Good for math work
Insufficient length for theory
Insufficient headings
Paper presentation is fine

Section - B

Q.6 (a) Given:

Depreciation rate = 10%.

Present value of washing machine = Rs 8748

Find:

Price of machine 3-years before = ?

Solution:

$\Rightarrow \frac{10}{100} \times 8748$

$\Rightarrow 874.8$ = This amount is depreciating each year

Now;

Three years before, the price is =>

874.8×3

$= 2624.4$

Present value + Amount depriciation in 3-years

$\Rightarrow 8748 + 2624.4$

$\Rightarrow$ Rs. 11,372.4

3

12.5

Result:

Hence, three years before, the price of the washing machine was Rs. 11,372.4.

(b) Given:

Let the age of daughter = x

Father age = $4x$

After 5-years, age of father

$= 4x + 5$

Age of daughter $= x + 5$

As Given that, after 5-years, father's age would be 3-times the age of daughter

$\Rightarrow 4x + 5 = 3(x+5) \rightarrow (A)$

Solution:

$\Rightarrow 4x + 5 = 3x + 15$

$\Rightarrow 4x - 3x = 15 - 5$

$\Rightarrow x = 10$

Daughter's current age = 10 years

How many times the father would be of his daughter's age after 5 years, can be calculated as:

⇒ Father's current age + 5 years
⇒ 40 + 5
⇒ 45 years

Daughter's age after 5 years
= 10 + 5
= 15 years

Now; after 5 more years,
⇒ $\frac{45}{15} = 3$

Hence, father will be 3-times the age of his daughter after five more years.

(c) Given:

As, football is a sphere.
Therefore, volume of sphere is given by: $V = \frac{4}{3}\pi r^3$

Diameter = 12 cm

Find:

Volume of football = V = ?

Solution:

As: $r = \frac{d}{2}$

$\Rightarrow r = \frac{12}{2}$

$\Rightarrow r = 6\,cm$

$\Rightarrow V = \frac{4}{3}(3.14) \times 6^2$

$\Rightarrow V = 8 \times 3.14$

$\Rightarrow V = 25.12$

$V = \frac{4}{3} \times 3.14 \times 6^3$

$V = \frac{4}{3} \times 3.14 \times 216$ (72)

$V = 288 \times 3.14$

$\boxed{V = 904.32\ cm^3}$

Result:

So, the volume of a football with diameter of 12cm is $904.32 cm^3$

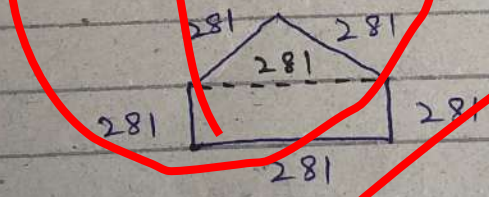
(d) Given:

Each side of a rectangular pentagon is = 281m

Find:

Perimeter of the building = ?

Solution:



In above figure, there are two shapes; a rectangle and a triangle

⇒ Perimeter of a rectangle = a+b+c+d

⇒ 281 + 281 + 281 + 281

= 1124m

⇒ Perimeter of a Trianble = a+b+c

= 843 m

Now; the total perimeter of rectangular pentagon is =

1124 m + 843 m

⇒ 1967 m

Result:

Hence the permeter of the rectangular pentagon in Washington D.C is 1,967 m

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Q.7(a) Given =

Average of 7 - consecutive number = 20

Find:

Largest number = ?

Solution:

Let, the first number = x

So, other consecutive numbers will be:

$\Rightarrow x+1, x+2, x+3, x+4, x+5$, and $x+6$

Now; to find the average,

$\Rightarrow$ Average = $\frac{\text{Sum of observations}}{\text{Number of observations}}$

$$\Rightarrow 20 = \frac{x + x+1 + x+2 + x+3 + x+4 + x+5 + x+6}{7}$$

$$\Rightarrow 20 = \frac{7x+21}{7}$$

$$\Rightarrow 140 = 7x + 21$$

$$7x = 140 - 21$$

$$7x = 119$$

$$\Rightarrow \boxed{x = 17}$$

So, the first number is 17. The largest number will be $x+6$

$\Rightarrow 17+6$

$\Rightarrow \boxed{23}$

Result:

The largest number in the average of 7-consecutive number is 23.

Part

(b) Given:

C is the father's nephew of A.

D is the cousin of A but not brother of C

Find:

Relationship between D and C=?

Solution:

As, C is the nephew of the father of A. D is the cousin of A. D is not the brother of C. Therefore, D and C are brother and sister.

Result:

Relation-ship between D and C is brother and sister.

Part

(c) 7, 12, 19, 28, 39, ___?

In the above numeric series, each next term is obtained by adding odd numbers in a sequence by starting from adding five in first number, then

Seven in second number, nine in third number and so on. Therefore, the next number in the series will be obtained by adding thirteen in last term which will be fifty-two.

Result:

7, 12, 19, 28, 39, 52

Part

(d) Given:

Money distributed among =>
A, B, C and D

Ratio = 5 : 2 : 4 : 3

=> 5 + 2 + 4 + 3

=> 14

Find:

Share of B = ?

Solution:

Let, the sum of money = x

A's share = 5x
B's share = 2x
C's share = 4x
D's share = 3x

Also, C gets 1000 more than D

→ C's share = 3x + 1000
⇒ 4x = 3x + 1000
⇒ x = 1000

Therefore, B's share will be
⇒

2x
⇒ 2 × 1000
= 2000

Result:
Therefore, B's share is 2000.

Section: A

Q.3:

(a) (1) Black holes:

A place is space where gravity pulls so much that even light cannot get out is called black hole.

(2) Formation of Blackhole from Stars:

Black holes are formed through a process called stellar evolution. It occurs when a massive star, like that of Sun, exhaust their nuclear fuel and undergo a catastrophic collapse. As a result, an extremely dense and compact object with a powerful gravitational field are formed, which are termed as black holes. The gravity is so strong because the matter has been squeezed into a tiny space.

Part

(b) (1) Cyclones:

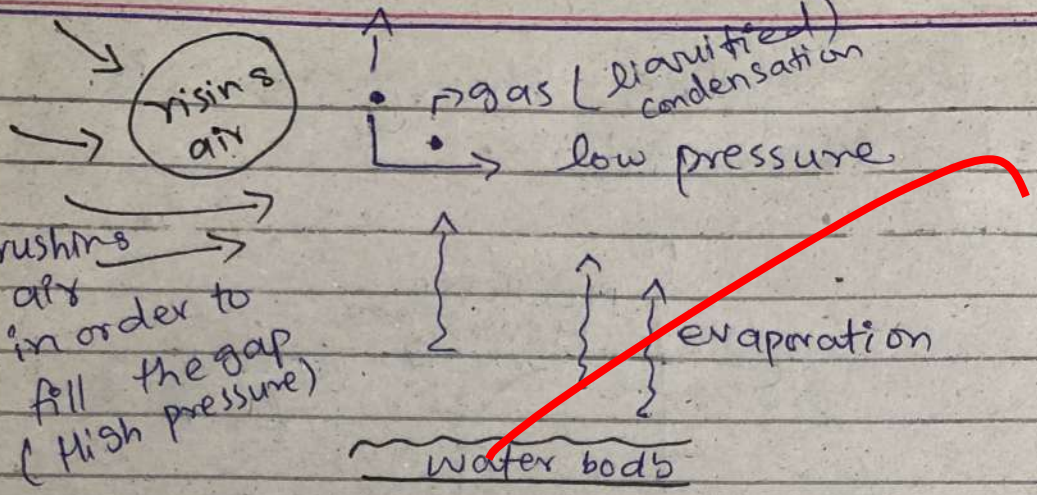
A system of rotating winds around a low pressure core due to pressure gradient and coriolis effect of spin motion of the earth, is called a cyclone.

(2) Formation of Cyclone:

Two things play an important role in the formation of a cyclone.

a) Pressure Gradient:

When water evaporates from a water body, like oceans, rivers etc, it goes into the upper atmosphere. Here, the gas particles are at low pressure, so they become liquified and condensation occurs. Heat of condensation is released and absorbed by the surroundings air which is called the rushing air. As a result, pressure gap is created. High pressure air (rushing air) rushes in order to fill the gap. This results in the change of pressure and is called as pressure gradient



(b) Coriolis Effect:

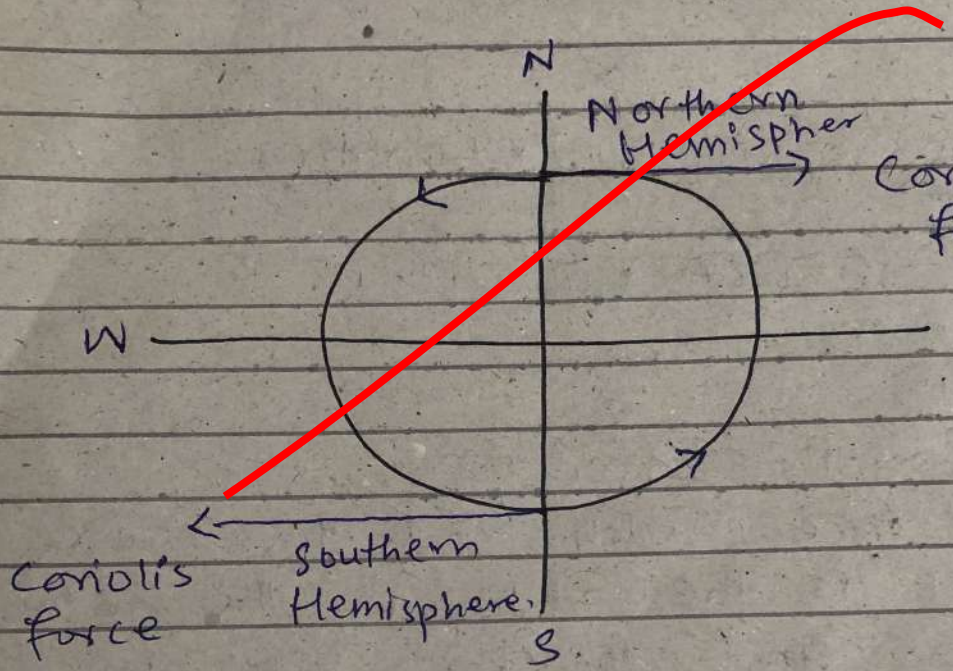
A force which tends to move the object to the right in the northern hemisphere and to the left in the southern hemisphere due to spin motion of the earth is called coriolis force, and this effect is called coriolis effect.

Origin of Coriolis Effect:

Earth rotates faster at the equator and slower near the poles. This is because the rate of change in the diameter of earth's latitude increases near the poles. This earth's rotation is the main cause of coriolis effect.

When this coriolis force of spin motion of the earth is coupled with the pressure gradient,

(3) then the resulting phenomena is termed as cyclone.



Part
(c) (1)
(2)

Part

(c) (1) Floods:

When a dry piece of land is submerged under water, it is called floods.

(2) Causes of Floods:

a) Meteorological Cause:

It is mostly caused by prolonged and intense rainfalls, cyclones, typhoons, storms and tidal surges.

b) Hydrological Cause:

Floods can also be caused by hydrological causes like land erosion because of massive deforestration, impermeable surfaces, melting of glaciers, poor infilteration rates and saturated lands.

c) Anthropogenic Cause:

Man kind role plays a vital role in causing floods such as massive population growth, land use change, deforestration intensive agriculture, urbanization,

global warming and climate change, socio-economic and developmental activities.

Part (d) ① **Sun:**

A star of huge ball of gas mostly Hydrogen and Helium

② **Energy production inside Sun:**

Inside the sun, nuclear fusion reactions are taking place. As a result of these reactions, enormous amount of energy is released. In fusion reaction, two lighter nuclei fuses to form a heavy nuclei with the release of energy. In Sun, Hydrogen and Helium nuclei are responsible for fusion reactions that power the Sun.

③ **Factor responsible for Gravity of Sun:**

The Sun's gravitational pull is

because of its heavier mass i.e. 1.98892×10^{30} kg. More massive the objects, stronger the pull it has.

(4) Solar Wind:

Solar wind is defined as:
"The continuous flow of charged particles from the sun which penetrates the solar system is called Solar Wind."

(3)

Q.5 (a) Uses of Electromagnetic Radiations:

Electromagnetic radiations are the radiations which require no medium for their propagation. Some of the uses are:

a) Uses of Gamma Rays:

i→ They are used in engineering to identify cracks in buildings, bridges, and aeroplanes.

ii→ They are also used in medical field to remove tumors, kidney stones without surgery.

b) Uses of X-rays:

i→ They are used to visualize the internal structure of the body as they can easily penetrate soft tissues.

ii→ They are also used to study the arrangement of atoms i.e. X-ray diffraction.

c) Uses of Visible Light:

i-> They are used in homes, offices, public places, incandescent, fluorescent, LED and other ~~lighting~~ lightening technologies to utilize visible light

ii-> They are used in medical field for endoscopy and microscopy in phototherapy to treat certain skin conditions.

d) Uses of Infrared rays:

i-> These rays are used in TV remote, and in night vision technologies.

ii-> They are also used to diagnose tumours. This works because a tumour emits more IR radiations than a healthy tissue does. This ~~transition~~ radiation is detected on thermogram.

e) Uses of Radio Waves:

i-> They are used in RADAR (Radio Detection and Ranging)

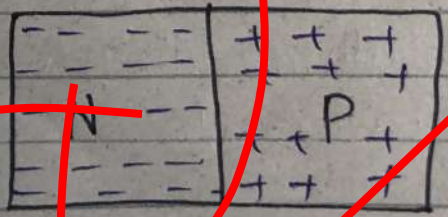
ii→ They are also used by mobile phones because of their least energy. Satellites also use radio waves for transmission.

Part (b) ① **LED** (Light emitting Diode)

A semi-conductor device which emits light when current is passes through it is called LED.

② **Explanation:**

A diode or simply P-N junction is used in LED. Silicon, a pure semi-conductor can be used.

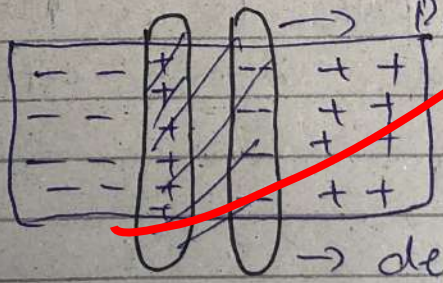


LED allows the current to flow in the forward direction and blocks the current in

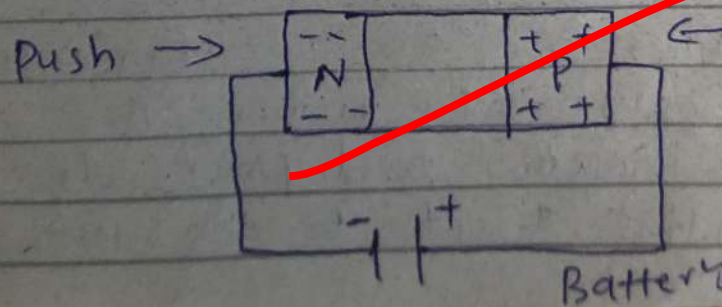
reverse direction

(3) Working:

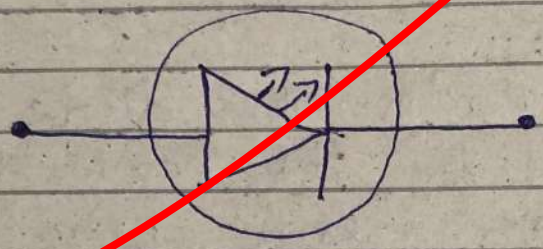
When the diode is farward biased, the minority electrons are sent from P to N while the minority holes are sent from N → P. At the junction boundary, the concentration of minority carriers increases. The excess minority carriers at the Junction recombine with the majority charges carriers.



The energy is released in the form of photons on recombination. As the farward voltage increases, the intensity of the light increases.



Symbol:



LED symbol

Part (a) Write a note on Polio.

(1) Polio:

Pollo is a highly infectious viral disease, mainly affects young children.

(2) Causes:

Pollo is caused by a virus called Pollo virus. People become infected with the virus through contaminated food and water, especially in areas where sanitation and hygiene are poor. Improper sewage disposal can contaminate a water supply. It enters the body through mouth and proceeds through digestive tract to the intestine.

③ How it Spread?

It spreads when an infected do not wash their hands and touch food or other people. Adults can become infected by changing the diapers of an infected infant and then touching their mouth.

④ Prevention:

There is no cure for polio, It can only be prevented. Immunization with polio vaccine is the best way to prevent polio

⑤ Polio Vaccine:

There are 2 types.

i → Inactivated Polio Vaccine (IPV) given by injection in the leg or arm.

ii → Oral Polio Vaccine: (OPV) It is taken by mouth.