Hadia Afzal
Mock-8

Date: _____

Part II

Section II

Question 2

Eruption of Volcano

Definition: A volcano is a rupture in the crust of a planetary-mass object, such as the Earth, that allows hot lava, volcanic ash, and gases to escape from a magma chamber below the surface.

Etymology: The word volcano is derived from the name of Volcano which is a volcanic island in the Aeolian Islands of Italy whose name, in turn, comes from Vulcan, the god of fire in the Roman mythology. The study of volcanoes is called volcanology sometimes called vulcanology.

Categories of Volcano: Volcanoes vary greatly in their level of activity, with individual volcanic systems having an eruption recurrence ranging from several times a year to once in tens of thousands of years. Volcanoes are classified as: **erupting, active, dormant or extinct.**

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How volcanic eruption takes place.

Step I: Weak Zones in the Earth's Crust

The parts of the Earth where two tectonic plates collide against or drift apart from each other are considered very weak. Volcanoes may erupt in such zones, for example, on African and Eurasian plates. On Earth, volcanoes are most often found underwater. For example, a mid-ocean ridge (~~sinks~~) such as the Mid-Atlantic Ridge, has volcanoes caused by divergent tectonic plates whereas the Pacific Ring of Fire has volcanoes caused by convergent tectonic plates.

Step II: Magma's Pressure

The mantle of the Earth is too hot, and the temperature ranges from 1000°C to 3000°C. The rocks present inside melt due to high pressure and temperature. The melted substance is light in weight. The thin lava comes up to the crust since it can float easily. Since the density of the magma between the area of its creation and the crust is less than the enclosed rocks, the magma gets to the surface and bursts. The magma is composed of andesitic and rhyolitic components along with water, SO_2, CO_2 in dissolved form. By forming bubbles, excess water is broken up with magma. When the magma comes closer to the surface, the level of water decreases, and the gas/magma rises in the channel. When the volume of the bubbles formed is about 75%, the magma breaks [illegible]

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main causes of volcanic eruption are:

- the buoyancy of the magma
- pressure from the exsolved gases in the magma
- increase in the pressure on the chamber lid.

Effects of Volcanic Activities:

A. Destructive effects of the volcano

- Showers of cinders and bombs can cause damage to life and properties.
- Several hazards may affect the area around the volcano, such as lava flows, pyroclastic ~~trees~~ flows, lahars, and landslides or debris avalanches.

B. Positive effects of volcanoes

- Volcanism creates new landforms.
- Volcanic rocks yield very fertile soil upon weathering and decomposition.

b)

Big Bang Theory

Most astronomers believe the entire universe was inside a bubble that was thousands of times smaller than a pin head and it was named singularity. It was hotter and denser than anything we can imagine. Then it suddenly expanded. The universe that we know was born. Time, space, and matter all began with the Big Bang. In a fraction of a second, the universe grew from

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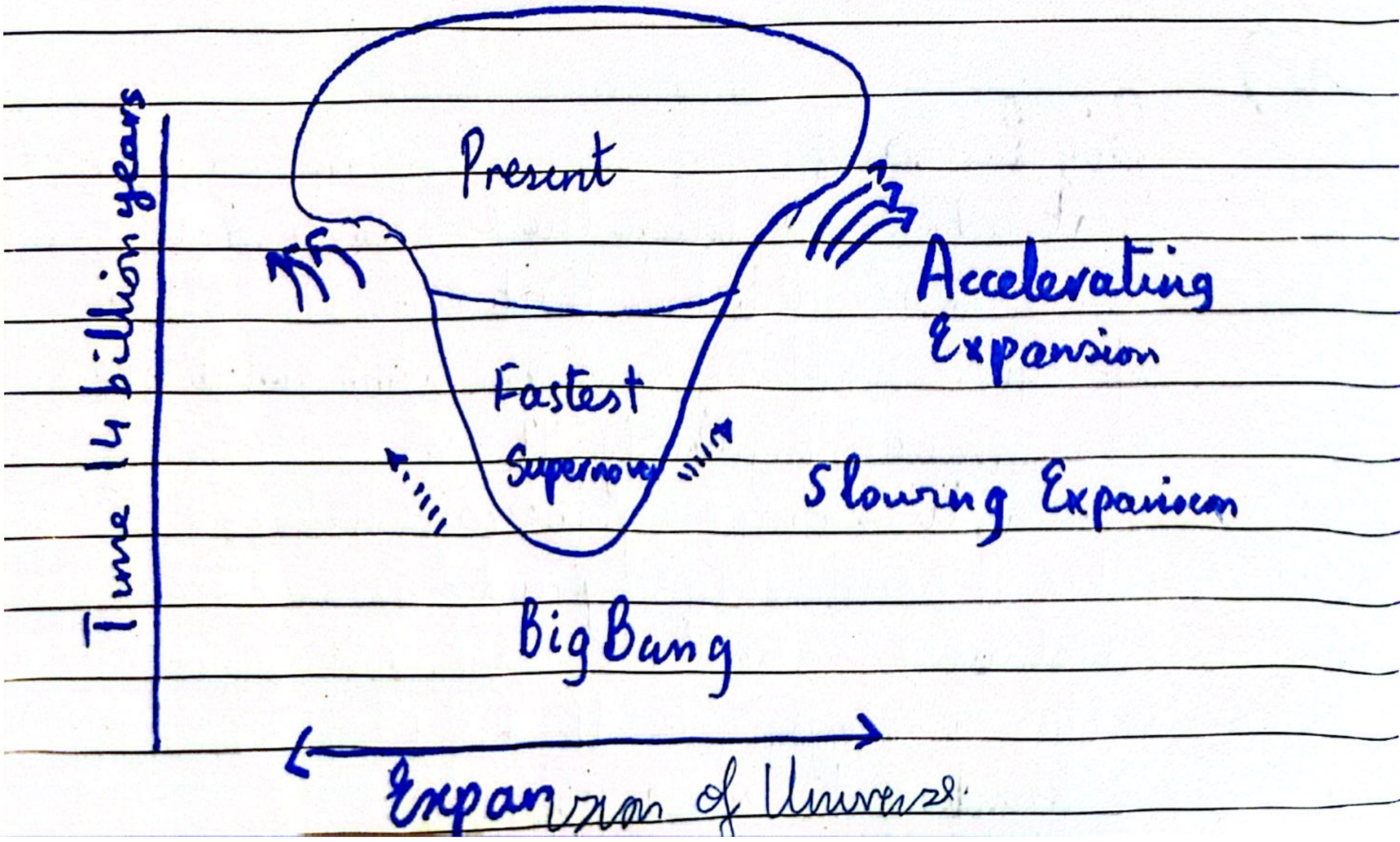
a singularity to the size of a galaxy and it kept on growing at a fantastic rate. As the universe expanded and cooled, the energy changed into matter and anti-matter. These two opposite types of particles largely destroyed each other. During this process as the universe was cooling down, it led to the production of gluons and then quarks. After that, more stable particles called protons and neutrons started to form when the universe was one second old. Over the next three minutes, the temperature dropped below 1 billion degree Celsius. It was now cool enough for the protons and neutrons to come together, forming hydrogen and helium nuclei. The universe was filled with clouds of hydrogen and helium gas. These clouds of dust and gases formed all celestial bodies afterwards. Red shift and blue shift are evidence of the Big Bang Theory.



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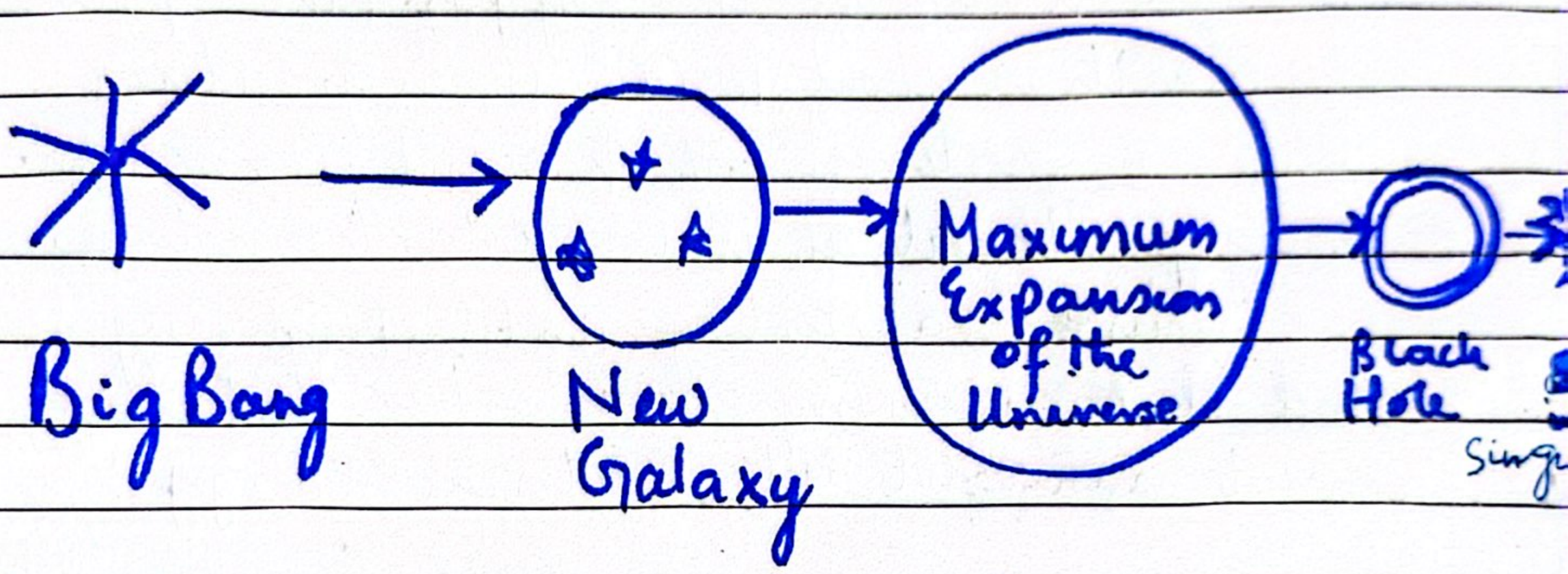
Big Crunch: The Big Crunch Theory theory is a scenario which will load to the ultimate fate of the universe, in which the expansion of the universe would start to gradually reverse and the universe would recollapse. This ultimately will cause the cosmic scale factor to reach zero, an event followed by a reformation of the universe starting with another big bang.



Determining the age of the Universe

Astronomers estimated that the Big Bang occurred b/w 12 and 14 billion years ago. The Solar System is thought to be 4.5 billion years ago. Astronomers estimate the age of the Universe in two ways:

- by looking for the oldest stars
- by measuring the rate of expansion of the universe and extrapolating back to the Big Bang.

c)

Renewable Energy.

Renewable energy is energy derived from natural sources that are replenished at a higher rate than they are consumed.

1. **Solar Energy**: Solar energy is the most abundant of all energy resources and can even be harnessed in cloudy weather. The rate at which solar energy is intercepted by Earth is about 10,000 times greater than the rate at which mankind consumes energy. The rate at which solar technologies can deliver heat, cooling, natural lighting and electricity is impressive. Solar technologies convert sunlight into electrical energy.

2. **Wind energy**: It harnesses the kinetic energy of moving air by using large wind turbines located on land (on shore) or in sea or freshwater.

3. **Geo-thermal energy**: It utilizes the accessible thermal energy from the Earth's interior. Once heat extracted at the surface, fluids of various temperatures can be used to generate electricity

4. **Hydropower**: Hydropower harnesses the energy of water moving from higher to lower elevations. It can be generated from reservoirs and rivers.

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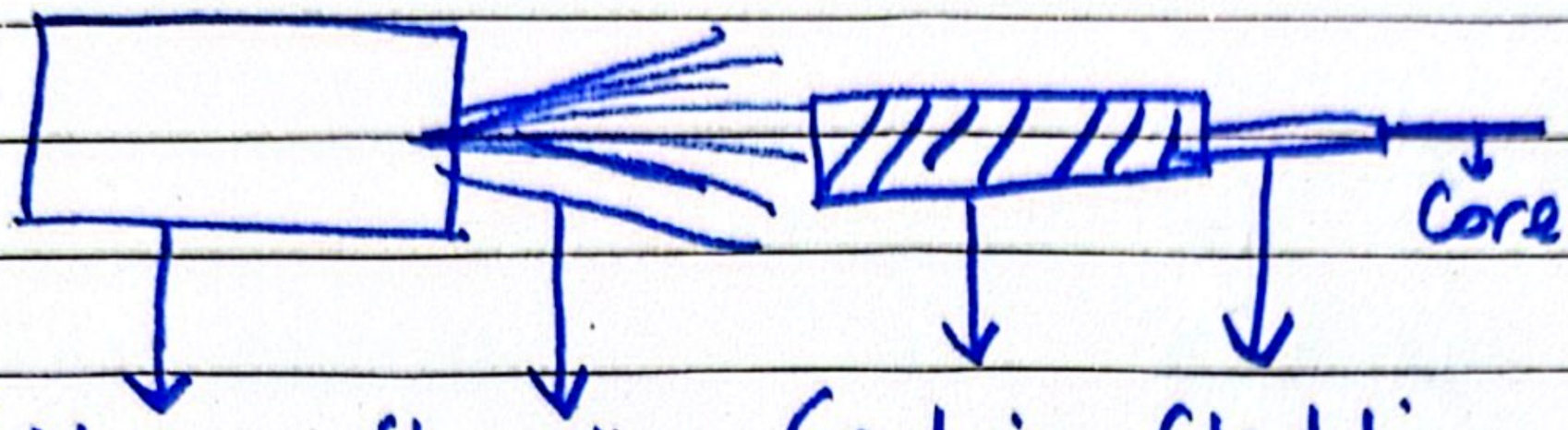
d) Optical Fibre

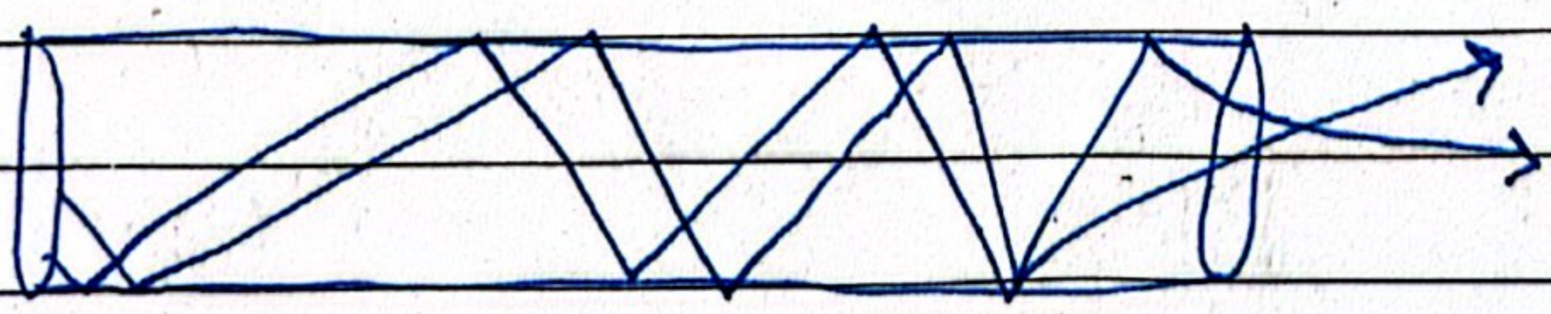
A fibre optic consists of five main components: core, cladding, coating, strengthening fibers and cable jacket



Types of Optical Fibres

- Multi-mode
- Single-Mode.

Transmission in Optical Fibre



Optic fiber helps transmit only specific parts of the electromagnetic spectrum using the phenomenon of total internal reflection

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Section II

Question 6

a) Total votes received: 15,000 + 10,000 + 8,000

= 25,000 + 8,000

= 33,000

$\frac{15,000}{33,000} \times 100\% = 45.45\%$

b) $\frac{3}{12} \times 180 = 15^{\circ}$

$\frac{4}{12} \times 180 = 60^{\circ}$

$\frac{5}{12} \times 180 = 105^{\circ}$

c) $\frac{102}{6} = \frac{\text{Total girls}}{\text{Total girls in each group.}}$

16 are total number of groups that can accommodate 102 girls. Each group should have four boys. Therefore 16 groups will have 64 boys in total.

d) Present age of A is 30 years while present age of B is 35 years.

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Question 8

a) let odd number 1 be = x
let odd number 2 be = $x+2$
let odd number 3 be = $x+4$

$$x + x + 2 + x + 4 = 273$$
$$3x + 6 = 273$$
$$x = 89$$

89, 91, 93

b) i. 4, 16, 36, 64 ..., 144

$2^2, 4^2, 6^2, 8^2, 10^2, \ldots, 12^2$

4, 16, 36, 64, 100, 144

ii. 30, 29, 27, ..., 20, 15

30, 29, 27, 24, 20, 15

iii. 1, 7, 15, 25, ..., 51

1, 7, 15, 25, 37, 51

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

0, 2, 4, 6, 12, 20, 30, 42

v. 48, 24, 72, 36, 108, ...
48, 24, 72, 36, 108, 54

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c) i. Shirt
ii. Danger
iii. Stomach.
iv. London
v. Holiday

d) Sara's age = x
Mother's age = $6x$
Brother's age = $2x$

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

$$x = 7$$

Sara's age = 7
Brother's age = 14
Mother's age = 42