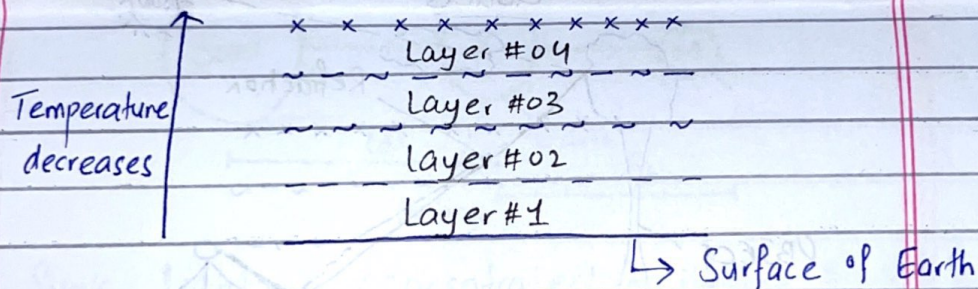


Q4(a) What is Mirage? Describe its creation.

Mirage is basically an Optical illusion. It usually occurs in hot summer days. In mirage reflection of clouds & objects are seen on surface as like water.

### 1 CREATION OF MIRAGE

In hot summer days, surface of earth is warmer and as we move on the layers of air become cooler.



From temperature perspective

Layer 1 > Layer 2 > Layer 3 > Layer 4

### 1.1 EFFECT OF TEMPERATURE ON DENSITY :-

As temperature of molecules increases they start moving in wider spaces as before it means that now the similar mass of air is getting more volume so it becomes less denser

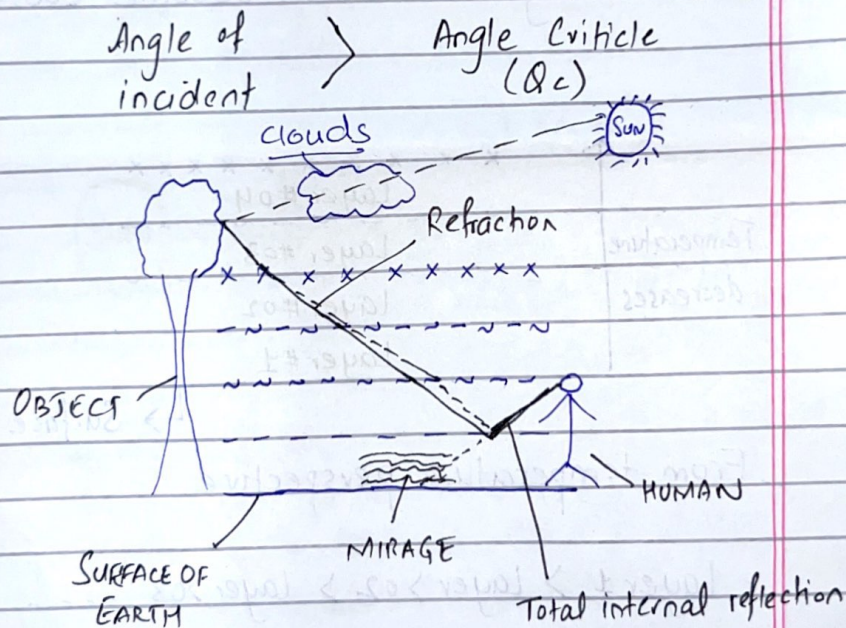
$$\rho \propto \frac{1}{T}$$

So,

layer #01 is the least denser  
layer #04 is the most denser

## 4.2 Falling of light on Object :-

When light falls on the object it gets reflected and enters rarer layer from denser. When light enters rarer medium it gets refracted, refraction process will go on until



## 4.3 Total Internal Reflection :-

When angle of incident is greater than critical angle total internal reflection occurs. Consequently, light will be reflected to eye and a person see projection of object and clouds on the surface of earth called mirage.

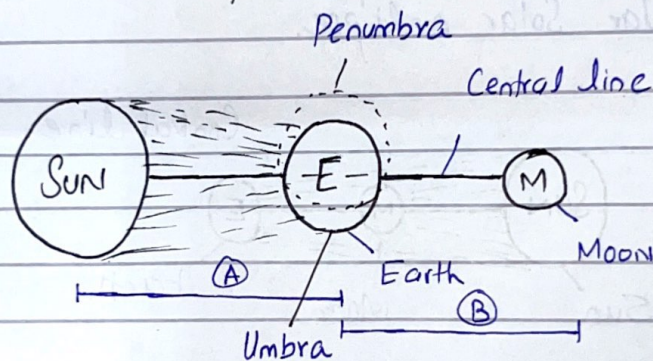
Q#04(b) Differentiate between occurrence of ... ?

Eclipse is the phenomenon in which in which one object (heavenly body) blocks or comes in between other two objects (heavenly body).

#### 4. LUNAR ECLIPSE :-

In this eclipse earth comes in between Sun and moon. There are two types of lunar eclipse.

- Complete lunar eclipse (Umbra)
- Partial lunar eclipse (Penumbra)



Sun's light is concentrated in Region A and because of earth no light will go to Region B.

#### a) Complete Lunar eclipse :-

In complete lunar eclipse earth comes exactly in between sun and moon or we can say earth aligned on the centre line and block the light way from sun to moon.

#### b) Partial Lunar eclipse :-

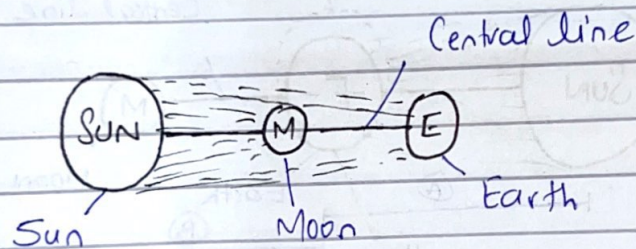
b) Partial Lunar eclipse

When earth is settled slightly above or below the central line connecting Sun and moon, this eclipse is known as Partial lunar eclipse.

2. SOLAR ECLIPSE:-

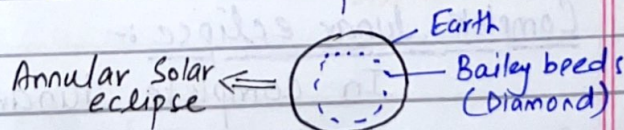
When moon comes in between Sun & earth this phenomenon is called Solar eclipse. It has three types.

- a) Complete Solar eclipse.
- b) Partial Solar eclipse.
- c) Annular Solar eclipse.



Complete Solar eclipse:-

When moon comes in between the Sun & earth such that it aligned properly at central line is called complete solar eclipse.



Partial Solar eclipse:-

If moon is displaced from the centre line but stills blocks the way is called partial solar eclipse.

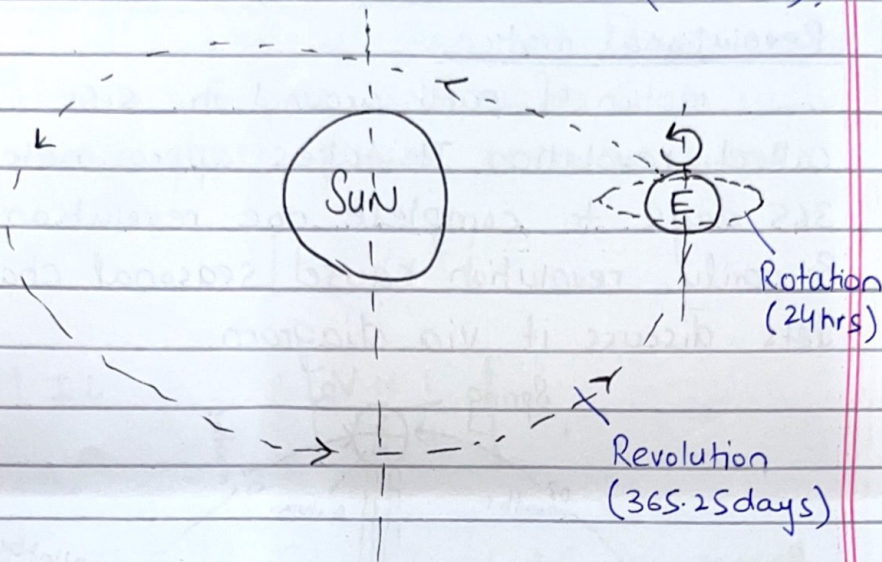
Annular

It is similar to Umbra but moon is slightly displaced to upper or lower part of centre line, if form diamond like structure on Earth surface.

Q#4(c) Briefly explain effects produced by Rotation & Revolution of earth.

Earth is in couple of motions at a time.

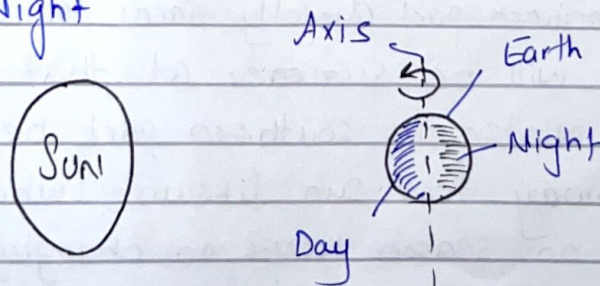
1. Motion of earth around sun (Revolution)
2. Motion of earth around its axis (Rotation)



a) ROTATIONAL MOTION:-

Earth rotates around its own axis and approximately takes 24hrs to complete rotation. While rotating the side that faces sun have day on that earth's part whereas night on the one away from sun.

Day & Night



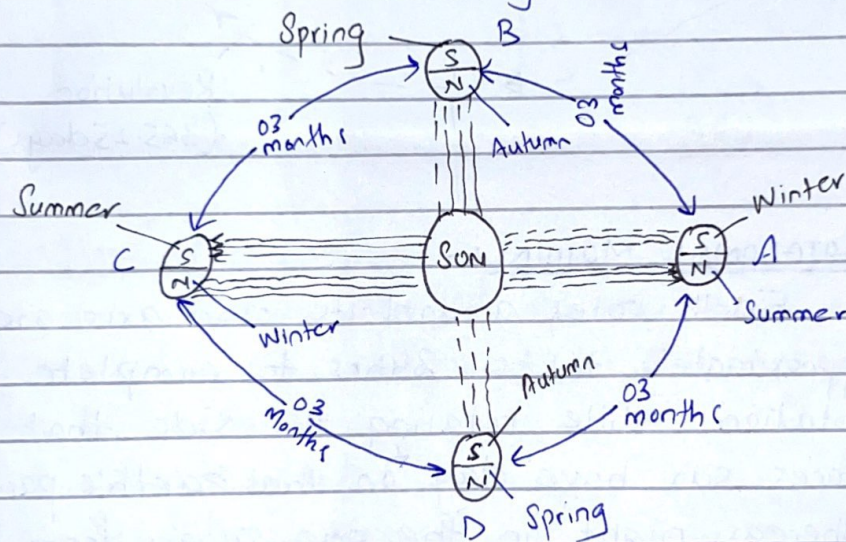
Rotation of earth also helps human to walk and remain stable of it and it also maintains water level stable.

In general rotational motion causes.

- 1- Day and Night
- 2- Temperature variations
- 3- Coriolis effect
- 4- Gravity

b) Revolutional motion:-

Motion of earth around the sun is called revolution. It takes approximately 365 days to complete one revolution. Primarily revolution cause seasonal changes. Lets discuss it via diagram.



POINT # A, B, C, D

Northern part directly faces the sun so there will be summer at that time but winter in southern part because it is away from sun. likewise, when we move on season keeps on changing because of ~~rotatory~~ revolution of earth around sun. Revolution also causes

1. Seasonal changes
2. Global temperature variations
3. Global water currents

Q#04(d) Why we generate 'AC' at power stations?  
There are several reasons for the production of AC at power stations instead of DC.

#### 1. STEP-UP AND STEP-DOWN

Step up and step down means to vary voltage and current in such a way that power remains same.

$$P = V \times I$$

$V \uparrow I \downarrow$

$$\frac{V \propto I}{I}$$

AC voltage can easily be increased (step-up) or decreased (step-down) by transformer. However, in case of DC this is difficult and expensive procedure.

#### 2. POWER LOSSES :-

In AC power losses are reduced as compared to DC. DC generates more heating effect because it remains constant whereas AC has cycles in it.

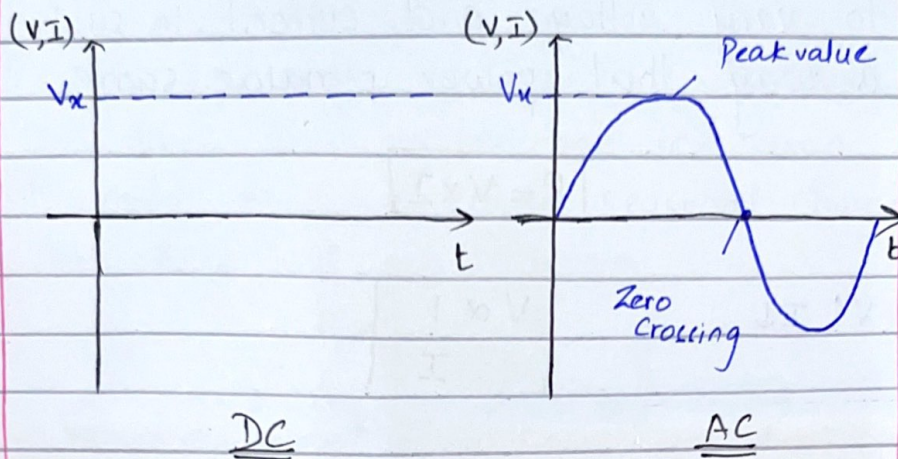
$$H = I^2 R t$$

$$P = I^2 R$$

- $\therefore I = \text{Current}$
- $\therefore R = \text{Resistance}$
- $\therefore H = \text{Heat}$
- $\therefore P = \text{Power loss}$

### 3. DC is more fatal :-

DC is more dangerous as compared to AC, because in AC there is zero crossing which reduces its fatalness whereas AC i DC has constant magnitude and can produce more heat in less time.



### 4. Economical Reason :-

Transmission of AC is more economical as compared to DC because for DC it takes

- High converter cost.
- High insulation cost.
- High transmission cost.

→ To a certain distance AC is very economical as compared to DC. It can be seen by graph below.

