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General Science and AbilitySection - IIQ: no: 6Part: aSolution:

Given data: Five years ago the age of father = Thrice of son age.

Son's present age = 30

To find: Present age of father.

Let suppose the present age of father and son is denoted by 'x' and 'y' respectively.

5 years ago Present Age

Father $x - 5$

Son $y - 5$

$$y = 30$$

According to the given data

$$x - 5 = 3(y - 5)$$

$$x - 5 = 3y - 15 \rightarrow (1)$$

By putting the value of 'y' in equation (1)

$$x-5 = 3(30-5)$$

$$x-5 = 3(25)$$

$$x-5 = 75$$

$$x = 75 + 5$$

$x = 80$ Hence, present age of father

Ans

is 80 years

Part : b

Given data: Mean of 10, 30, y, and 50 is 30.

To find: the value of y.

Solution:

As Mean-formula is

$$\text{Mean} = \frac{\text{Sum of numbers or amounts or values}}{\text{No. of values}}$$

By applying the formula

∴ In the given data, there are total four values and their mean is 30.

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Hence by applying values into formula we get:

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

$$200 = 90 + y$$

$$200 - 90 = y$$

$$\boxed{110 = y} \text{ Ans}$$

Hence, the value of y is 110.

Part: c

Missing terms:

i) 2, 6, 18, 54, 162...

Solution: In every term in the given data is multiplied to '3'. For example, $2 \times 3 = 6 \rightarrow$ i.e. 2nd term, $6 \times 3 = 18 \rightarrow$ 3rd term, $18 \times 3 = 54$ 4th term. Or the same pattern the 5th term will be $54 \times 3 = 162$. Therefore, answer is $\boxed{162}$

~~(ii) 3125, 256, 49~~

3125, ⁵256, 49

Part: d

Given: Product of 2 numbers = 320

Their Ratio = 1:5

To find: Difference between ~~the~~ squares of two numbers.

Solution: Let suppose the 1st number

is 'x' and the other number is 'y'

then we have

$xy = 320$

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

Hence, by applying two supposed values we'll get:

Product of two numbers = 320

$$\Rightarrow x \cdot y = 320$$

$$\therefore xy = 320 \rightarrow \text{(i)}$$

Similarly,

Ratio of two no. = 1:5

$$\Rightarrow x : y = 1 : 5$$

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

$$\therefore x = y/5 \rightarrow \text{(ii)}$$

By putting value of (ii) into (i)

$$y/5 \cdot y = 320$$

$$\boxed{y^2 = 1600} \text{ square of the 2nd number}$$

- By taking square root we'll get the value of 'y' and so by putting value we'll get 'x'.

→ Taking square roots of both sides

$$\Rightarrow \sqrt{y^2} = \sqrt{1600}$$

$$\boxed{y = 40} \rightarrow \text{(a)}$$

By putting value of 'y' from (a)
into eq- (ii)

$$x = \frac{408}{5}$$

$$\boxed{x = 8}$$

As we have to find difference of squares, thus, we need x^2 .

Thus, we take square of both sides

$$(x)^2 = (8)^2$$

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

The difference of two squares will be $= y^2 - x^2$ or $x^2 - y^2$

By putting values

$$" " " = 1600 - 64 \quad \text{or} \quad 64 - 1600$$

$$= \boxed{1536 \quad \text{or} \quad -1536}$$

Ans.

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Part : a

Given: woman sold two scooters for
96000 each.

For the first scooter profit gained = 20%

On the 2nd loss incurred = 20%

To find: loss or gain in total.

Solution:

Let suppose the original price
of 1st scooter is 'x' and the 2nd
is 'y'. To find the total gain or loss 1st
we need to find original values of scooters.

As % loss and % profit formulae
are:

$$\% \text{ Loss} = \frac{\text{Original price} - \text{sold price}}{\text{Original price}} \times 100 \rightarrow \underline{A}$$

Similarly,

$$\% \text{ Profit} = \frac{\text{Sold price} - \text{Original price}}{\text{Original price}} \rightarrow \underline{B}$$

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Thus, 1st we find the ^{original} value of 1st scooter 'x' which gained 20% profit.

By putting data of 1st scooter in equation B

$$20 = \frac{96000 - x}{x} \times 100$$

$$\Rightarrow 20x = (96000 - x)100$$

$$\Rightarrow 20x = 9600000 - 100x$$

$$20x + 100x = 9600000$$

$$120x = 9600000$$

$$x = \frac{9600000}{120}$$

Hence, $x = 80000$ ^{original} Price of 1st scooter

As sold price = 96000

Hence profit earned = 96000 - 80000

$$= 16000$$

Similarly, we put data of 2nd scooter in eq - A to find its original value.

$$\Rightarrow 20 = \frac{y - 96000}{y} \times 100$$

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$$\Rightarrow 20y = (y - 96000)100$$

$$\Rightarrow 20y = 100y - 9600000$$

$$\Rightarrow 9600000 = 100y - 20y$$

$$\Rightarrow 960000 = 80y$$

$$\Rightarrow y = \frac{9600000}{80}$$

Hence,

$$\boxed{y = 120,000} \rightarrow \text{Original price of 2nd scooter.}$$

This implies

$$\text{loss of 2nd scooter} = \text{Original price} - \text{sold price}$$

By putting values.

$$\Rightarrow \boxed{= 24000}$$

Sum of total ^{original} prices of two scooters = $x + y$

by putting values

$$\text{Sum} = 80000 + 120000$$

$$\boxed{\text{Sum} = 200000}$$

As sold price is 96000 each. Hence

sum of sold price will be = $96000 + 96000$

$$\therefore = 192000$$

As the sold price is 8000 less than original price. Hence, total loss incurred

by selling scooters is $\boxed{8000}$ Ans

Part: bGiven:

i) 195 men finish a job in 20 days when they work 10 hours a day.

To find: How many men will do the same job in 15 days if they work for 13 hours a day.

Solution:

Men	Days	Hours
195 ↑	20 ↓	10 ↓
x	15 ↓	13 ↓

If we draw a relation between men and days, we'll find that is indirect relation. As when men are less, ^{more} days are required to finish the job and vice versa.

Hence, there is indirect relation between men and days.

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Similarly, if we compare men and hours, certainly when ~~star~~ men are greater they would take less hours to finish the job and vice-versa. As initially hours were 10, hence we need more men but later the hours increase, thus less men can finish the job.

In other words, there is an indirect relation b/w hours and men in the given data.

Hence, equation will be:

~~$$\frac{x}{15} = \frac{20}{15}$$~~

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

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

$$\boxed{x = 200 \text{ men}} \quad \text{Ans}$$

Hence, we need 200 men to finish the same job in 15 days.

Given =

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

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

To find: the value of A'

Solution:

As A' is known as the complement of A , which can be the difference of A and U .

In mathematical terms A' will be

$$A' = \cancel{A} - U \rightarrow (i)$$

From the given data, by putting value.

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

As, ' U ' has all the elements of set A . Hence the difference of ' A ' to ' U ' will none but empty set.

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$$\therefore A' = \{\emptyset\} \quad \underline{\text{Ans}}$$

Hence, A' will be an empty set.

Part: d

Given data:

Volume of pyramid square = 372 cm^3

Height = 3 km

To find: Perimeter of its base.

Solution:

P.S formula to find the volume of a pyramid square is:

$$\text{Volume} = \frac{1}{2} (\text{Base} \times \text{Attitude}) \rightarrow \text{ii}$$

By taking values of volume and attitude which means height from the given data.

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$$\Rightarrow 372 = \frac{1}{2} (\text{Base} \times 3)$$

$$372 = \frac{3}{2} \text{Base}$$

$$372 \times 2 = 3 \cdot \text{Base}$$

$$\frac{248}{3} = \text{Base}$$

$$\boxed{248 \text{ cm}^3 = \text{Base}} \quad \underline{\text{Ans}}$$

Hence, the base is 248 cm^3 .

Section - I

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Part: a

Three Renewable Energy resources under CPEC.

There are many projects under CPEC but three main which deal with renewable energy are discussed below.

1- Quaid-E-Azam Solar Park using solar energy

First of all it is Quaid-E-Azam solar park that is developed under CPEC in the city of Nawabshah — Bahawalpur. The government has ensured that this is one of the world's largest solar energy production units. All energy produced under this project will be obtained via using

sun light. The unit is located in Punjab under the Allama Iqbal Industrial International City special economic zone.

2- Sukhi Kenari and Karot Hydel power projects in KPK, AJK and Punjab.

Another resource that is renewable and is being used under CPFC is water. As Pakistan's $\frac{1}{3}$ rd of water is directly discharged into Arabian oceans thereby, the government committed to tap this precious resource. These two small energy production units are in KPK and Karot, Punjab or Azad Jammu and Kashmir.

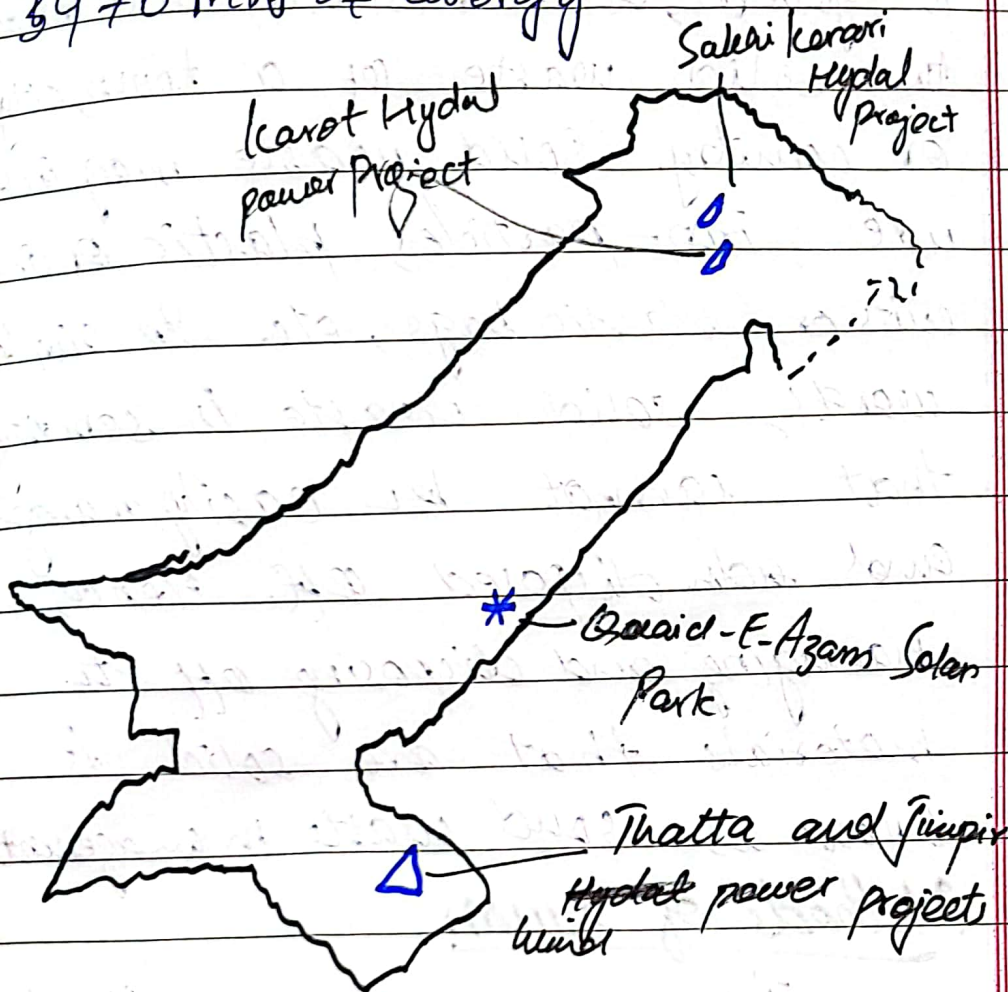
3- Thatta and Jampur wind power projects in Sindh

Sindh being a province close to coastal line have different wind patterns. While keeping in to mind, under CPFC the

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government has started work on Thatta, and Jinnah for planting a wind power project. The project is operational and ^{has capacity} producing almost 3970 MW of energy.



Source : CPEC.gov.pk

Hence, these are the projects which use renewable energy resource in Pakistan under CPEC.

b- Solid Waste Management (SUM)

Solid waste management is a methodology that is used to govern, administer and manage the solid waste of a town, city or country. Solid waste may include iron-particles, plastic or circuits or plastic bags, etc. In simple words, solid waste is something that cannot be easily managed and ~~and~~ disposed off. Hence, managing and disposing off the materials that are solid is known as solid waste management.

Methods of SUM:

There are many methods of solid waste management but the commonly used are given below

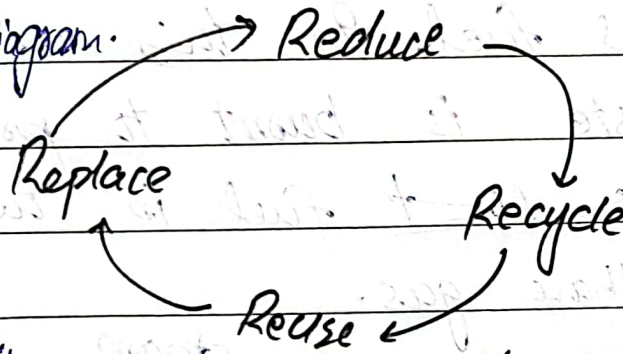
1- Landfills

It is one of the mostly adopted methods of solid waste management. Solid waste is carried ^{away} from the cities or towns to

areas which are open. Then, after some days, they are filled in patches of land. Mostly developing states follow it as it is less costly yet dangerous for health.

2- 4 R Method

Another most effective approach used for solid waste is 4 R method. This method is elaborated in diagram.



Mostly developed nations such as U.S.A, Canada, France and Italy use this strategy.

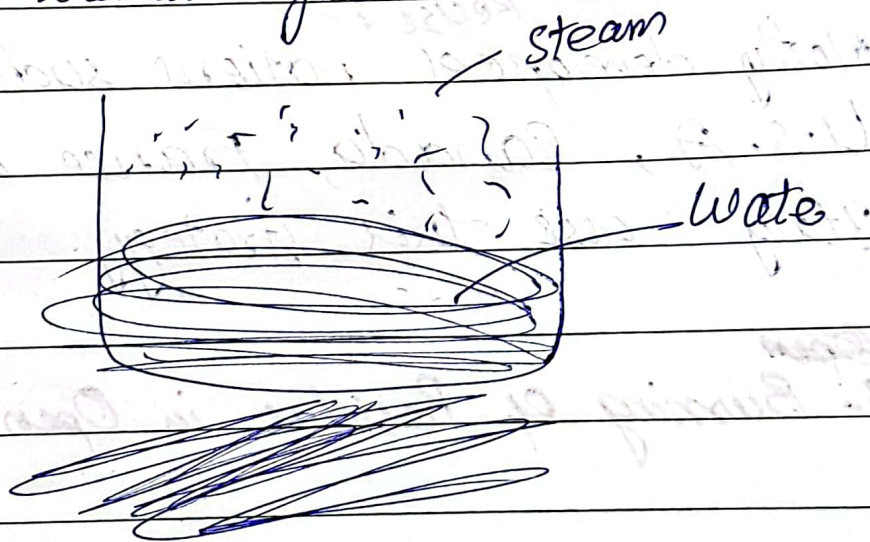
3- Burning of Residue in Open Air

Another method used for solid waste is open burning of the waste. In this method solid waste is gathered in

the form of piles. Then these piles are openly burnt in the air. The method is very toxic and unhealthy as it triggers respiratory diseases.

4- Biomass fuel production through using solid waste.

Another method is management of solid waste through biomass fuel. In this method, the waste is burnt to produce ~~biogas~~ fuel in the form of methane gas.



Solid waste

hence, it is another method.

Balanced Diet:

Balanced diet is plan in which the amount of nutrients, proteins, carbohydrates, fats, and ~~emr~~ calories, etc. are managed and controlled adequately. In other words, a balanced diet is one that does not badly impact one's health.

For example, when someone is got too fat, it is often prescribed by doctors to set a balanced diet. For instance, a gymner is often said to take proteins before exercising. Nuts, ^{milk} shakes, dry fruits are often suggested to be the part of food.

Fiber is another part of balanced diet. In balanced diet

all these are kept in moderate level so that one can burn or gain calories easily. Like, doctors often recommend to take chocolates while studying as it helps to raise one's glucose level which gets low due to concentration. Similarly, taking 4 to 5 litre of water daily is also a part of balanced diet.

a- Key Features of COP-28 regarding

Loss and Damage Fund:

Like to previous Conference of Parties (COP-27), COP-28 also pledges many commitments and promises. The major one is the loss and damage fund which is promised in COP-28.

Two leaders from developed nations along with the United Nations authori-

ties have realized that developing nations have confronted a huge damage due to the ongoing calamity of climate change.

Recent floods in Pakistan leaving half of the country under water, damaging ~~million~~ ^{trillion} dollars worth crops and inflicting infrastructural damage is a glaring proof. R.

Leaders at COP-28 promised that even though they have failed to collect \$100 bn of COP 27, they would try to reach the level of ~~losses~~ and damage fund of COP-28 which ^{is over} \$250 bn.

Apart from that, it is also discussed that developing nations lack finance required for technology transition, thus, they ^{must} also be provided with finance so

so that they could cater their technology needs.

The Gulf states also promised that would give a lending hand to the climate suffered nations so that these nations could stand soldier by soldier with the global community.

Along with the loss and damage fund the governments also pledged that adaptation and mitigation funds must be reached to the nation which faces the impacts of climate change.

Lastly, in COP-28, parties also shown a great willingness that in coming future, there would be increase in the loss and damage fund.

Hence, these are the key features discussed in COP-28.

Part: aRAM

1- RAM stands for Random Access Memory (RAM).

2- It is volatile form of memory. Data used on it is not stored permanently. Until the data is in run-time, it is save but once run times complete RAM does not keep the data.

3- It is often of less size. For example in PCs (personal computers), it is mostly between 1GB

ROM

It is abbreviated form of Read Read Only - Memory.

It is non volatile memory. It stores the data for longer period. Through using it, data is later used. As RAM cannot hold data for long time, thus, ROM is important for computers.

It is commonly of large size. Simply because, it stores the whole data of computers, thereby,

to 20 GB. It may be larger than that depending upon the requirements of the users.

Example

For example, when we listen to a song, it is played with the help of RAM.

cut, the data will be lost from the RAM but ROM still holds it.

It is commonly above 100 GB ~~data~~. For it manages the data of users which is in various forms.

While the song is stored it is stored in not RAM but ROM. Hence when song stops playing or we may have a power

Nibble:

Nibble is another computer related terminology. It is one of the terms that are used to describe memory of a computer.

USB:

USB stands for Universal Serial Bus. By 'bus' in computer language means the path of traffic. In computers, to share data from one place to other place, we often use USB. It develops a connection to transfer data from one side to other or it can be said it's a form of medium.

Part: b

AI Revolutionizing the World

Artificial intelligence has revolutionized the world in various ways. It has changed the world completely through changing the means of doing things. Major areas where it has brought about a profound change are

discussed below.

1- Revolution in Military Equipments

AI has completely changed the military weapons. From ~~AI~~ based ~~miss~~ ~~droves~~ to guided missiles, everything in military domain is getting changed with the rise of AI.

Example: U.S used AI based drones in many attacks in Afghanistan against Taliban.

2- Medical Field Transformation

Similarly, medical field is also going through AI-backed transformation. Research and development aside, AI is helping medical field through designing Robots that can perform medical operations.

Example:

In U.S, a Robot was used to perform a surgery which proved very helpful. Similarly, AI

Day: ~~based softwares~~ are also being used to diagnose diseases.

3- Change in Economics

eco

Economics has thoroughly changed in the AI world. Today's world is having e-commerce.

Robots
AI

Online AI-based algorithms are handling everything. Data analysis of AI are reducing cost of doing business.

Example of Japanese Robot: The robot can work for 22 hours. It can lift upto 400kg weight easily.

4- Revolution in Transportation Industry

Transportation industry is another area which substantiate that AI has revolutionized the world.

Driverless robot-based cars are a glaring evidence of the aforesaid.

5- Media Industry and AI:

AI has also changed the media industry by many ways. Recently reporting was done by robots which is a consequence of AI.

Research and Development and Role of AI.

AI is alluring & helping in military, medical and transportation, it is also helping in research and development. It is igniting the process of innovation and inventions. There are many instances where its role can be seen.

Agriculture sector is a glaring area where AI-based research has increased the production.

Concluding Remarks:

In a nutshell, it is pertinent to say that AI has revolutionized the world through transforming the major sectors like agriculture, military, transportation, and medical.

Part: a

Critical Speed of Satellite

Critical speed of satellite is the speed that is required to send a satellite out from the orbit of the planet. It may vary depending upon the planet and distance that a satellite has to travel. For example, U.S. based satellite Appollo has a different less speed than the Chandrayan - 3 satellite sent by India on moon.

Geo-stationary and Polar Satellites.

There are many differences between geostationary and polar satellites. Main

differences are discussed below.

1- Purpose

Geo stationary satellites are often used to draw picture of earth. So that the weather pattern can be deduced.

Similarly, they are used to make pole-pictures to determine climatic changes over the time.

2- Speed

Speed of geo-satellite in terms of picture processing is higher.

They are lower in speed in covering pictures. They take time.

3- Distance

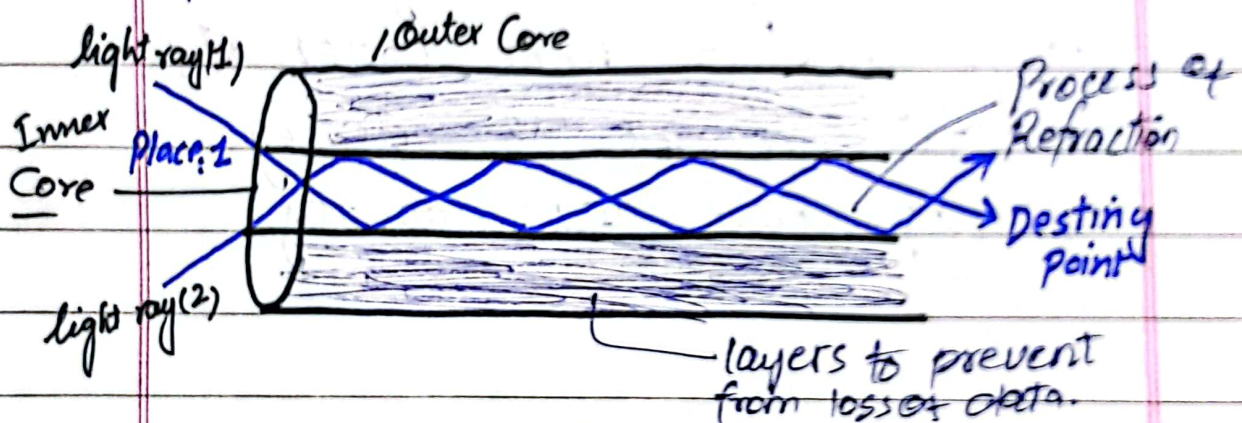
They are closer to earth orbit.

While polar are not close to earth orbit as geo stationary are.

Part: c

Optical Fibre

Optical fibre is a network of glass-like threads which are used to send data from one place to other place through using light signals. The diagram shows how fibre optic networks work.



From one place, data is entered in the form of light signals and then received on the other. It uses the method of refractive index.

Advantages

Time-

1) Efficiency

First of all fibre optics is time saving. It can

transmit data from one place to other without taking hours.

Example: Fibre optic project under CPEC is expected to send data in seconds.

Cost-
2- Effectiveness:

Another benefit of fibre optic is that it is best effective. It is easy to manage. Initially, it takes large amount but later its benefits make it very cheap and less costly.

3- ~~Cost~~ Less Distortion or loss of data

Signals of data are not lost in fibre optics. It is developed fact that fibre optics can cover long distances without losing the data.