SECTION - II

Question 9

a. The sum of three consecutive odd number is 273. What are three odd numbers?

Given data:

Sum of three consecutive odd numbers = 273

To Find:

Three odd numbers

Solution:

$x + y + z = 273$

$89 + 91 + 93 = 273$

Three consecutive odd numbers are

$\boxed{89, 91, 93}$

b- Find the missing number in the given series

i- 4, 16, 36, 64, ?, 144

4, 16, 36, 64, 100, 144

ii- 30, 29, 27, ?, 20

30, 29, 27, 24, 20

iii) 1, 7, 15, 25, ?, 51

1, 7, 15, 25, 37, 51

iv) 0, 2, 6, 12, 20, 30

0, 2, 6, 12, 20, 30, 42

v) 48, 24, 72, 36, 108, ?

48, 24, 72, 36, 108, 54

C- Correct word from fumbled spelling

i- THRSI

SHIRT

ii) GNDREA

GARDEN

iii) SCHAMOT

MACHOST

iv) ONLNDO

LONDON

v. HIODALY

HOLIDAY

d. Sara's mother is 6 times older than Sara, where as her brother Ali is twice as old as Sara. In 3 years time sum of their ages will be 72. How old are Sara, Ali and mother now?

Data given

Sara mother - 6 times older than sara
sara brother - 2 times older than sara
sum of their ages in 3 years = 72

To find:

ages of sara, Ali and mother now?

Solution

Let the age of Sara = x

Her mother age = 6x

Her brother Ali age = 2x

In Three years sum of their ages = 72

$(x + 3) + (6x + 3) + (2x + 3) = 72$

$x + 6x + 2x + 3 + 3 + 3 = 72$

$9x + 9 = 72$

$9x = 72 - 9$

$9x = 63$

$x = \frac{63}{9}^{7}$

$x = 7$

Age of sara = 7

Age of mother = $6x = 6 \times 7 =$ 42

Age of brother Ali = $2x = 2(7) =$ 14

Question 6

a- Three candidates contested elections in a constituency of Isb and received votes 15,000, 10,000 and 8000 resp - What is percentage of total votes of the winning candidate?

Data given

candidates who contested elections and received votes

candidate 1 = 15000

candidate 2 = 10,000

candidate 3 = 8000

To find

Percentage of total votes of winning candidates

Solution

Total votes

10,000, 15000, 8000 = 33000

Winning candidate = 15000

Percentage of winning candidate

$\frac{15000}{33000} \times 100 = \boxed{45\%}$

b- The ratio of angles of a triangle are 3:4:5 in total distribution. Find each angle

Data given

ratio of angles of triangle = 3:4:5

To find

each angle = ?

Solution-

Angles are in the ratio of 3:4:5

Let the angles be

$3x + 4x + 5x =$

Sum of angles = 180°

$3x + 4x + 5x = 180$

$12x = 180$

$x = 15$

Hence the angles are

$3(15) + 4(15) + 5(15)$

$\boxed{45°}, \boxed{60°}, \boxed{75°}$

d- The ratio of present ages of A and B is 6:7. After 5 years the ratio would become 7:8. Find present ages of A & B.

If ages are A and B

Let the ages be

Ax and Bx

Ratio between them

$\frac{Ax}{Bx} = \frac{6}{7}$

$\frac{6x}{7x}$

after 5 years = ratio is $\frac{7}{8}$

$$\frac{6x+5}{7x+5} = \frac{7}{8}$$

$$8(6x+5) = 7(7x+5)$$

$$48x + 40 = 49x + 35$$

$$x = 5$$

Present age of A = $6x$

$= 6 \times 5 =$ **30 years**

Present age of B = $7x$

$= 7(5)$

$=$ **35 years**

c- In a sports meet group of boys and girls are to be formed. Each group consist of 4 boys and 6 girls. How many boys are required if 102 girls are available for such groupings?

Each group must have

4 boys

6 girls

Total girls = 102

with each group having 6 girls

$$\frac{102}{6} = \boxed{17}$$

Hence total groups formed = 17

each group has 4 boys

so in 17 groups

$$17 \times 4$$

$$= \boxed{68 \text{ boys}}$$

Required number of boys are 68.

Section I

Question 2

a- How volcanoes are erupted

The Eruption Process :

Magma - Deep within Earth, immense heat melts rocks creating a thick, flowing substance called magma. This magma being buoyant, rises towards the surface. Its journey can be influenced by

Plate tectonics

Most volcanoes form at plate boundries where the movement of tectonic plates creates zones of weakness. Magma can exploit these weakness and rise through cracks and fissures.

Hotspots

In some areas, plumes of hot mantle material rise from deep within the Earth, creating hotspots, that melt rock above them forming volcanoes even far from plate boundaries.

As magma nears the surface, it collects in underground chambers. The pressure here builds up due to

Gases

Magma naturally contain dissolved gases like water vapor, carbon dioxide, SO_2. As pressure decreases towards surface, these gases expand and bubble up, creating further pressure.

New Magma

continuous supply of fresh magma from below adds to the pressure in the chamber.

Eventually, the pressure overcomes the rock's resistance, and magma finds a way to the surface through

Central vents

These are main openings of volcano, and erruptions can be

Effusive If magma is thin and fluid (like in Hawaii), it flows out as lava, creating gentle eruptions

Explosive If magma is thick and viscous (like Mount St Helens) gas bubbles have difficulty escaping, building pressure and leading to violent explosion.

Fissures - Sometimes, magma breaks through weaker zones on the volcano's flank, creating long cracks called fissures. These can erupt lava flows covering large areas.

b- What is Big Bang and Big Crunch? How age of universe is determined?

Big Bang: A prevailing cosmological model for the universe. It states that the universe began from an incredibly hot and dense state roughly 13.8 billion years ago and has been expanding and cooling ever since. In the first moments, fundamental forces and particles formed, followed by the nuclei of the first atoms (H_2 & He) over billions of years gravity pulled these materials, together to form stars and galaxies leading to the vast universe we see today.

Big Crunch: A hypothetical scenario of universe, where the expansion eventually slows down and reverses leading to a collapse back into a singularity.

Determining the Age of the Universe:

a- Cosmic Microwave Background (CMB)

The faint radiation leftover from the Big Bang holds information about the early universe

b- Redshift of Distant Galaxies

As galaxies recede due to the universe expansion their light becomes red shifted. Measuring this redshift for distant galaxies help estimate their distance giving idea about age of universe

c- Discuss any five sources of Renewable energy?

i- Solar energy:

Capturing the sun's light through photovoltaic panels to generate electricity, or using concentrated solar power to produce heat. It is readily available even in cloudy conditions. It is clean and versatile for generating electricity, heating water and for domestic purposes i-e powering homes.

ii- Wind Energy

It converts the kinetic energy of moving air into electricity using wind turbines. Strong winds are available in many locations, both onshore and offshore.
It is clean, reliable and cost effective in suitable locations.

iii- Hydropower

It captures the potential energy of following water to generate electricity through dam's and turbines. Depends on river's and suitable topography but widely used globally. It uses mature technology, is reliable and can store energy through pumped storage

iv- Geothermal Energy

It utilizes earth's internal heat to generate electricity

or provide direct heating. It is limited in areas with geothermal activity but can be stable source in those regions. It is clean, reliable, and with minimal land use impact.

v) Biomass Energy

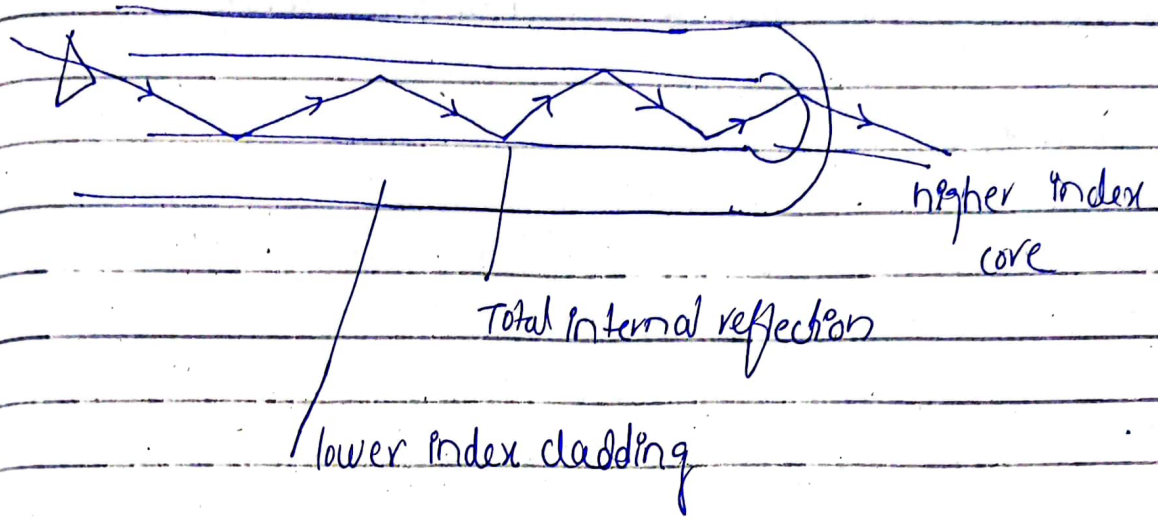
It converts organic matter like wood chips, crops or waste in to heat, electricity or biofuels. It is widely available but needs sustainable practices crucial to avoid deforestation and emissions. It can be a local source of energy and waste management solutions.

d. 320 km of optical fiber is laid down between Khunjerab pass and city of Rawalpindi under CPEC, how optic fibers work?

Light travels down a fiber optic cable by bouncing off the walls of the cable repeatedly. Each light particle (photon) bounces down the pipe with continued internal mirror-like reflection.

The light beam travels down the core of the cable. The core is the middle of the cable and the glass structure. The cladding is another layer of glass wrapped around the core.

Cladding is there to keep the light signals inside the core.



Question 3

COP-28 scheduled for Nov-2023, will focus on keeping 1.5 alive (limiting global warming to 1.5°C above pre-industrial levels) - Delivering this relies heavily on developed countries fulfilling pledge to provide $100 billion annually in climate finance to developing nations.

Hurdles in developing countries -

Financing - They lack financial resources needed to invest in climate adaption and mitigating strategies. This include

i - building dams
ii - developing early warning systems
iii - Transitioning to renewable energy sources

- Technology transfer and capacity building

They lack the access to advanced technologies and expertise needed to effectively adapt to and mitigate climate change. This include

i- Renewable energy technologies
ii- climate resilient agricultural practices
iii- efficient early warning systems

- Governance and institutional capacities

→ lack of political will
→ lack of coordination among different branches of government
→ lack of effective public participation
→ transparency and accountability concerns

b- Note on Balanced diet

A balanced diet is crucial for maintaining overall health and well being. It involves consuming variety of foods that provide essential nutrients such as

Carbohydrates
Fats
Proteins
Fats
Vitamins
Minerals in appropriate proportions.

This help support optimal bodily functions, energy levels and immune system functions. A well balanced

diet includes a mix of fruits, vegetables, whole grains lean proteins and dairy or alternatives. It plays key role in preventing nutritional deficiencies and promoting long-term health.

c- Distinguish RAM and ROM

Features	RAM	ROM
	Random access Memory	Read only memory
Volatility	volatile	non-volatile
Access	Read/write	Read only
Use	stores temporary data	stores essential instructions
Speed	Faster	slower
Capacity	Larger	Smaller
Upgradibility	yes	No

c- Machine learning is the subset of AI - How it has revolutionized the todays world?

It has revolutionized world in following ways

I- Health
aids in diagnosis, imaging, personalized medicine and drug discovery with use in Ultrasound, MRI, X-Ray machines

II- Finance
Fraud detection, trading and risk assesment enabling faster and more accurate financial decisions

III - Transportation
self-driving cars, navigation, obstacle detection, improves safety and efficiency-

IV- learning
Use for entertainment, personalized learning, social media.

V- Environment
Aids in solving global challenges to predict weather pattern, climate change, monitor air water quality