 0 = A$

### **ASSIGNMENT III (PART -2)**

7. State the Principle of Duality.
8. Find the complement of the following Boolean expression using De Morgan's law.  
 $F(a, b, c) = (b' + c) + a$
9. Minimize the following expression by use of Boolean rules.  
 $X = A B C + A' B + A B C'$
10. Simplify the Boolean expressions:  
 $(X + Y) (X + Y') (X' + Z)$

## **Business studies for class 12:**

### **Ch -2 manpower planning:**

Answers the following questions after listening to the explanations below:

Q1: What is a manpower planning?

Q2: What are the objective of manpower planning?

Q3: What are the benefits of manpower planning?

Q4: What are the steps of manpower planning?

Q5: What will happen if do not have a particular man power planning?

## **Economics**

### **Ch-2 demand and law of demand:**

assignment:

Answer the following question after listening to explanation in the Audio Lesson below:

Q1: What is a demand?

Q2: What are individual demand?

Q3: What are market demand?

Q4: What is an Ex-ante demand?

Q5: What is ex-post demand?

Q6: What is joint demand?

Q7: What composite demand?

Q8: What what is derived demand?

Q9 : What ate inferior goods?

Q10:What are normal goods?

Q11: What are inexpensive goods?

Q12: What are the different factors which effect demand.?

## **Class 12 Pol.Sci**

### **Chapter :3 (Parliamentary & Presidential form of government)**

In Presidential form of government there is separation of powers between the legislature & the executive and the latter is not responsible to the former. In this form of government the Head of the State is also Head of the Government. The features of this governance are as follows:

- Fixed tenure of legislature & executive.
- Single unified executive.
- Responsibility of the ministers to the President.
- There is separation of powers between legislature & executive.
- Political homogeneity of the Cabinet is not required.
- The Cabinet acts as the advisory body to the President.

This form of government has its own merits like it is a stable form of governance, having a strong executive, there is continuity in government executive policies & executive is free from aggressive party politics. It is to be noted that this government has also its demerits. As for example: Executive is irresponsible & can be easily changed. President can use his power in despotic way.

Questions:

- a) Define-Presidential form of government.
- b) What do you understand by Cabinet acting as an advisory body?
- c) Discuss any three features of Presidential form of government.

Maths - Inverse Trigo.  
Home assignment

Formula :- ① 
$$\left. \begin{aligned} \sin(\sin^{-1}x) &= x \\ \cos(\cos^{-1}x) &= x \\ \tan(\tan^{-1}x) &= x \\ \text{etc.} \end{aligned} \right\} x = (\text{Number})$$

②  $\sin^{-1}(\sin \theta) = \theta$ ,  $\cos^{-1}(\cos \theta) = \theta$ ,  
 $\tan^{-1}(\tan \theta) = \theta$  etc. [ $\theta = \text{angle}$ ]

③  $\sin^{-1}x \pm \sin^{-1}y = \sin^{-1}(x\sqrt{1-y^2} \pm y\sqrt{1-x^2})$

④  $\cos^{-1}x \pm \cos^{-1}y = \cos^{-1}(xy \mp \sqrt{1-x^2}\sqrt{1-y^2})$

⑤  $\tan^{-1}x + \tan^{-1}y = \tan^{-1} \frac{x+y}{1-xy}$

⑥  $\tan^{-1}x - \tan^{-1}y = \tan^{-1} \frac{x-y}{1+xy}$

⑦ V.V.I  $2\tan^{-1}x = \sin^{-1} \frac{2x}{1+x^2} = \cos^{-1} \frac{1-x^2}{1+x^2} = \tan^{-1} \frac{2x}{1-x^2}$

Ex 1.  $\cos^{-1}\left(-\frac{\sqrt{3}}{2}\right) = ?$

Let  $\cos^{-1}\left(-\frac{\sqrt{3}}{2}\right) = \alpha \Rightarrow \cos \alpha = -\frac{\sqrt{3}}{2} = -\cos \frac{\pi}{6}$   
 $= \cos\left(\pi - \frac{\pi}{6}\right)$

Hence  $\alpha = \left(\pi - \frac{\pi}{6}\right) = \frac{5\pi}{6}$

Ex 2  $\tan^{-1}\left(-\frac{1}{\sqrt{3}}\right) = ?$

Let  $\tan^{-1}\left(-\frac{1}{\sqrt{3}}\right) = \alpha$ . Now  $\tan \alpha = -\frac{1}{\sqrt{3}} = -\tan\left(\frac{\pi}{6}\right)$

$\tan \alpha = \tan\left(-\frac{\pi}{6}\right)$

$\therefore \alpha = -\frac{\pi}{6}$

Ex 3 Find the value  $\sin(\sin^{-1} \frac{1}{3} + \sec^{-1} 3) + \cos(\tan^{-1} \frac{1}{2} + \tan^{-1} 2)$

$$\begin{aligned} & \sin(\sin^{-1} \frac{1}{3} + \sec^{-1} 3) + \cos(\tan^{-1} \frac{1}{2} + \tan^{-1} 2) \\ &= \sin(\cos^{-1} 3 + \sec^{-1} 3) + \cos(\cot^{-1} 2 + \tan^{-1} 2) \\ &= \sin \frac{\pi}{2} + \cos \frac{\pi}{2} = 1 + 0 = 1. \end{aligned}$$

Ex 4 Find the value  $\cos(\sin^{-1} -\frac{\sqrt{3}}{2})$

$$= \cos(-\frac{\pi}{3}) = \cos \frac{\pi}{3} = \frac{1}{2}$$

Ex 5  $\sec^2(\cot^{-1} \frac{1}{\sqrt{3}}) + \tan^2(\cos^{-1} \sqrt{2})$

$$= \sec^2 \frac{\pi}{3} + \tan^2 \frac{\pi}{4} = (2)^2 + (1)^2 = 5.$$

Ex 6 Solve  $2 \tan^{-1} \frac{2x}{1-x^2} = \frac{\pi}{6}$

Ans  $\tan^{-1} \frac{2x}{1-x^2} = \frac{\pi}{12}$

or,  $2 \tan^{-1} x = \frac{\pi}{12}$

or,  $\tan^{-1} x = \frac{\pi}{24}$

or,  $x = \tan(\frac{\pi}{24})$

~~or, x = tan(pi/24)~~

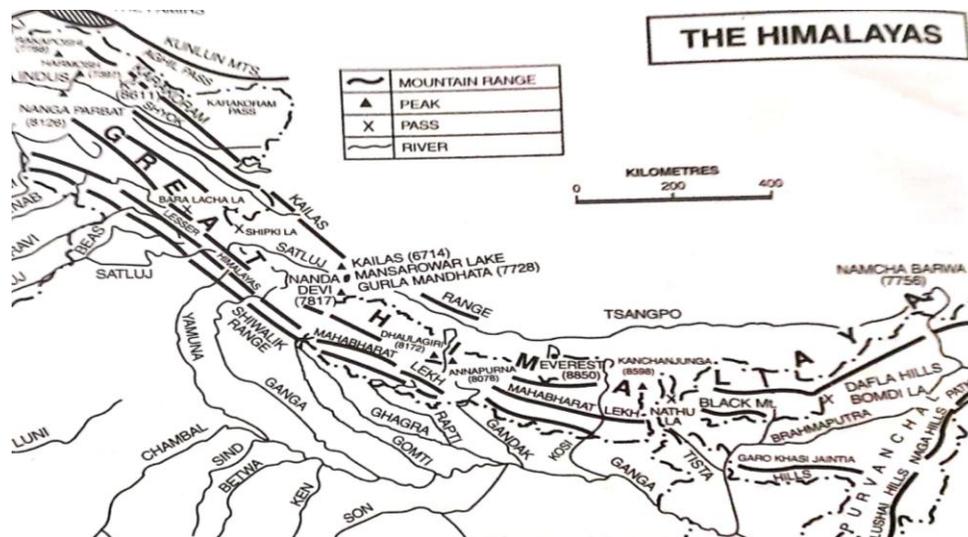
# Geography

Class XII

Chapter 3 (Part-1)

## The Himalayan mountain complex:-

the Himalaya mountain is not just one range but a group of three mountain ranges running almost parallel to one another all along its longitudinal axis. A brief description of these mountain ranges is given below:-



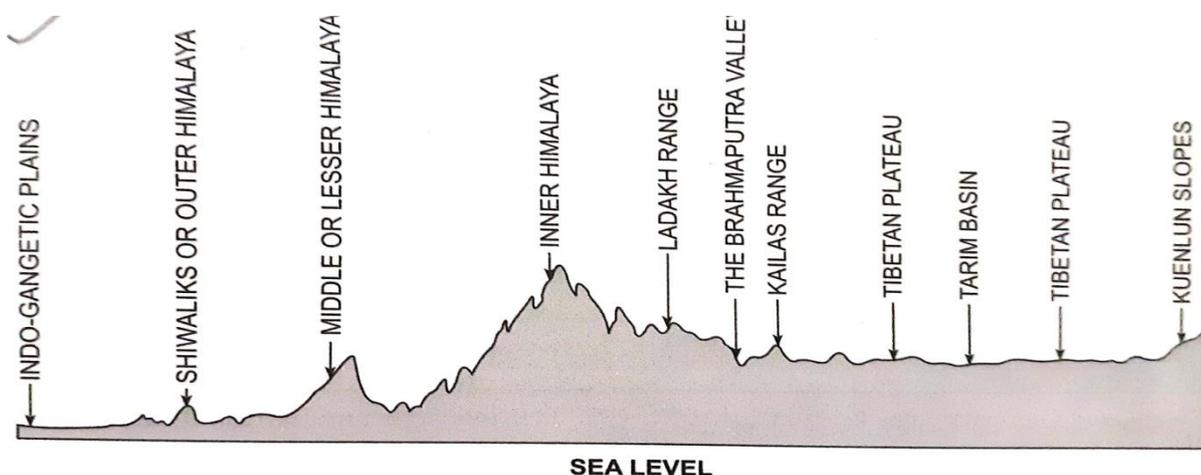
**1. The great Himalayas or the inner Himalayas:-** this is the highest mountain range of the Himalayan system. this always remains snow covered and is generally referred to as Himadri. Its average altitude exceeds 6000 metres. almost all the important peaks are located in this range for example- Mount Everest Kanchenjunga etc.

**2. The lesser or the middle Himalayas:-**

this is located in the south of great Himalayas and runs parallel to it in the east- west direction. Its average height is from 3700 to 4500 metres. It's important branches are the Pir Panjal and Dhauladhar. In between the great Himalayas and the lesser Himalayas, there are longitudinal Valleys. For example - the beautiful Kashmir Valley. Most of the hill Resorts such as Shimla, Mussorie etc are located in this range.

**3. The outer Himalayas or The sub- Himalayas or the Shiwalik Range:-**

The southernmost range of the Himalayas is the Shiwalik Range whose height varies from 900 to 1200 metres. In between the lesser Himalayas and the outer Himalayas are a longitudinal Valley is known as duns, in the west and duars in the east.



### Offshoots of the Himalayas:-

#### i) The North-west off shoots:-

these offshoots include the mountain ranges lying beyond the Indus. they are the Hazara, the Sulaiman Rangers etc.

ii) **The north-east offshoots:** - this section of the Himalayas lies beyond the gorge of Tsangpo-Brahmaputra. This includes the Indo Myanmar Hills, The Arakan Yoma and The Tenasserim ranges.

Difference between eastern Himalayas and western Himalayas:-

Eastern Himalayas	Western Himalayas
The eastern Himalayas rise from the plains of Bihar and west Bengal.	The western Himalayas rise from the sub-Himalayan hills of Jammu and Kashmir.
The average annual rainfall is more than 200 cm.	The average annual rainfall is more than 100cm.
This region covered with dense evergreen forests.	This region covered with alpine and coniferous forests.

### Regional divisions of the Himalayas:-

**1) The Kashmir or Punjab Himalayas:** - The section between the Indus and the Satluj is known as the Punjab Himalayas. it is also called Jammu Kashmir and Himachal Himalaya because most of this section is located in these two States. These sections are 560 km long. The important ranges of this section are the Ladakh, the Pir Panjal etc.

**2) The Himachal or Uttarakhand or Kumaon Himalayas:-** This section runs for a distance of 320 kilometres between the Satluj and the Kali river. This is higher than the Punjab Himalayas.

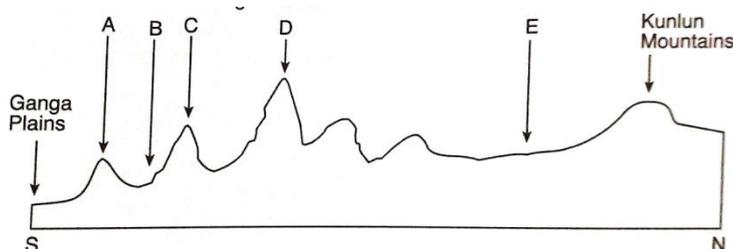
#### 3) The Nepal Himalayas:-

this is situated between the Kali and the Tista river and is 800 kilometres long . most of it is located in Nepal. This is the highest part of Himalayas where peaks like the Everest, Kanchenjunga situated. The flat Kathmandu Valley is also situated in the Nepal Himalayas.

**4) The Assam Himalayas:** - it extends for a distance of 720 kilometres between the Tista and the Dihang River.

### HOME ASSIGNMENT- 3

1. Name the three parallel mountain ranges of Himalayas.
2. What is Duns?
3. Write a short note on The Himachal Himalayas.
4. Write any three differences between Western Himalayas and Eastern Himalayas.
5. The figure given below represents a section through the Himalayas, from the Kunlun to Ganga plains. Identify any four of the relief features marked.



## INVERSE TRIGONOMETRIC FUNCTIONS

1. **Inverse Trigonometric Function:** Trigonometric functions are many-one functions. But inverse of a function exists if the function is bijective (one-one and onto).

If we restrict the domain of trigonometric functions, then these functions become bijective and inverse trigonometric functions are defined within the restricted domain. Inverse of  $f$  is defined by  $f^{-1}$ .

Let  $y = f(x) = \sin x$ . Then its inverse is  $x = \sin^{-1} y$ .

2. **Domain and Range of Inverse Trigonometric Functions:**

Function	Domain	Range (Principal value form)
$\sin^{-1} x$	$[-1, 1]$	$\left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$
$\cos^{-1} x$	$[-1, 1]$	$[0, \pi]$
$\tan^{-1} x$	$\mathbb{R}$	$\left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$
$\cot^{-1} x$	$\mathbb{R}$	$(0, \pi)$
$\sec^{-1} x$	$\mathbb{R} - (-1, 1)$	$[0, \pi] - \left\{\frac{\pi}{2}\right\}$
$\operatorname{cosec}^{-1} x$	$\mathbb{R} - (-1, 1)$	$\left[-\frac{\pi}{2}, \frac{\pi}{2}\right] - \{0\}$

3. **Properties of Inverse Trigonometric Functions**

(A) (i)  $\sin^{-1} (\sin \alpha) = \alpha; \forall \alpha \in \left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$

(ii)  $\cos^{-1} (\cos \alpha) = \alpha; \forall \alpha \in [0, \pi]$

(iii)  $\tan^{-1} (\tan \alpha) = \alpha; \forall \alpha \in \left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$

(iv)  $\operatorname{cosec}^{-1} (\operatorname{cosec} \alpha) = \alpha; \forall \alpha \in \left[-\frac{\pi}{2}, \frac{\pi}{2}\right] - \{0\}$

(v)  $\sec^{-1} (\sec \alpha) = \alpha; \forall \alpha \in [0, \pi] - \left[\frac{\pi}{2}\right]$

(vi)  $\cot^{-1} (\cot \alpha) = \alpha; \forall \alpha \in (0, \pi)$

(B) (i)  $\sin^{-1} (\sin x) = x; \forall x \in [-1, 1]$

(ii)  $\cos^{-1} (\cos x) = x; \forall x \in [-1, 1]$

(iii)  $\tan^{-1} (\tan x) = x; \forall x \in \mathbb{R}$

(iv)  $\operatorname{cosec}^{-1} (\operatorname{cosec} x) = x; \forall x \in [-1, 1]$

(v)  $\sec (\sec^{-1} x) = x; \forall x \in (-\infty, -1] \cup [1, \infty)$

(vi)  $\cot (\cot^{-1} x) = x; \forall x \in \mathbb{R}$

(C) (i)  $\sin^{-1} \left(\frac{1}{x}\right) = \operatorname{cosec}^{-1} x; x \geq 1 \text{ or } x \leq -1$

$$(ii) \cos^{-1}\left(\frac{1}{x}\right) = \sec^{-1} x; \quad x \geq 1 \text{ or } x \leq -1$$

$$(iii) \tan^{-1}\left(\frac{1}{x}\right) = \begin{cases} \cot^{-1} x; & x > 0 \\ -\pi + \cot^{-1} x; & x < 0 \end{cases}$$

$$(D) (i) \sin^{-1}(-x) = -\sin^{-1} x; \quad x \in [-1, 1]$$

$$(ii) \tan^{-1}(-x) = -\tan^{-1} x; \quad x \in \mathbb{R}$$

$$(iii) \operatorname{cosec}^{-1}(-x) = -\operatorname{cosec}^{-1} x; \quad |x| \geq 1$$

$$(E) (i) \cos^{-1}(-x) = \pi - \cos^{-1} x; \quad x \in [-1, 1]$$

$$(ii) \sec^{-1}(-x) = \pi - \sec^{-1} x; \quad |x| \geq 1$$

$$(iii) \cot^{-1}(-x) = \pi - \cot^{-1} x; \quad x \in \mathbb{R}$$

$$(F) (i) \sin^{-1} x + \cos^{-1} x = \frac{\pi}{2}; \quad x \in [-1, 1]$$

$$(ii) \tan^{-1} x + \cot^{-1} x = \frac{\pi}{2}; \quad x \in \mathbb{R}$$

$$(iii) \operatorname{cosec}^{-1} x + \sec^{-1} x = \frac{\pi}{2}; \quad |x| \geq 1$$

$$(G) \tan^{-1} x + \tan^{-1} y = \tan^{-1} \left( \frac{x+y}{1-xy} \right); \quad xy < 1$$

$$\tan^{-1} x - \tan^{-1} y = \tan^{-1} \left( \frac{x-y}{1+xy} \right); \quad xy > -1$$

$$(H) (i) \sin^{-1} x + \sin^{-1} y = \sin^{-1} \left( x\sqrt{1-y^2} + y\sqrt{1-x^2} \right)$$

$$(ii) \sin^{-1} x - \sin^{-1} y = \sin^{-1} \left( x\sqrt{1-y^2} - y\sqrt{1-x^2} \right)$$

$$(iii) \cos^{-1} x + \cos^{-1} y = \cos^{-1} \left( xy - \sqrt{1-x^2} \sqrt{1-y^2} \right)$$

$$(iv) \cos^{-1} x - \cos^{-1} y = \cos^{-1} \left( xy + \sqrt{1-x^2} \sqrt{1-y^2} \right)$$

$$(I) (i) 2\tan^{-1} x = \sin^{-1} \left( \frac{2x}{1+x^2} \right); \quad |x| \leq 1$$

$$(ii) 2\tan^{-1} x = \cos^{-1} \left( \frac{1-x^2}{1+x^2} \right); \quad x \geq 0$$

$$(iii) 2\tan^{-1} x = \tan^{-1} \left( \frac{2x}{1-x^2} \right); \quad -1 < x < 1$$

$$(iv) 2\sin^{-1} x = \sin^{-1} \left( 2x\sqrt{1-x^2} \right); \quad \frac{-1}{\sqrt{2}} \leq x \leq \frac{1}{\sqrt{2}}$$

$$(v) 2\cos^{-1} x = \sin^{-1} \left( 2x\sqrt{1-x^2} \right); \quad \frac{-1}{\sqrt{2}} \leq x \leq 1$$

$$\text{or } 2\cos^{-1} x = \cos^{-1} (2x^2 - 1); \quad 0 \leq x \leq 1$$

### Home Assignment: -

1. Find the value of  $\cot\left(\frac{\pi}{2} - 2\cot^{-1}\sqrt{3}\right)$ .
2. Find the value of  $\tan^{-1}\left[2\sin\left(2\cos^{-1}\frac{\sqrt{3}}{2}\right)\right]$ .
3. If  $\sin[\cot^{-1}(x+1)] = \cos(\tan^{-1}x)$  then find  $x$ .
4. If  $\tan^{-1}\left(\frac{x-2}{x-4}\right) + \tan^{-1}\left(\frac{x+2}{x+4}\right) = \frac{\pi}{4}$  then find the value of  $x$ .
5. Solve for  $x$ ,  $\cos^{-1}x + \sin^{-1}\left(\frac{x}{2}\right) = \frac{\pi}{6}$ .
6. Prove that  $\tan^{-1}\left(\frac{3}{4}\right) + \tan^{-1}\left(\frac{3}{5}\right) - \tan^{-1}\left(\frac{8}{19}\right) = \frac{\pi}{4}$ .
7. Prove that  $\sin^{-1}\frac{8}{17} + \sin^{-1}\frac{3}{5} = \tan^{-1}\frac{77}{36}$ .
8. Find the principal value of  $\tan^{-1}\sqrt{3} - \sec^{-1}(-2)$ .
9. Prove that  $\tan^{-1}\frac{1}{4} + \tan^{-1}\frac{2}{9} = \frac{1}{2}\sin^{-1}\frac{4}{5}$ . [ISC 2013]
10. Evaluate  $\tan\left[2\tan^{-1}\frac{1}{2} - \cot^{-1}3\right]$ . [ISC 2014]
11. If  $\cos^{-1}x + \cos^{-1}y + \cos^{-1}z = \pi$ , then prove that  $x^2 + y^2 + z^2 + 2xyz = 1$ . [ISC 2014]
12. If  $\tan^{-1}a + \tan^{-1}b + \tan^{-1}c = \pi$ , prove that  $a + b + c = abc$ . [ISC 2018]
13. Evaluate:  $\tan^{-1}\left(\frac{x}{y}\right) - \tan^{-1}\left(\frac{x-y}{x+y}\right)$ .
14. If  $\sin^{-1}x + \tan^{-1}x = \frac{\pi}{2}$ , prove that  $2x^2 + 1 = \sqrt{5}$  [ISC 2016]  
(Hints:  $\tan^{-1}x = \frac{\pi}{2} - \sin^{-1}x \Rightarrow \tan^{-1}x = \cos^{-1}x$ )  
[Express  $\cos^{-1}x$  in terms of  $\tan^{-1}x$ ,  $\cos^{-1}x = \tan^{-1}\frac{\sqrt{1-x^2}}{x}$ ].
15. Solve for  $x$ :  $\cos^{-1}(\sin(\cos^{-1}x)) = \frac{\pi}{3}$ . [ISC 2010]
16. Solve the following simultaneous equations:  
 $\sin^{-1}x + \sin^{-1}y = \frac{2\pi}{3}$ ,  $\cos^{-1}x - \cos^{-1}y = \frac{\pi}{3}$ .

**DREAMLAND SCHOOL**  
**CLASS XII (session 2020-21)**  
**BIOLOGY HOME WORK-3A**

**Chapter 7: EVOLUTION**

**Quick review of the content**

**Evolution-** English philosopher, Herbert Spencer coined the term Evolution, that means the phenomenon that brings about continuous and orderly change in the environment, which is a very slow process

- In solar system of Milky Way galaxies, earth has been supposed to be formed about 4.5 billion years ago. There was no atmosphere in early earth. Water vapour, methane, carbon dioxide and ammonia released from molten mass covered the earth surface.

The Chapter Evolution can be discussed under following heads

- A. **Evolution of life on earth**
- B. Evidences of evolution**
- C. Theories of evolution**
- D. Human evolution.**

**A.Evolution of Life on earth(Biopoiesis)**

- Big Bang Theory attempts to explain the origin of universe. According to this theory, a huge explosion occurs that forms the different galaxies.
- THEORY OF SPECIAL CREATION-According to this theory all forms of life on earth was created by some super natural power.
- Theory of Spontaneous Generation (Abiogenesis/Autogenesis)  
according to other theory, life comes out of dead and decaying matters like straw and mud (given by **Van Helmont**). This theory is called theory of spontaneous origin.
- Later on three scientists discarded the theory of spontaneous generation of life and gave theory of BIOGENESIS.Louis Pasteur, Francesco Redi, Spallanzani experimentally proved that life arises only from pre-existing life. Spontaneous theory of origin of life was dismissed after that.

# Redi's Experiment

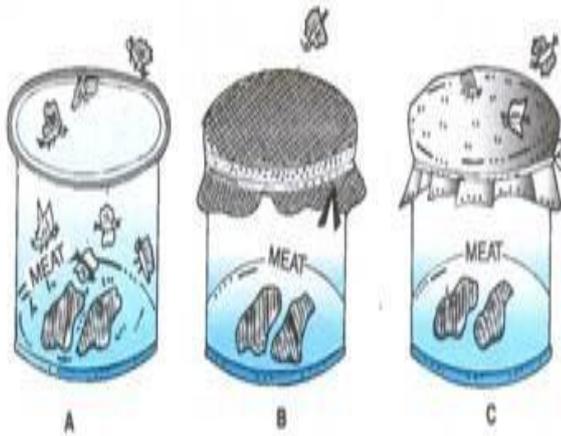


Fig. 7.2. Redi's experiment to disprove abiogenesis in large animals.  
A. Uncovered jar, B. Jar covered with parchment, C. Jar covered with muslin.

- In the middle of the 17<sup>th</sup> century, the Italian scientist Francesco Redi noticed and described the different developmental forms of flies.
- Redi observed that tiny wormlike maggots turned into sturdy oval cases, from which flies eventually emerge.
- He also observed that maggots seemed to appear where adult flies had previously landed.
- In 1668, Redi proposed a different hypothesis: **that maggots came from eggs that flies laid on meat.**



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# Spallanzani's Experiment

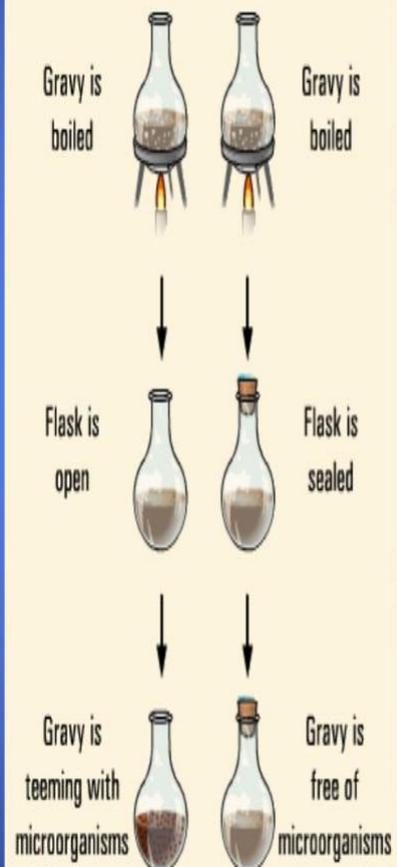
- In the 1700s, another Italian scientist, Lazzaro Spallanzani, designed an experiment to test the hypothesis of spontaneous generation of microorganisms.
- He thought that Needham had not heated his samples enough and decided to improve upon Needham's experiment.
- Spallanzani hypothesized that microorganisms formed not from air but from other microorganisms.

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## Lazzaro Spallanzani - 1768

- ❖ Modified Spallanzani's experiment.
- ❖ Boiled the broth for an hour.
- ❖ Partially evacuated the jars and sealed the vessels right after boiling.
- ❖ No growth was observed.
- ❖ Some felt that air was necessary for spontaneous generation to occur.

## Spallanzani's Experiment



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# The Theory of Biogenesis

1. Pasteur next placed broth in open-ended long-necked flasks and bent the necks into S-shaped curves.
2. The contents of these flasks were then boiled and cooled.
3. The broth of in the flasks did not decay and showed no signs of life.
4. Pasteur's S-shaped neck allowed air to pass into the flask, but trapped the airborne MOs that might contaminate the broth.



Figure 1.3

## ➤ Theory of Panspermia/cosmozoic Theory-

According to Richter life came on earth from some other planet in the form of seed or spore called panspermia/cosmozoans, hence called Spore theory.

Objection Living material can not survive in the extreme cold, dryness, intense radiation. Also this theory does not explain how life originated and from where and how spores reached the earth.

## ASSIGNMENT

1. Who coined the term evolution? Define it.
2. What do you mean by theory of abiogenesis?
3. Explain the Swan –neck experiment of Pasteur as a rejection to theory of abiogenesis?
4. What was the theory proposed by Spallanzani? Explain with a suitable experiment.
5. What is cosmozoans.

(NOTE-STUDENTS ARE REQUESTED TO WRITE THE ASSIGNMENTS OF BOTH THE BIOLOGY TEACHERS IN SEPARATE COPY, ALSO GIVE THE ASSIGNMENT NUMBER PROPERLY THAT IS GIVEN AT THE BEGINNING.)

Madhubanti Banerjee

CLASS-XII  
SUBJECT-PHYSICS  
CHAPTER-1: ELECTRIC CHARGES AND FIELDS

- ◆ Electrostatic force between two point charges,

$$F = \frac{q_1 q_2}{kr^2} \text{ (in CGS system); } F = \frac{q_1 q_2}{4\pi\epsilon r^2} \text{ (in SI)}$$

where  $k$  = permittivity of the medium in CGS system and  
 $\epsilon$  = permittivity of the medium in SI.

- ◆ Relation between  $\kappa$  and  $\epsilon$  :

$$\kappa = \frac{\epsilon}{\epsilon_0} \text{ [where } \epsilon_0 = \text{permittivity of vacuum (or air)} \\ = 8.854 \times 10^{-12} \text{ C}^2 \cdot \text{N}^{-1} \cdot \text{m}^{-2} \text{ ]}$$

- ◆ For vacuum or air,  $k = 1$

$$\text{and } \frac{1}{4\pi\epsilon_0} = 9 \times 10^9 \text{ N} \cdot \text{m}^2 \cdot \text{C}^{-2}$$

- ◆ The electric intensity at a point at distance  $r$  from a point charge  $q$ ,

$$E = \frac{q}{kr^2} \text{ (in CGS system); } E = \frac{1}{4\pi\kappa\epsilon_0} \cdot \frac{q}{r^2} \text{ (in SI)}$$

- ◆ Relation between electrostatic force and electric intensity,

$$F = qE$$

CLASS-XII  
SUBJECT-PHYSICS  
ASSIGNMENT-5  
CHAPTER-1: ELECTRIC CHARGES AND FIELDS  
(F.M.-10)

*Answer the following questions*

*(Question No-1 carries 1 mark, 2 carries 2 marks, 3 carries 3 marks, 4 carries 4 marks)*

1. Write down the dimension of electric permittivity in free space.
2. Write on the Coulomb's law and its vector form
3. Write the formula of electrostatic force in terms of volume charge, surface charge and line charge distribution.
4. (i) Write the electron theory of electrification.  
(ii) What do you mean by conservation of electric charge?

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# 12-Commerce

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## Fixed Capital

1. Fixed capital means the investments done by the business for acquiring long term benefits.

2. It is used to acquire non-current assets of the business.

3. This capital cannot be converted into cash immediately.

## Working Capital

1. Working capital means the funds required for day to day operations of the business.

2. It is used to acquire current assets of the business.

3. This capital can be converted into cash immediately.

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## Shares

## Debentures

1. The shares are owned funds of the company.

1. The debentures are borrowed funds of the company.

2. Shares represent capital of the company.

2. Debentures represent debt of the company.

3. The holder of shares is known as shareholder.

3. The holder of debentures is known as debenture holder.

4. Shareholders get the dividend.

4. Debenture holders get the interest.

Question 4.

(a) Explain any three disadvantages of issuing equity shares, from the Company's point of view.

(b) What is meant by NEFT? Give any two features of NEFT. [4]

(c) Explain five factors that should be taken into consideration while determining the price of a product or service.

Answer:

(a) 1. If only equity shares are issued, the company cannot take the advantage of trading on equity.

2. As equity' capital cannot be redeemed, there is a danger of over capitalization.

3. Equity' shareholders can put obstacles for management by manipulation and organizing themselves.

(b) NEFT stands for National Electronic Funds Transfer. This facility is provided by commercial banks to the persons requesting for sending funds from one branch of the bank to another branch of the same bank or different bank. The customer can transfer money from Rupee one to any limit at very 'nominal' charges. These charges are much lesser than sending the funds through a draft.

(c) Cost of Production : Cost of production/service is the main component of price. No company can sell its product or services at less than the cost of production. Before price fixation, it is necessary to compile data relating to the cost of production and keep that in mind.

Demand for Product: Intensive study of demand for product and services in the market be undertaken before price fixation. If demand is relatively more than supply, higher price can be fixed.

Price of Competing Firms: It is necessary to take into consideration prices of the products of the competing firms before fixing the price. In case of cut-throat competition prices are required to be kept low.

(c) Five types of debentures are :

**Mortgage and Unsecured Debentures :** Mortgage debentures are those debentures which are secured by either a fixed charge or a floating charge on the assets of the company. In case, the company makes a default in payment, the debentureholders can recover their dues from the mortgage property. Whereas unsecured debentures are those debentures which are not secured by a charge.

**Redeemable and Irredeemable Debentures:**

Redeemable debentures are repayable on a predetermined date or at any time prior to their maturity at the option of the company. Irredeemable debentures are those debentures that are not repayable during the lifetime of the company and hence will be repaid only when the company is wound up.

**Bearer Debentures :** Bearer debentures can be transferred by mere delivery as no record of such debentures is kept in the Register of Debentureholders. Payment of interest is made on production of coupons attached to the debenture. No

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formal notice or intimation to the company is necessary.

Registered Debentures : These are the debentures, in respect of which the names, addresses and particulars of holdings of the debentureholders are entered in a register kept by the company. Such debentures can be transferred only by transfer deed or intimation to the company and not mere delivery.

(v) Convertible and Non-Convertible Debentures: In case of convertible debentures, the debentureholders are given the option to convert their debentures into equity shares after a specified period. Debentureholders have an option of exchanging the whole or a part of amount of their debentures for shares. In case of non-convertible debentures, these are those debentures which do not earn the right to be converted into equity shares.

## 2.9 TYPES OF WORKING CAPITAL

Working capital can be classified as follows: (Fig. 2.2)

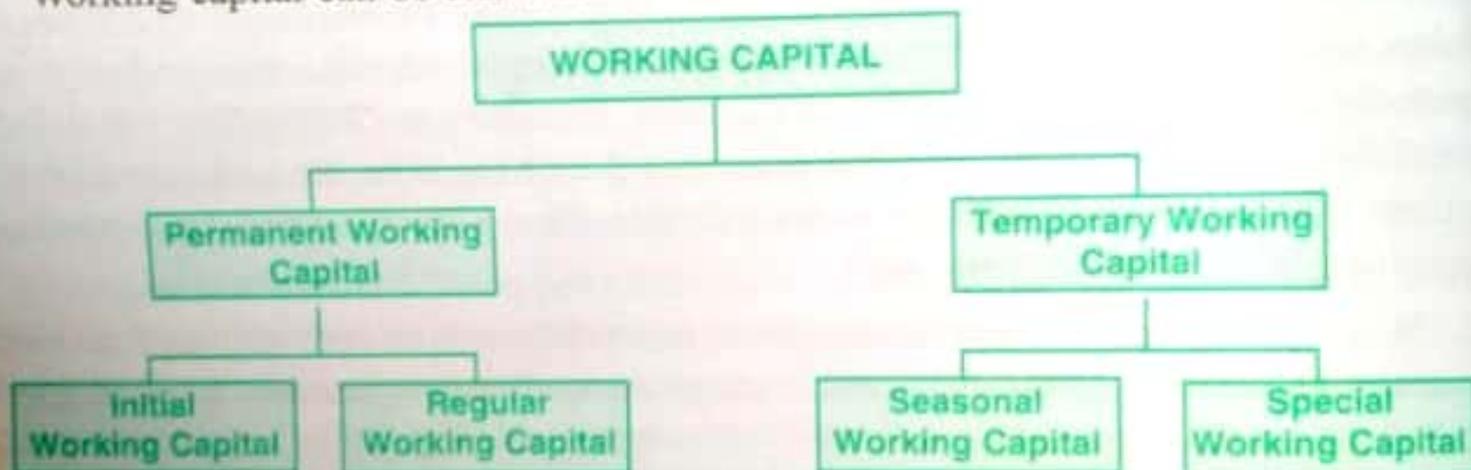


Fig. 2.2. Types of Working Capital

**1. Permanent Working Capital:** It refers to the minimum amount of working capital required permanently to operate the minimum level of business activity. It is permanently locked up in current assets. It is, therefore, raised through long-term sources of finance. Permanent working capital is of two kinds.

**(a) Initial working capital.** Initial working capital is that part of permanent working capital which is required at the time of commencement of a business. It is the amount needed to start business activities. In the initial stage, the business usually does not get credit from suppliers. Therefore, all operating expenses have to be incurred in cash. The capital to meet initial operating expenditure is generally provided by the owners.

- (b) **Regular working capital.** It means that part of permanent working capital which is required for the continuous business operations. It represents the excess of current assets over current liabilities. It consists of enough cash to meet short-term obligations, to build up inventory and enough stock of finished goods to ensure quick delivery to customers.

**2. Temporary or Variable Working Capital:** It is the working capital that is required in addition to the permanent working capital. It is required to meet seasonal and special needs of business. It is fluctuating in nature and is, therefore known as variable working capital. The amount of temporary working capital depends upon the extent of extra demand in season and exigencies of urgent circumstances. It is generally raised from short-term sources of finance. Temporary working capital is of two types:

- (a) **Seasonal Working Capital.** It means the extra working capital required during a particular season. Firms dealing in products of a seasonal nature (e.g., woollen garments, fans, umbrellas, etc.) require more working capital during the busy season. According to Gerstenberg, "Beyond their initial and regular circulating capital most business will require at stated intervals a larger amount of current assets to fill the demands of the seasonal busy periods". When the busy season begins, additional working capital is required to buy raw materials and pay extra labour.

For example, sugarcane, wheat, cotton, etc., are to be purchased in bulk during the season when these items are produced.

- (b) **Special Working Capital.** It refers to extra funds required to meet future contingencies that may arise in business. It is advisable to set up a reserve working capital to act as a cushion in times of emergencies. A business firm must set aside additional funds to cope with unforeseen contingencies such as:

- (i) special operations to meet sudden spurt in demand;
- (ii) unusually stagnant periods or depression leading to piling up of inventory;
- (iii) strikes, lockouts and natural calamities like earthquake, flood, fire, etc.

## 2.10 IMPORTANCE OF WORKING CAPITAL

Adequate amount of working capital provides the following advantages:

1. **Timely Payment of Dues:** An enterprise with sufficient working capital can pay dues to its creditors in time. Timely payment of liabilities helps to ensure short-term solvency of business.

2. **Smooth Working:** (Adequate working capital enables the business to purchase raw materials, pay wages and salaries and meet their expenses. It keeps the flow of production and distribution uninterrupted.) In the absence of adequate working capital a business will stagnate.

3. **High Credit Worthiness:** A business with satisfactory working capital position enjoys high credit standing. Such a business firm can raise loans from banks and financial institutions easily and on more favourable terms.

**4. Cash Discount:** An enterprise with sufficient liquid funds can take advantage of cash discount. Suppliers offer cash discount in return for prompt payment.

**5. Availing Business Opportunities:** A business having sufficient working capital can execute special orders at a short notice. It can buy raw materials in bulk during the season. It can hold stocks in order to secure higher prices. The bargaining power and competitive strength of such a business firm are high.

**6. Good Relations with Employees:** An enterprise having adequate working capital can pay wages and salaries to its employees in time. This helps to improve sense of safety and confidence of employees.

**7. Timely Payment of Dividends:** Cash is required for payment of dividends. A company may lose its reputation if dividends are not paid in time to shareholders due to shortage of cash.

## 2.11 FACTORS AFFECTING WORKING CAPITAL

The working capital requirements of an enterprise depend on the following factors:

**1. Nature of Business:** Manufacturing firms require considerable working capital as they have to build up stock of raw materials and finished products. On the other hand, public utility undertakings require less working capital as they do not have to maintain inventory.

**2. Size of Business:** Firms carrying on large scale operations and undertaking high volume of production require more working capital than small scale firms. For example, a departmental store needs greater amount of working capital as compared to a hawker.

**3. Manufacturing Cycle:** It means the time involved in the production of goods. Longer is the time gap between the purchase of raw materials and production of finished goods, higher is the need for working capital.

**4. Rapidity of Turnover:** Turnover means the speed with which the amount of working capital is recovered by the sale of goods. When the turnover is rapid, the amount of working capital required is small. This is because working capital is locked up in business for a short period.

**5. Terms of Purchase and Sale:** A business firm requires comparatively small amount of working capital if it buys goods and services on credit and sells them in cash. On the other hand, if it purchases in cash and sells on credit, larger amount of working capital will be required.

**6. Credit Policy:** When a liberal credit policy is followed, more working capital is required. On the contrary, smaller working capital is needed in case of a tight credit policy.

**7. Operating Efficiency:** Better utilisation of resources leads to reduction in costs and improves profitability. As a result need for working capital is reduced. High profit margins and flow of regular income from sales also reduce the amount of working capital required in business.

**8. Goodwill of Business:** An enterprise enjoying good reputation in the market can easily and quickly obtain short-term loans from commercial banks. It requires a less amount of working capital.

**9. Growth and Expansion Plans:** A growing and expanding firm requires more working capital than a stagnant firm.

**10. Seasonal Variations:** Working capital requirements of businesses which are subject to seasonal variations are comparatively high during a particular season.

**11. Cyclical Fluctuations:** Cyclical changes create emergency demands for working capital. During boom period there is need for larger working capital to support higher

## 2.12. COMPARISON BETWEEN FIXED AND WORKING CAPITAL

Sl. No.	Basis of Comparison	Fixed Capital	Working Capital
1.	Meaning	Capital invested in fixed assets	Capital invested in current assets
2.	Time Span of investment	Invested for long time period	Invested for short time period
3.	Circulation	Does not circulate or change its form	Keeps on circulating or changing its form
4.	Sources	Shares, debentures and long term loans	Public deposits, trade credit, banks
5.	Purpose	To generate income	To meet day to day expenses
6.	Another term	Block capital	Circulating capital

### SUMMARY

**Nature :** Business finance is the finance used for business activities.

**Importance :** (i) Helps in raising credit standing through prompt payment to creditors (ii) Advantage of business opportunities can be taken (iii) Business can be carried on without interruptions (iv) Plant and machinery can be modernised (v) Trade cycles and recession can be faced.

**Finance for different types of Firms :** (i) Sole trader-owner's capital and loans (ii) Partnership-capital contributed by partners and loans (iii) company-shares, retained earnings, debentures, loans.

**Meaning of Financial Planning :** The process of deciding the future financial needs of a business firm and the sources from which the required funds will be raised.

**Factors Affecting capital structure :** Capital structure means the composition of longterm funds i.e. the ratio between equity (owned funds) and debt (borrowed funds) (i) Trading on equity (ii) Exercise of control (iii) Flexibility (iv) Nature of business (v) Cost of financing (vi) Period and purchase of finance (vii) Capital market conditions (viii) Legal restrictions (ix) Needs of investors (x) Cash flow position.

**Fixed Capital :** Funds invested in permanent capital assets for continuous use and not for sale. (i) Nature of business (ii) Scale of operations (iii) Type of manufacturing (iv) Degree of mechanisation (v) Mode of acquiring fixed assets (vi) Intangible assets (vii) Scope of activities.