

General Science and Ability

Section-II

Q nos (a)

Sum of three consecutive
prime no = 187
numbers = ?

To take 3 consecutive
terms which can be added
to give 187 .. we divide
187 by 3.

$$\frac{187}{3} \approx 62.33$$

prime number close to 62
are 59, 61 and 67 which
are consecutive too their
sum

$$59 + 61 + 67 = 187$$

Answer: 59, 61 and 67 are
3 consecutive prime numbers
whose sum give 187.

Q nos (b)

let the positive NO = x

NO increased by 17 = $x+17$

given condition says,

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

Equation

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

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

Rearrange:

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

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

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

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

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

$$x + 20 = 0$$

$$x - 3 = 0$$

$$x = -20$$

$$x = +3$$

As per condition number is positive
So number will be 3

Answer: Number is 3

Proof:

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

$$3 + 17 = 60 \times \frac{1}{3}$$

$$20 = 20$$

$$L.H.S = R.H.S \text{ [proved]}$$

Q nos (c)

Initial population of town = 1,75,000
 population after 10 years = 2,62,500

$$\text{Increase in 10 years} = 262500 - 175000 = 87,500$$

$$\text{increase in one year} = \frac{87500}{10} = 8750$$

$$\text{Increase in each year} = 8750$$

$$\text{percent increase in each year} = 10\%$$

Q nos (d)

$$\begin{aligned} \text{price of 20 dozen eggs} &= \\ &= 375 \times 12 \\ &= 7500 \text{ Rs} \end{aligned}$$

$$\begin{aligned} \text{Sale price of each egg} &= 33 \text{ Rs} \\ \text{S.p of a dozen} &= 33 \times 12 \\ &= 396 \end{aligned}$$

$$\begin{aligned} \text{Sale price of 20 dozens} &= 396 \times 20 \\ &= 7920 \text{ Rs} \end{aligned}$$

$$\text{profit} = \text{Sale price} - \text{cost Price}$$

$$\text{profit} = 7920 - 7500 = 420$$

$$\text{Profit \%} = \frac{\text{Profit}}{\text{Cost price}} \times 100$$

$$= \frac{420}{7500} \times 100$$

$$= 5.6 \%$$

Ans: His percentage profit is 5.6 %.

Q no 6 (a)

Suppose two numbers are x and y .

As per given condition:

$$xy = 120$$

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

$$x + y = ?$$

As per formula

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

Put values in equation

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

$$(x+y)^2 = 529$$

$$x+y = 23 \text{ Ans: Sum of numbers is } 23$$

Teacher Feedback

Q no 6 (b)

suppose present age of kamran and Salman are x and y respectively.

As per condition:

6 years ago:

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

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

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

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

$$5x-6y = -6 \text{ --- (1)}$$

After 4 years

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

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

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

$$10x-11y = 4 \text{ --- (2)}$$

Multiply equation (1) by 10 and equation (2) by 5 then

$$50x-60y = -60 \text{ --- (1)}$$

$$50x-55y = 20 \text{ --- (2)}$$

Subtracting equation (2) from (1)

we get

$$5y = 80$$

$$y = 16$$

Ass supposed earlier salman's age is y so

Ans: Salman's age is 16 years

Q NO 6 (C)

Suppose 3 numbers are x, y and z consecutive respectively 1st, 2nd and 3rd

So,

$$x + y + z = 98 \quad \text{--- (1)}$$

$$x : y = 2 : 3$$

$$y : z = 5 : 8$$

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

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

Put these in equation (1)

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

put $z = \frac{8y}{5}$ now then

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

$$\frac{2y}{3} + \frac{40y}{40} + \frac{8y}{5} = 98$$

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

$$\frac{10y + 15y + 24y}{15} = 98$$

$$49y = 1470$$

$$y = 30$$

As y is supposed as 2nd number

Ans: The second number is 30.

Q no 6 (d)

Expected %age profit = 22.5%

on cost price which is supposed as x .

Sale price = 392

22.5% of x = Sale price - cost price

$$\frac{22.5}{100} \times x = 392 - x$$

Marks 100 Percent % Grade

Equation:

$$\frac{22.5x}{100} = 392 - x$$

$$22.5x = 39200 - 100x$$

$$22.5x + 100x = 39200$$

$$122.5x = 39200$$

$$x = 320$$

$$\text{cost price} = 320$$

$$\text{Profit} = \text{Sale price} - \text{cost price}$$

$$P = 392 - 320$$

$$\text{profit} = 72$$

Ans : profit was Rs 72.

Section-I

Q No3 (a)

Big Bang Theory:

The theory which explains the origin and evolution of universe by explaining that whole universe, all its energy, matter, time were enclosed in a ^{big} ball and when due to pressure of gases that ball exploded the universe came into existence. Since then that matter is moving and universe is expanding at fast rate which can be supported by evidences. This expansion of universe is due to dark energy and dark matter which are anti gravitational in nature and causing universe to expand.

Evidences Supporting Big Bang:

Some evidences listed

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below support big bang theory:

- 1- Expansion of universe as shown by redshift of distant galaxies.
2. Existence of Cosmic Microwave background (CMB) Radiation.
- 3 After glow of the early universe
- 4- Abundances of hydrogen and Helium observed.

Q No 3 (b)

Galaxy:

Galaxy is a collection of stars, planets, dwarf planets, remnants and other interstellar bodies all revolving around a gravitational center known as black hole at centre of universe.

Example: Milky way and Andromeda galaxy.

Structure and Composition of Milkyway galaxy:

The galaxy

which is home of Solar system and where life exist is milky way galaxy. Milky way is a spiral galaxy and has roughly 100,000 light years diameters, and composed of billions of stars, gas, dust, and dark matter. It has core of supermassive blackhole, Sagittarius A* obscured by dust and this galaxy has older stars and globular clusters.

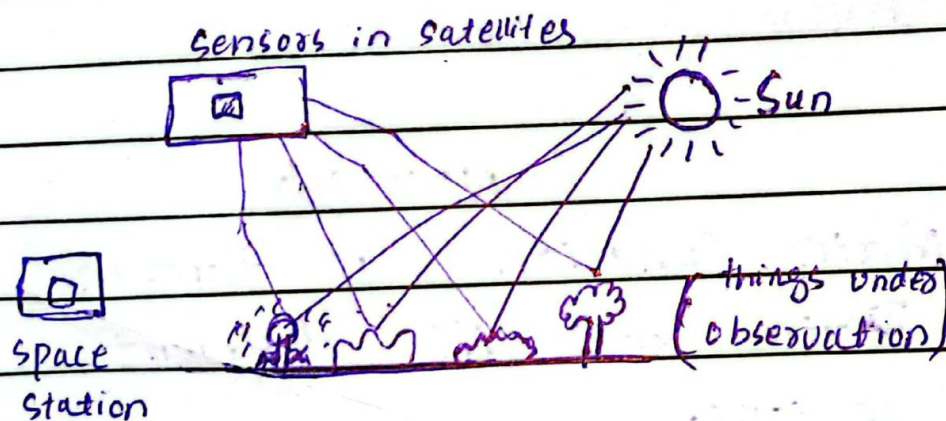
Formation and Evolution of a galaxy:-

Galaxy form from large clouds of gas and stars that collapse under gravity and it adds to old existing bodies and evolve with passage of time and they are moving away from each other due to expansion of universe.

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Q No 3 (c) Remote Sensing:

Remote sensing is a technique used to observe and analyze distant objects or events on earth without being in contact with them. Different light rays reflect from these things under observation and pass to sensors installed in satellites orbiting in orbits and give information about earth.



Remote Sensing Diagram

There are different remote sensing technologies used and they observe and give information and

monitor environmental changes and natural disasters by this information. These techniques are

1- Satellite imaging:

Satellites has sensors and these satellites orbit and take information and send it to space station for further analysis.

2- Aerial photography:

Capturing video or pictures from elevated aircrafts, drone and other airborne platform like a balloon or rocket.

Q No 3 (d)

Main functions of human Brain and its different regions:

Brain is the main processor of the human body it has different parts like Forebrain, mid brain and Hindbrain and these

parts are further subdivided with hypothalamus controlling thirst, hunger and temperature. Brain work under stress also, during sleep and nutrition too.

All parts of brain are coordinated together to function properly and each part has specified function.

Q No 4 (d) Main Sources of water pollution:

Definition: The presence of undesirable chemicals in water which contaminate it and make it unfit for living organisms' consumption is called water pollution.

Sources:

- 1- Domestic wastes in water bodies
- 2- Industrial wastes
- 3- Acid rain
- 4- Sewage wastes

5- Growth of excessive algal blooms

6- Leaked drainage system

Effects:

It impacts human health, water bodies and aquatic life, deteriorate water for plants and aquatic plants, and dissolved oxygen decrease due to increased microorganism growth in polluted water.

Overall quality of water deteriorate and cause many waterborne diseases in humans and animals. It also causes land pollution and soil erosion.

Preventing water pollution:

water pollution can be prevented or its effects can be reduced by:

1- proper treatment of industrial waste

2- proper treatment of sewage wastes

- 3- proper drainage system
- 4- proper disposal of agricultural wastes.
- 5- constructing acid resilient buildings.
- 6- Reduction of polluting gases.

Q No 4 (b)

Earthquake:

Sudden release of energy from earth's crust and shattering earth's crust is called earthquake.

Causes:

- 1- Tectonic plates movement
 - 1.1 Convergent Boundaries
 - 1.2 Divergent Boundaries
 - 1.3 Transform Boundaries
- 2- Volcanic Eruptions
- 3- Nuclear explosions
- 4- Drilling and mining
- 5- may be concerts or parade.

Effects: earthquake causes loss of lives, infrastructure, property damage, economic loss,

Social and environmental loss. It causes loss of fauna and flora, psychological problems, health problems etc.

Prevention:

1- Preparedness:

- 1- earthquake resistant construction
- 2- Early warning systems
- 3- Predictions
- 4- Community engagement
- 5- Public awareness
- 6- emergency and alarm system.
- 7- using Building codes

2- Response:

- 1- medical aid
- 2- Shelter provision
- 3- Evacuations
- 4- ambulances, police and security.
- 5- Community help

3- Recovery:

- 1- Restoration
- 2- Reconstruction and
- 3- Rehabilitation.