

PART II

Good for math portion
 Enough length for theory
 Enough headings
 Fine diagrams

SECTION II"QUESTION NO. 06""PART A"

Q. 6

Given that:-

Son's age = 30 Father's age = ?
 Father's age s years ago was thrice of
 son's age.

Let Father age = x

Therefore,

 s years ago.

$$x - s = 3(\text{Son's age} - s)$$

$$x - s = 3(30 - s)$$

$$x - s = 3(25)$$

$$x - s = 75$$

$$x = 75 + s$$

$$\boxed{x = 80}$$

Hence, Father's ^{current} age is 80 years

"PART B"

Given that:-

Mean of 10, 30, y and 50 is 50We have to find the value of y .

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$$\therefore \text{Mean} = \frac{\text{Total Observation Sum}}{\text{Total No. of Observations}}$$

$$\therefore \text{Mean} = \frac{10 + 30 + y + 50}{4}$$

As Mean is given, which is 50.

$$\text{So, } 50 = \frac{10 + 30 + y + 50}{4}$$

$$50 \times 4 = 90 + y$$

$$200 = 90 + y$$

$$y = 200 - 90$$

$$y = 110$$

∴ Hence, the value of y is 110.

"PART C"

(i) 2, 6, 18, 54, _____

Sol:

$$2, 6, 18, 54, 162$$

$\xrightarrow{\times 3} \quad \xrightarrow{\times 3} \quad \xrightarrow{\times 3} \quad \xrightarrow{\times 3}$

As the previous value is multiplying by '3' to get the next value.

∴ Therefore the missing number is 162.

(ii) 3125, 256, _____, 4, 1

~~Q. 2~~

3125	256	27	4	1
↓	↓	↓	↓	↓
5^5	4^4	3^3	2^2	1^1

Explanation :- As we have total number of digits = 5. and each value has the same power in order. descending

Therefore, the missing number is 27

"PART D"

Given that :-

Product of two numbers = 320

Their ratio = 1:5

We have to find the difference b/w the square of these two numbers.

~~Q. 2~~

Let the two numbers be x and y .

∴ According to 1st condition.

$$x \times y = 320 \quad \text{--- (1)}$$

According to 2nd condition.

$$x : y = 1 : 5$$

$$\frac{x}{y} = \frac{1}{5} \quad \text{--- (2)}$$

Let's figure out the value of x and y .

By Solving equation # 02.

$$\frac{x}{y} = \frac{1}{5}$$

$$5x = y \times 1$$

$$y = 5x \quad \text{--- (3)}$$

Now, Putting the value of y in equation # 01.

$$\therefore x(5x) = 320$$

$$5x^2 = 320$$

$$x^2 = \frac{320}{5}$$

$$x^2 = 64$$

Applying root on both sides

$$\sqrt{x^2} = \sqrt{64}$$

$$x = 8$$

Now, Putting the value of x in eq (3) Grc

$$\therefore y = 5 \times 8$$

$$y = 40$$

Now, we have to find the difference b/w the square of these two numbers.

$$\therefore (x)^2 - (y)^2 = ?$$

$$x^2 - y^2 = (8)^2 - (40)^2$$

$$= 64 - 1600$$

$$x^2 - y^2 = 1536$$

Hence, the difference b/w the square of these two numbers (8, 40) is 1536.

X — X — X — X

"QUESTION NO. 04"

"PART (A)"

Soln

Sold two scooters for 96000 each
 On 1st sale, profit was 20%
 On 2nd sale, loss was 20%

We have to find the total percentage of gain or loss.

So, the selling price of each scooter is 96000

Now, figuring out the cost price of each Scooty

For Scooty # 01

Selling Price = 96000
Profit = 20%

Therefore, the cost price = $96000 - 20\%(96000)$
= $96000 - \frac{20}{100}(96000)$

=

= 96000 - 19200

=

= 76800

Cost price = 76,800

For Scooty # 02

Selling Price = 96000
Loss = 20%

Therefore, Cost price = $96000 + 20\%(96000)$
= $96000 + \frac{20}{100}(96000)$

=

= 96000 + 19200

=

= 115,200

Therefore, the total cost price for two Scooties.

$$76,800 + 115,200 = 192,000$$

Now, Profit or loss Percentage.

$$\text{Total Selling Price} - \overset{\text{Total}}{\text{Cost}} - \text{Price}$$

$$192,000 - 192,000 = 0$$

Hence, the seller neither earn any profit or loss any amount.

"PART B"

Given that

195 men \rightarrow works for 10 hours a day
 \rightarrow Can finish the job in 20 days.

How many ~~men~~ men are required to finish the job in 15 days and working hours are 13 hours/day.

Men	hours	Days
\uparrow 195 =	10	20
x	13	15

From the above, we can see that if we increase the number of men then our finishing time will decrease proportionally.

So, let's make the equation proportion.

$$\frac{x}{195} = \frac{10}{13} \times \frac{20}{15}$$

Solving the equation simultaneously

$$\frac{x}{195} = \frac{2}{13} \times \frac{20}{3}$$

$$\frac{x}{65} = \frac{40}{13}$$

$$x = \frac{40 \times 65}{13}$$

$$x = 200$$

Hence, 200 men are required to complete the job in 15 days.

"PART C"

Given that

$$A = \{a, e, i, o, u\}$$

$$U = \{a, b, c, \dots, z\}$$

We have to find A^c .

Q. 2

As we know, $A^c = U - A$

$$\therefore U - A = \{a, b, c, d, \dots, z\} - \{a, e, i, o, u\}$$

$$U - A = \{b, c, d, f, g, h, j, k, l, m, n, p, q, r, s, t, v, w, x, y, z\}$$

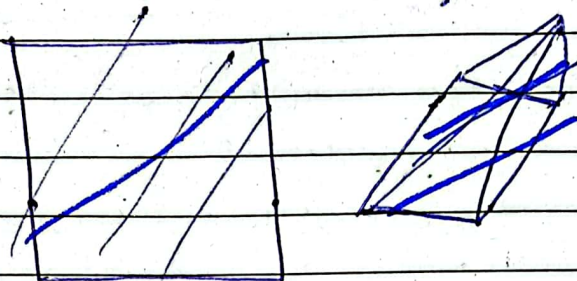
"PART D"Given that

$$\text{Pyramid's volume} = 372 \text{ cm}^3$$

$$\text{Height} = 30 \text{ m} = 30000 \text{ cm}$$

We have to find the ~~area~~ perimeter of its base.

Q. 1



As the perimeter of pyramid includes the 4 sides. therefore, we have to find the one of the sides.

As we know, Volume of a pyramid = $\frac{1}{3} \times \text{area of base} \times \text{height}$

Put the values of height & volume in above formula.

$$372 = \frac{1}{3} \text{ area of base} \times 30000$$

$$372 = 10000 \times \text{area of base}$$

$$\text{area of base} = 0.00372$$

As we know, Area of Pyramid = $\frac{1}{2} \times \text{Perimeter} \times \text{Height}$

$$0.00372 = x^2$$

Applying Square root on Both Sides

$$\sqrt{0.00372} = \sqrt{x^2}$$

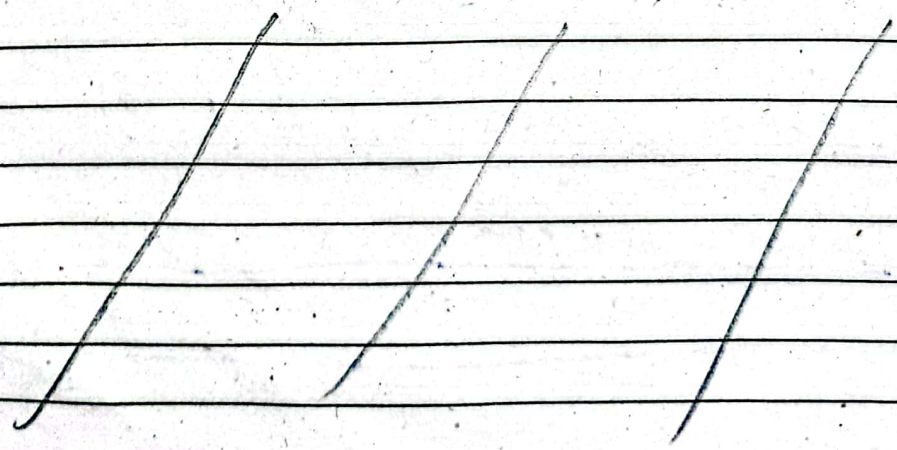
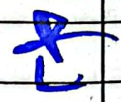
$$x = 0.06099$$

We know, Pyramid has 4 sides in its perimeter. So, lets add the four times.

~~$$\begin{aligned} \text{Perimeter} &= x + x + x + x \\ &= 0.06099 + 0.06099 + 0.06099 + 0.06099 \end{aligned}$$~~

~~$$4 = 0.24396$$~~

Here, the Perimeter of its base = 0.24396



SECTION NO. IQUESTION NO. 5PART ARAM VS ROM, NIBBLE AND USB(i) RAM :-

RAM is an internal memory of the system known as Random Access memory. It is a volatile and short term memory. This is the memory where the process stored and can be directly accessible by the logical address generated by the CPU. The range of memory vary between ~~16~~ MB to GB.

(ii) ROM :-

ROM is an external memory of the computer system known as Random Read Only memory, which means, computer can only store and retrieve data from it. It cannot write any data in it or it do in RAM. Therefore it is non-volatile or permanent memory.

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memory of computer system. You can get the maximum size such as Tera Bytes (TBs).

DIFFERENCES B/W RAM AND ROM

RAM	ROM
(i) Known as Random access Memory	Known as Read only memory
(ii) It is short term or Volatile Memory	It is Permanent or non-volatile memory
(iii) Use to store process	Use to store any kind of data
(iv) It is an internal memory of the system	It is an external memory of system
(v) Accessible through logical addresses	Accessible through physical addresses
(vi) Can store small piece of data, therefore less memory available. upto GBs	Can store huge amount of data, upto TBs
(vii) Examples include DRAM, DDR2, DDR3, etc.	Examples include Hard drive, USB, CDs etc.

(i) USB :-

USB known as Universal Serial bus, is an industry standard that establishes specifications for connectors, cables, and protocols for computer communication, connection, data storage and power supply between personal computers and their peripheral devices. There have 3 generations of USB specifications:

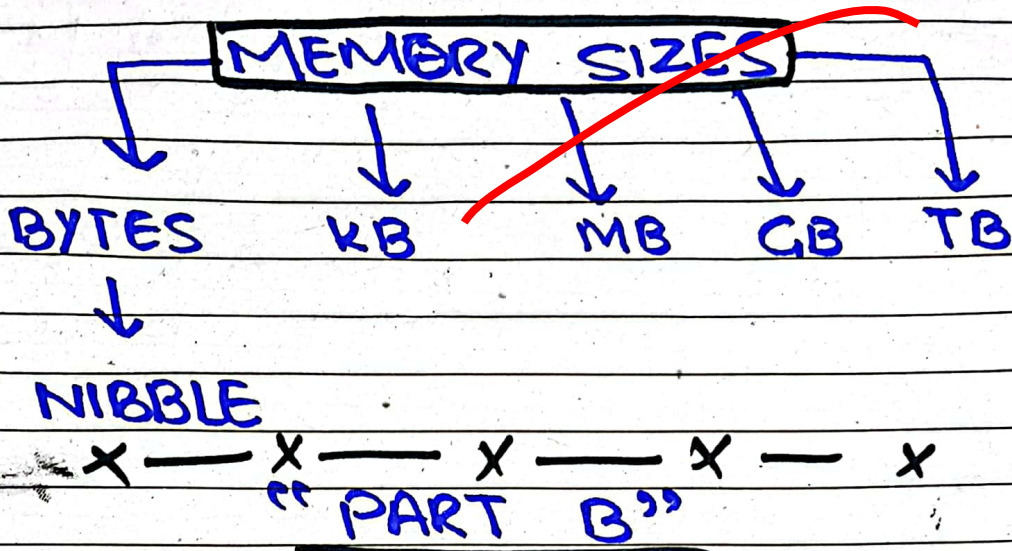
- (a) USB 1.1
- (b) USB 2.0
- (c) USB 3.0

In a nutshell, USB was designed to standardise the connection of peripheral devices like keyboard, mouse, camera etc. But soon devices such as printers, portable media players, disk drives, network adapter, Data sharing ^{with} computers or other devices used USB to share

(ii) NIBBLES :-

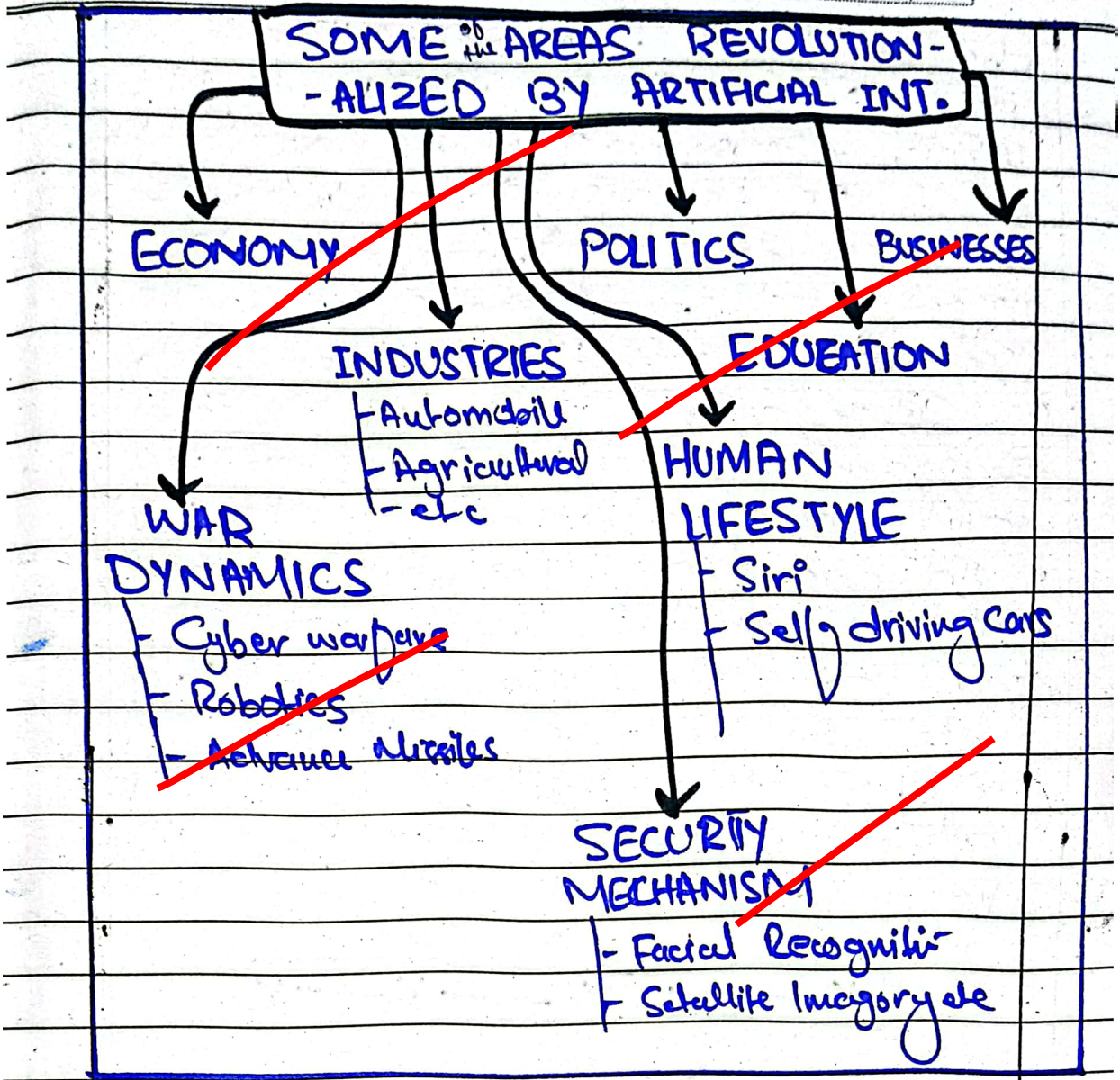
In computing terminology, Nibble known as the size of a data or memory size. It is also known as Bytes which

consist of binary digits. Nibbles are typically used as a smaller alternative to bytes, or considered as bytes.



Artificial Intelligence (AI) refers to the simulation of human intelligence in computer systems and machines. It involves the development of algorithms, software, and hardware that enable machines to perform tasks that typically require human intelligence, such as problem-solving, learning from experience, understanding the natural language, recognizing the patterns, and making decisions.

Artificial Intelligence is the greatest innovation of 21st century that has revolutionized every aspect of human being. From human lifestyle



↳ Education, economy, industries, politics, business, war dynamics, security mechanism even one can find AI in one's surrounding. Although, it has some negative implications but its positive aspects outweighing its negative sides. For instance, according to the world economic forum report "The Future of Jobs, 2020" shows that 85 million jobs will disappear globally by 2025. Gracy

due to AI and automation. However, it will also create 97 million new jobs which shows that AI is more beneficial.

In the view of revolution, we can see that wars, now are not waged directly, different tactics are used to attack the opponent such as cyber crime, false information, propaganda through social media and using different AI tools. Similarly, in the case of security dynamics, earlier personnels were required for surveillance, now, cameras can do the job even they can recognize the faces and malicious activities. This shows that AI has revolutionized the world.

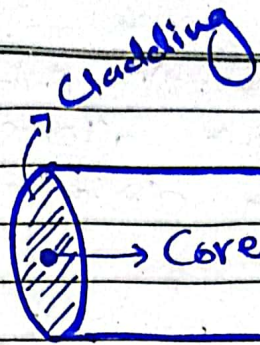
~~X — X — X — X~~

"PART C"

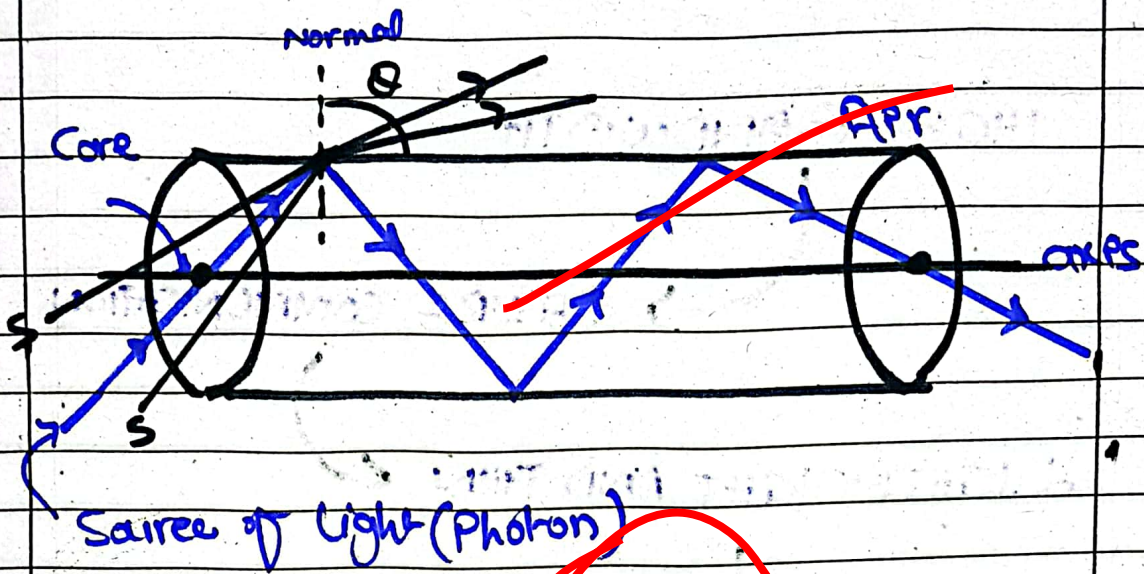
"OPTICAL FIBER"

DEFINITIONS

"These are the strands (thread like structure) of glass which are used to transmit/transmission light signal from one point to another point in telecommunication."



WORKING OF OPTICAL FIBER :-



The working of optical fiber is based on total internal reflection which allows light to travel through the fiber without losing energy. Consider the above diagram consists a core surrounded by cladding with a lower refractive index. When light enters the fiber at shallow angle, it is reflected through the inner surface of cladding and travels through the core. Because of high refractive index, the light is confined to

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The core and does not interact with the cladding. This allows the light to travel long distances with minimal loss.

ADVANTAGES OF FIBER OPTICS

Following are the key advantages of fiber optics.

HIGH BANDWIDTH

SECURE COMMUNICATION

LIGHTWEIGHT AND THIN

HIGH SECURITY

LONG LIFE SPAN

LOWER MAINTENANCE COST

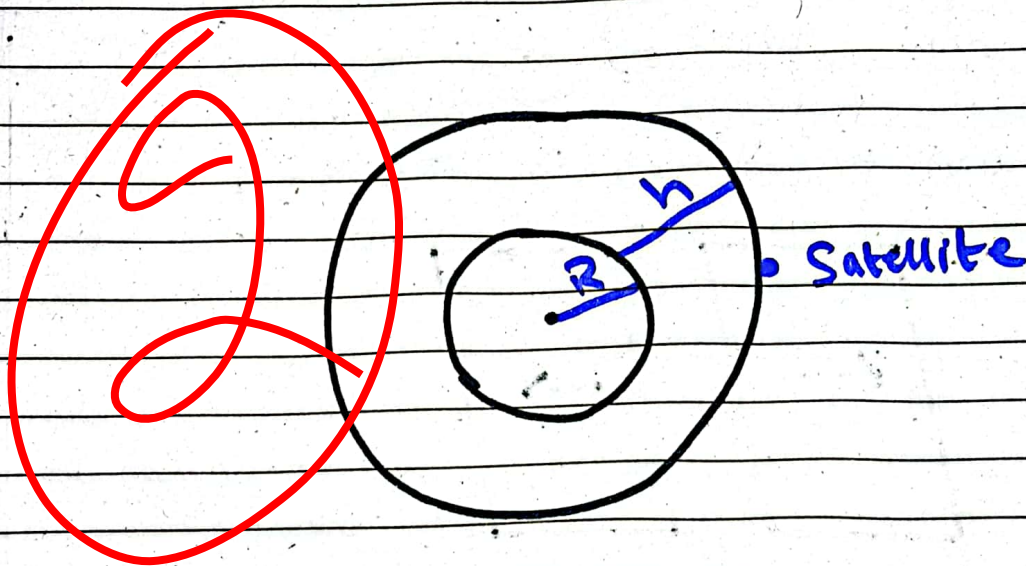
PART "d"

GEO-STATIONARY AND POLAR SATELLITES AND THE CRITICAL SPEED OF SATELLITE

SATELLITES

"Any revolving object around the earth (any planet or even star) is called satellite."

CRITICAL SPEED OF SATELLITES



From the above diagram, we can see that the " R " is the radius of earth which value is 6400 km and " h " is height of satellite from the earth's crust.

While the Critical Speed which is also known as orbital speed is the minimum speed Gracy

required to move a satellite around the earth.

~~X=X=X=X~~

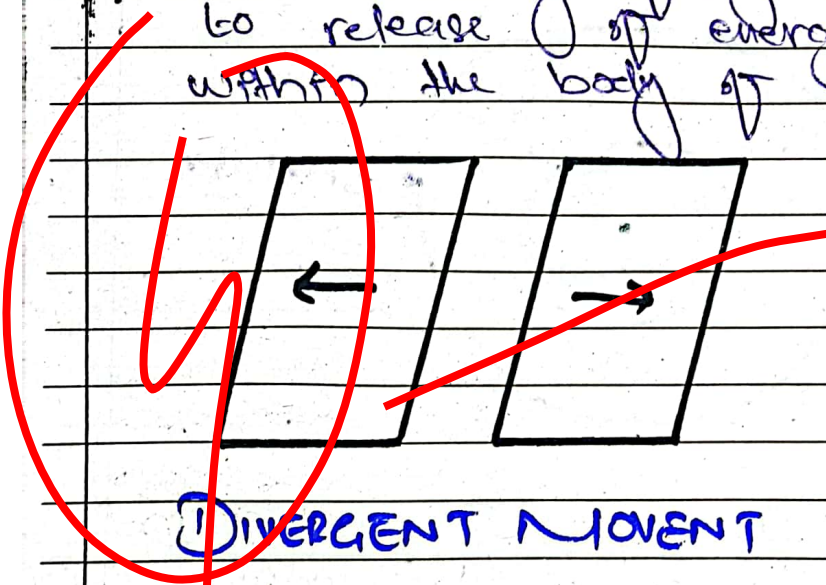
"QUESTION NO 04"

"PART A"

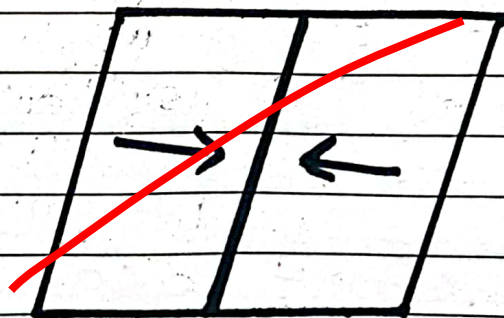
EARTHQUAKE AND TSUNAMI

(1) EARTHQUAKE AND ITS FORMATIONS

Earthquake is a temporary trembling and shaking of ground due to release of energy stored within the body of the earth.

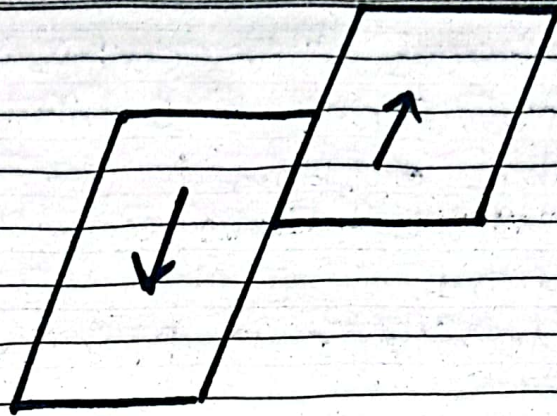


DIVERGENT MOVEMENT



CONVERGENT MOVEMENT

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TRANSFORM MOVEMENT

The major cause of earth quake is the movement of tectonic plates. These earthquakes occur due to the structural adjustments inside the earth. The earth's lithosphere is divided into tectonic plates of various sizes. Over millions of years, the movement of tectonic plates have created certain weak points, called faults, in the crust. Most faults occur along the boundaries of the tectonic plates and these are the zones where the earthquake occur.

The movement of the tectonic plates can be seen in three ways. One, when they come towards each other, known as convergent movement, second, when they go far from each other, known as divergent movement and the last when they slide past each other forms a transform movement.

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Other factors that contribute in earth-quake formation are the following.

- a) Volcanic Eruption
- b) Iso-static Balance
- c) Dams
- d) Miscellaneous factors

EARTHQUAKE . . . VERSUS TSUNAMI :-

"Tsunami is a very large ocean wave that is caused by an under water earthquake or volcanic eruption and often cause extreme destruction when it strikes land."

From the above, we can find out that the earthquake is a natural ground-shaking event caused by the movement of the earth's crust, while a tsunami is a series of ocean waves generated by underwater earthquake or near coastlines.

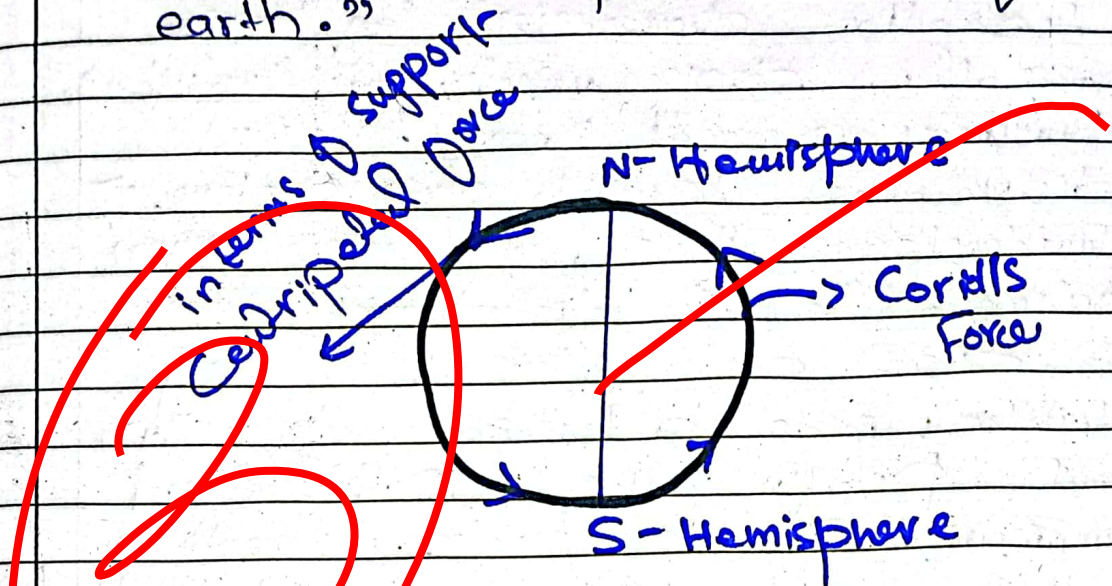
"PART B"

CORIOLIS FORCE AND HURRICANES

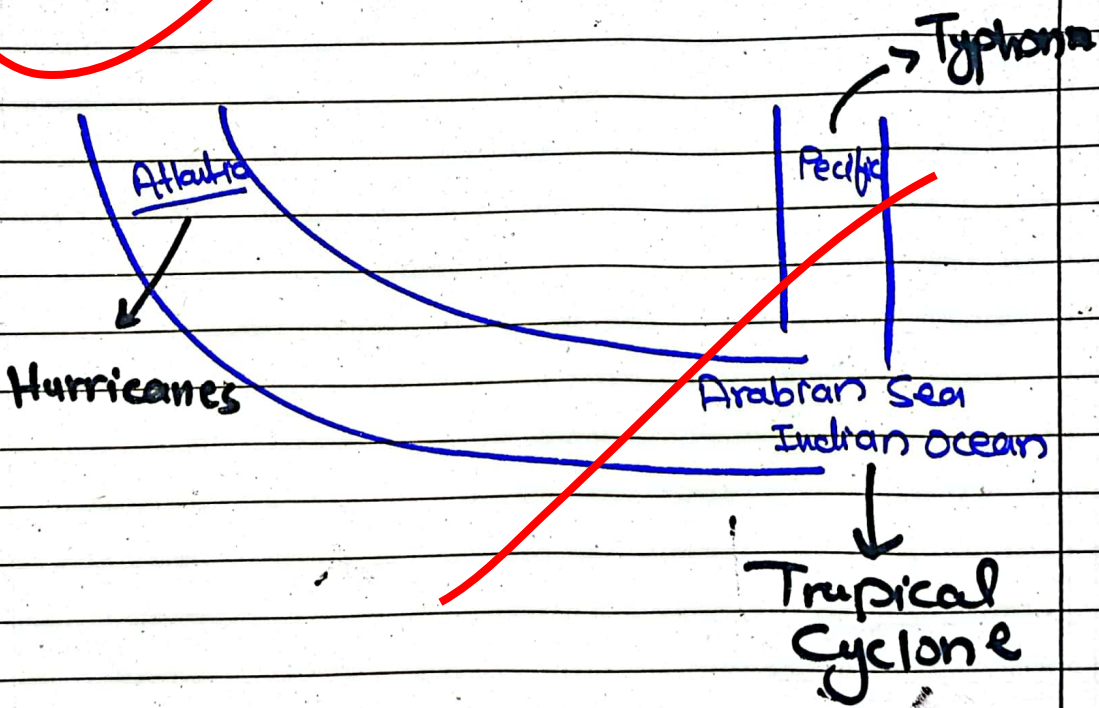
CORIOLIS FORCE :-

"Coriolis force is a force which tends to move the objects to

"the right hemisphere and to the left in southern hemisphere due to the spin motion of earth."



HURRICANES &



Hurricanes, also known as typhoons or cyclones in different parts of the world as shown in the

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Figure above. Hurricanes are powerful storm systems that form over tropical or subtropical waters. They are typically characterized by heavy rainfall, strong winds, and thunderstorms. Hurricanes are formed from tropical disturbances, which are clusters of thunderstorms that form over warm waters. As the disturbance grows in size and intensity, it may develop into a tropical depression, and finally into a full-fledged hurricane if it meets certain criteria, such as sustained winds of at least 74 mph and a minimum central pressure of 960 mb.