

SECTION - II

Q. No. 5:

(a)

The of three consecutive ----?

Solution:

Let the consecutive prime numbers be

$$x, x+1, x+3$$

According to given condition:

$$x + x+1 + x+3 = 187$$

$$3x + 4 = 187$$

$$3x = 187 - 4$$

$$\frac{3x}{3} = \frac{183}{3} \Rightarrow x = 61$$

So,

$$x = 61, x+1, x+3$$

$$61+1=62, 61+3=64$$

So the consecutive prime numbers are

$$\boxed{61, 62, 64}$$

(b)

find a five number ----?

Solution:

Let the positive number be x

According to given condition:

$$x + 17 = 60 \times \frac{1}{x}$$

$$x(x+17) = 60x$$

$$x^2 + 17x = 60x$$

$$x^2 + 17x - 60 = 0$$

$$x^2 + 20x - 3x - 60 = 0$$

$$x(x+20) - 3(x+20) = 0$$

$$x-3=0$$

$$x=3$$

$$x+20=0$$

$$x=-20$$

So the positive number is 3

(c) The population of a town — — —

Solution:

Population of town now = 262500

" " " before = 175000

Time interval = 10 years

Avg. % increase per year = ?

$$\text{Population Increase} = 262500 - 175000 = 87500$$

$$\% \text{ Increase} = \frac{87500}{175000} \times 100 = 50\%$$

Avg. % inc per year =

$$\frac{50}{10} = 5\%$$

So, Avg. % inc of population per year = 5%

(d) Salman purchased ---;

Solution:

Salman purchased eggs = 20 dozen

Price of 1 dozen = 375 Rs

sell price of 1 egg = 33 Rs

% profit = ?

Total price of 20 dozen eggs =

$$20 \times 375 = 7500 \text{ Rs}$$

$$\text{Price of 1 egg} = \frac{375}{12}$$

$$= 31.25 \text{ Rs}$$

$$\text{Profit on 1 egg} = 33 - 31.25$$

$$= 1.75 \text{ Rs}$$

$$\text{Profit on 1 dozen} = 1.75 \times 12$$

$$= 21 \text{ Rs}$$

$$\text{Profit on 20 dozen} = 21 \times 20$$

$$= 420 \text{ Rs}$$

$$\% \text{ profit on 20 dozen} = \frac{420 \times 100}{7500}$$

$$= \boxed{5.6\%}$$

Q6 (a) The product of two numbers ---

Solution:

Let the two numbers be x and y

According to given condition:

$$x * y = 120$$

$$xy = 120 \quad \text{--- (i)}$$

$$x^2 + y^2 = 289$$

$$\text{--- (ii)}$$

According to formula

$$(x+y)^2 = x^2 + y^2 + 2xy$$

putting values from (i) & (ii)

$$(x+y)^2 = 289 + 2(120)$$

$$\sqrt{(x+y)^2} = \sqrt{529}$$

$$x+y = 23$$

So, the sum of number is 23

(b) Six years ago -----?

Solution

Let the age of Kamran = x
 " " " " Salman = y

According to given condition :-

Six years ago :-

$$x-6 : y-6 :: 6 : 5$$

$$\frac{x}{6} : \frac{y}{6} = 6$$

$$\frac{x-6}{y-6} = \frac{6}{5}$$

$$5(x-6) = 6(y-6)$$

$$5x - 30 = 6y - 42$$

$$-30 + 42 = 6y - 5x$$

$$12 = y$$

$$6y - 5x = 12 \rightarrow \text{ii}$$

(b)

Solution. -

Let the age of Kamran = x
 " " " " Salman = y

Six years ago, Kamran age = $x-6$
 Salman age = $y-6$

According to given condition

$$x-6 : y-6 = 6 : 5$$

$$\frac{x-6}{y-6} = \frac{6}{5}$$

$$5(x-6) = 6(y-6)$$

$$5x - 30 = 6y - 36$$

$$5x = 6y - 30 + 36 = 6y - 6$$

$$6 = 6y - 5x \quad (i)$$

After 4 years,

Kamran age = $x+4$ Salman = $y+4$

According to given condition

$$x+4 : y+4 = 11 : 10$$

$$\frac{x+4}{y+4} = \frac{11}{10}$$

$$10(x+4) = 11(y+4)$$

$$10x + 40 = 11y + 44$$

$$10x - 11y = 4 \quad (ii)$$

Multiply eq (ii) with 2

$$2(10x - 11y) = 2 \cdot 4 \Rightarrow 20x - 22y = 8$$

$$12 = 12y - 10x \quad (iii)$$

Add eq (iii) & (ii)

$$\begin{array}{r} 12 = 12y - 10x \\ 4 = -11y + 10x \\ \hline 16 = y \end{array}$$

Hence age of Salman is ✓
16 years

(C)

The sum of three ---

Solution:

Let the three numbers be

 x, y, z

According to given condition

$$x + y + z = 98 \rightarrow \text{①}$$

$$x : y = 2 : 3, \quad y : z = 5 : 8$$

$$\frac{x}{y} = \frac{2}{3}, \quad \frac{y}{z} = \frac{5}{8}$$

$$3x = 2y, \quad 8y = 5z$$

$$\frac{3}{2}x = y, \quad y = \frac{5}{8}z$$

$$x = \frac{2}{3}y$$

$$z = \frac{8}{5}y$$

②

③

Put eq ② & ③ in eq ①

$$x + y + z = 98$$

$$\frac{2}{3}y + y + \frac{8}{5}y = 98$$

$$10y + 15y + 24y = 98 \times 15$$

$$15 \times \frac{49y}{15} = 98 \times 15$$

$$49y = 1470$$

$$y = 30$$

So second number is 30.

(d) Shopkeeper ---

Solution:

Shopkeeper expects gain = 22.5%
 Sales in 1 week = Rs 392
 Profit = ?

$$\text{As, Profit} = \text{Sale Price} - \text{Cost Price}$$

↳ $\downarrow$

$$\text{Cost Price} = ?$$

$$\text{As Sale Price} = \text{Gain \%} + \text{CP}$$

$$392 = \frac{22.5}{100} \text{CP} + \text{CP}$$

$$392 = \frac{22.5}{100} \text{CP} + \text{CP}$$

$$392 = 0.225 \text{CP} + \text{CP}$$

$$392 = 1.225 \text{CP}$$

$$\frac{392}{1.225} = \frac{1.225 \text{CP}}{1.225}$$

$$\text{CP} = 320$$

Now put in $\downarrow$

$$\text{Profit} = 392 - 320$$

$$\boxed{\text{Profit} = 72 \text{ Rs}}$$

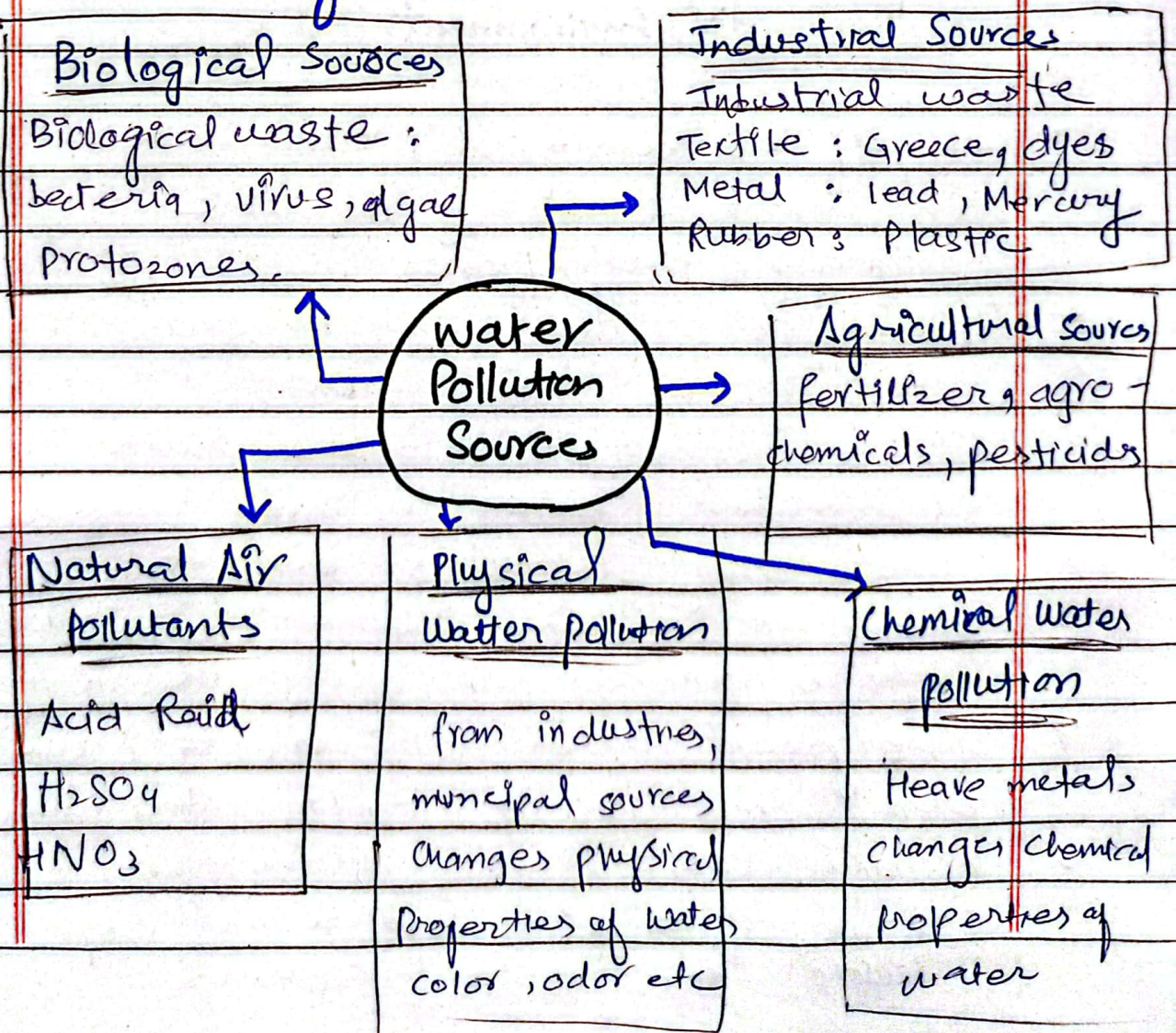
Q4(d) What are main sources of Water ---?

Answer:

Water Pollution:

Water pollution is any physical and chemical change in the quality of water that adversely affects the human life, aquatic life and make water unsuitable for desirable use.

Sources of Water Pollution:



Impacts of Water Pollution on Humans

- Water pollution adversely affects humans
- * It causes diseases like malaria, Cholera, blue baby syndrome
- * Heavy metals present in water can cause joint pains, blurred vision, Leukemia
- * Mercury, arsenic can cause cancer and disrupt human natural system

Impacts of Water Pollution on the Environment

- * Loss of biodiversity: Polluted water can cause death of aquatic animals and plants
- * Contaminated water damages crops and impact their yield.
- * Wildlife damage: Animals drink contaminated water can lead to death
- * Climate change worsens due to contaminated water. Release of contaminated water vapours in air can pollute air quality
- * Underground water pollution: occurs when soil absorbs contaminated water
- * Economic loss: food contamination, and impact on agriculture and crop yields can impact economy.

-: Ways to counter water pollution:-

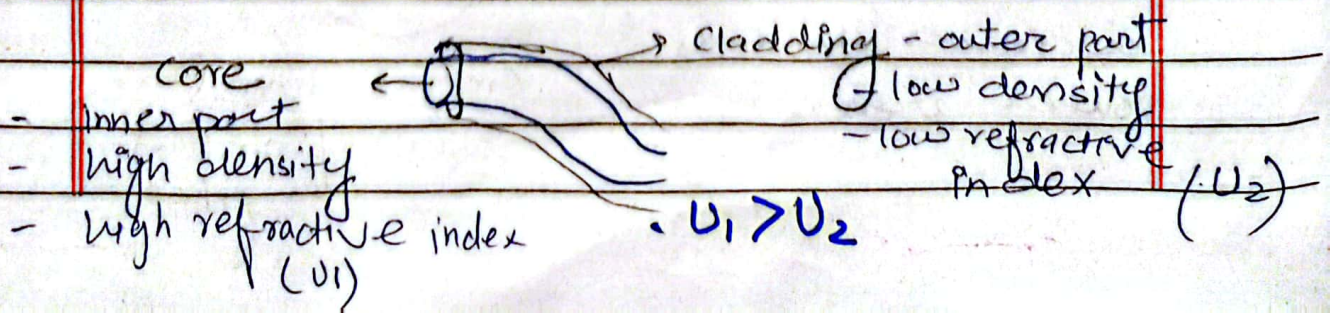
- * Install waste water treatment plants in industries.
- * Make solid waste management system effective.
- * Use Biological agents to control water pollution.
- * Reduce the use of agro-chemicals in agriculture sector.
- * Apply low cost water pollution control methods.
- * Ensure Environment Education.
- * Institutional mobilisation is necessary to control water pollution.

Q4(a) What are fiber optics ---?

Answer:

Fiber Optics :-

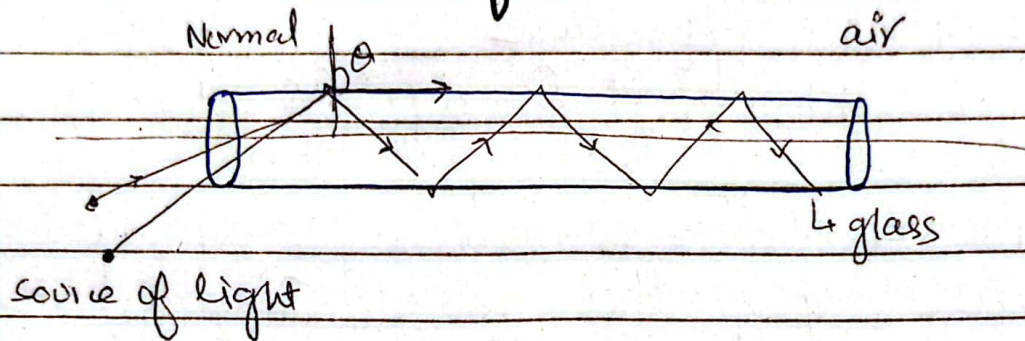
These are thin strands of glass or plastic that are used to transmit light signals from one point to another in telecommunication.



Working of Optical fiber:

Working of optical fiber can be two different methods :-

1) Total Internal Reflection :-



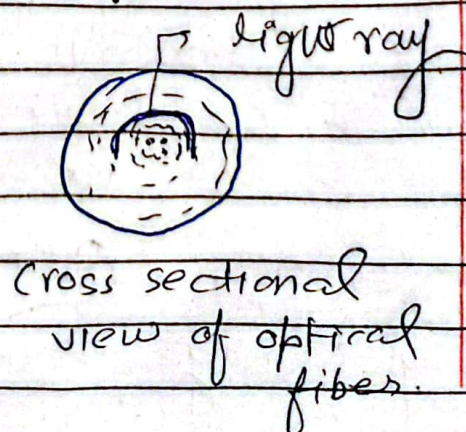
- * A ray of light enters from denser (glass) to rare medium (air)
- * Critical angle is achieved when ray of light travels along the boundary.

$\angle C$: It is an angle of incidence ($\angle i$) at which angle of refraction ($\angle r$) becomes equal to 90° .

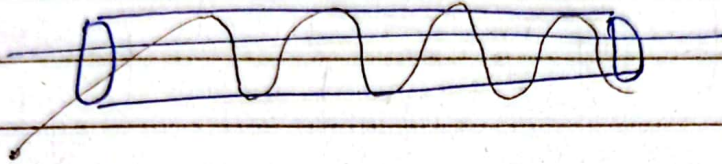
- * When $\angle i > \angle C$, Total internal reflection happens. Light rays travel from one point to another.

2) Continuous Refraction :-

- * Density is high in center and slowly decreases towards outer area.



- * light ray bends continuously due to density changes and travel from one point to another in curved path.



Advantages of fiber optics over copper wire

* Faster speed:

light signals are faster (200000 km/s in glass) than electromagnetic signal used in copper wire

* More Scalability:

Optical fibre use strands of light. Multiple strands can transmit terabits of data in 1 second

* Less loss of data:

light signals and optical fiber are less prone to outer environment than electromagnetic signals and copper wires

How do fiber optics enable high speed data transfer :-

- * Optical fiber ~~use~~ converts pulses of light to transfer data. Speed of light is much faster than electromagnetic signals.
- * It uses Wavelength division Multiplexing (WDM) method that further enhance speed & and capacity. It use light rays of different wavelengths and colors to transfer large amount of data at the same time.

Q4 (b) What are causes and effects --- ?

Answer:

Earthquakes: Sudden rolling and shaking of Earth Surface is called an earthquake.

Causes of Earthquake:

➤ Movement of Tectonic Plates:

When tectonic plates under Earth surface collides or move apart. suddenly seismic energy

releases

releases cause Earthquake.

* Elastic Bond Theory:

When elastic is stretched, elastic energy is stored in it and when elastic is broken this energy is released. Similarly, plates under Earth store elastic energy that release in the form of Earthquake.

* Human Activities / Dams:

Water reservoirs or dams put pressure on rocks under the Earth surface. When rocks no longer handle the pressure, Earthquake happens.

* Volcanic Activities :-

Hot magma erupts due to volcanic activities, also put pressure on under ground Earth plates that causes earthquake.

Types of seismic waves:

→ **Body waves:** travels under Earth surface.

Primary waves: fastest waves, longitudinal waves (push and pull effect), travels through solid, liquid & gas.

Secondary waves : slower than primary waves , transverse motion travels only through solids

Measurement of Earthquake:

Seismograph - to measure intensity of seismic waves.

Richter Scale - measure magnitude of seismic waves

Earthquake - Resistance Construction: and preparedness

- Construction should be able to absorb seismic waves , flexible
- ▷ Light - weight materials should be used.
- ▷ Public awareness about earthquake
- * Alarm system , Evacuations systems should be used
- ▷ Avoid construction on fault lines
- * Shock absorbers in buildings.

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