Part - II
SECTION - I

Q. NO. 2
part (a)

Earth surface is divided by tectonic plates. Most of the volcanic eruptions occur at these plate boundaries. There are around 600 active volcanoes present on earth. These plate boundaries allow gas and lava to escape.
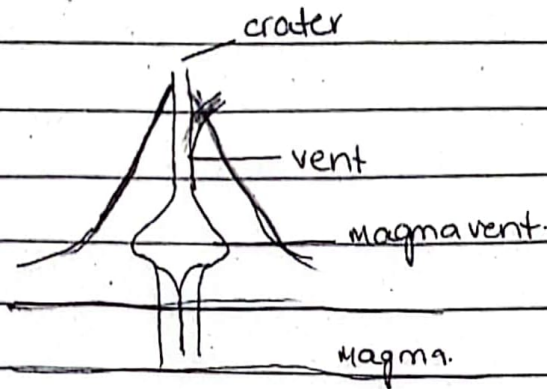
How volcanoes erupt:

At convergent plate boundary, when both oceanic plate and contental plate boundary move towards each other the denser oceanic plate sinks under the continental plate and starts melting. This melt down releases gas which disturbs magma in the magma chamber eventually forcing it out of the crater of volcano.

At divergent plate boundary two oceanic plates drift away from each other slowely giving way to the molten magma to come out of the surface.

Structure of volcano:

An active volcano consists of a magma chamber which connects to the magma inside the earth surface. Upon getting pressured it moves through the vent all the way to crater, from where it burst and travel down the volcano in the form of lava.

crater
vent
magma vent.
magma.

voleano

part (b)

Big Bang and Big crunch.

Big bang and Big crunch are theories regarding universe formation and destruction. Both theories were proposed in the 1920s.

Big Bang:

Big Bang theory was proposed by Georges Lemaitre discussing about universe formation. According to this theory universe began as a singularity, a point of infinite density and temperature. This theory says that universe started expanding some 13.8 billion years ago.

Big crunch:

This theory was suggested by Alexander Friedman in 1922 on how the universe would/might end. The It suggests that eventually would stop expanding and start contracting. The gravitational pull will pull every matter in the singularity with a big crunch and the universe would end.

How age of universe is determined :

Age of universe can be determined by the cosmic microwave background radiation, which are leftover radiations from the early days of universe formation.

part (c)

Sources of Renewable Energy

Five sources of renewable energy are following

(1) Solar power

(2) Wind power

(3) Hydropower

(4) Geothermal

(5) Biomass.

Solar power : Solar power can be harnessed through solar panels. Solar panels convert sun energy into electric energy which is much cheaper then the conventional ways of electricity generation

Wind Power: By fixing wind mill over areas with needed frequency of winds, conversion of wind ener power into energy can be done with the help of turbine

Hydropower : Hydropower refers to the capability of electricity generation using energy of falling water i.e via dams.

Geothermal : Geothermal energy of the earth can be tapped to generate heat and electricity

Biomass organic materials such as plant matter, agricultural waste and wood e.t.c can be burnt and converted into biogass to produce heat and electricity.
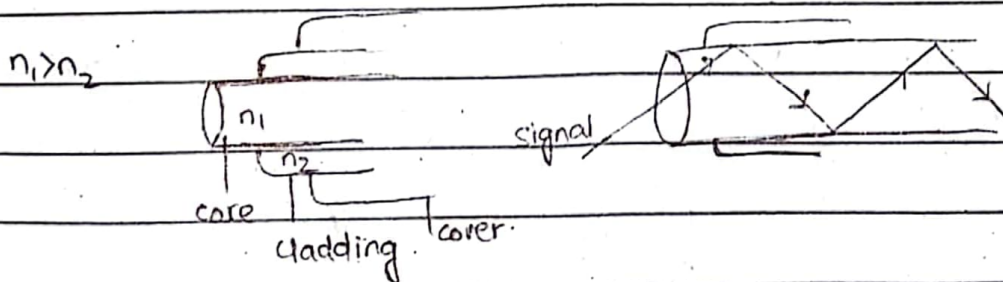
Renewable energy sources are excellent replacement of fossil fuels.

part (d)

How optical fibre works:

optical fibres are thin strands of glass which have capability to transmit signal to far away distances with minimum energy loss.

Fibre optics are consisted of three parts i.e core, cladding and outer covering. Core has greater refractive index then the cladding.

$n_1 > n_2$

When data is transmitted it is converted into electric signal and travel through the signal by repeatedly reflacting off the inner wall of the fibre. This phenomenon is called total internal reflection. this allows light to bounce back without losing energy. On the receving end the signal is converted from electrical energy, converted into data and interpreted

Q. NO. 5
part (a)

Food Preservation:

Food preservation is done using various techniques to prevent food items from getting spoiled and thus can be used for longer period of time. There are many techniques for food preservation such as

(1) canning

(2) Drying

(3) Curing.

(4) Salting   (5) Freezing   (6) Pickling.

(7) and through Jam making.

canning is a modern method of food preservation. It is done specially when food items have to be transported far away from the production place. Food item are first heated to kill all germs and then sealed in cans. In contrast to canning, drying is a traditional form of food preservation method. Food items such as fruits, vegetables and even meat are dried either using sunlight or through machines. Water removal from the food item removes the habitat for micro-organism growth.

curing is another process of food preservation in which food items are rubbed with mixture of sugar, salt and nitrate. These components help release of water from the food item. Same principle is followed in the salting process in which meat or fish are rubbed with salt to removed water content of meat.

Food items can also be preserved by freezing. After a certain temperature micro-organisms ability to grow ceases and the same principle is utilized by freezing food items.
Pickling is one of the most ancient forms of food preservation. Vinegar used in the pickling prevents microbe growth. Preservation through making fruit jams is also very popular techniques. By doing so fruits can be preserved from spoilage for a long period of time

part (b)
Milky way:
Milky way is the name of galaxy that human beings live in. It is a spiral galaxy which consists of stars, dust and gas and other celestial bodies. In the centre of these celestial components is black hole. This whole system is held together by strong gravitational pull.

Relation of dark matter to galaxies:
Dark matter is the large part of universe which neither emits nor absorbs light. that's why it appears dark. It is believed that gravitational pull of the dark matter holds the galaxies together without which every thing would be free and haphazard. So while dark is invisible it is still observable through the dynamics of galaxies.

Parts of galaxies:

Galaxy is a gravitional bound system of
(1) black hole
(2) stars
(3) Nebulae
(4) stellar remnants

Black hole is central part of a galaxy followed by billions of stars. Followed by stars are nebulae, which is cloud of dust and gas, anursery for formation of new star. At last there are stellar remnants which are collection of white dwarfs, neutron stars and stellar mass black holes.
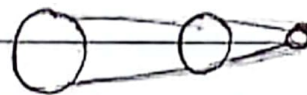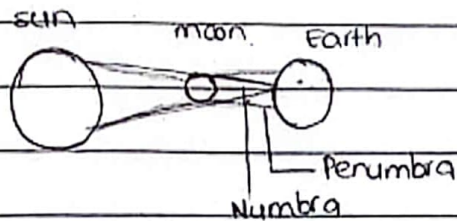
Part (c)

Solar and lunar eclipse:

For solar and lunar eclipse to happen all of three celestial trio must be aligned in a single line, which is called "syzgy"

Moon while rotating, when comes in between sun and the earth, blocks sun light to the earth. Part of earth on which moon's shadow falls appears completely dark and is called numbra while the area which receives partial light is called penumbra.

For lunar eclipse to happen, the condition needs to be fulfilled is that the earth must be aligned in a single line with it along with sun and moon and it in between. Earth because of its position

blocks the ^sun^ light from reaching the moon. on a complete lunar eclipse the moon appears dark ^red^ due to the earth atmosphere. The earth atmosphere passes the red ^wavelength^ light while scattering all other light away.

sun   moon.   Earth

— Perumbra
Numbra

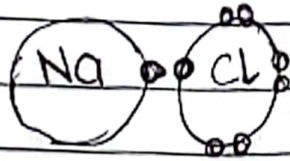So'ar Eclips.   Lunar eclipse.

Part(d)

Nuclear Fusion and Nuclear Fission:

Nuclear fusion is a process where two smaller atomic nuclei fuses together to form a larger molecule nucleus. This fusion releases a huge amount of energy while nuclear fission is a process in which nucleus of an atom splits into ^one or more^ smaller nuclei and a larger amount of energy is released.

Ionic Bond in table salt

Formula of table salt is NaCl. Sodium has one electron in its last shell while chloride has 7 electrons in its last shell. Both sodium and chlorine needs one electron to attain the state of stability. To stabilize sodium donates its outer shelled electron to chlorine

and so both attains stability

SECTION·II

Q. No. 6

part (a)

votes of contestan A = 15000

"   "   "   B = 10000

"   "   "   C = 8000

Total no. of votes = Votes of A+B+C = 15000 +10000+ 8000

$$= 33,000$$

so the percentage of winner = $\dfrac{15000 \times 100}{33000}$

$$= \dfrac{15}{33} \times 100$$

$$= 45\% \quad \text{Ans}$$

part (b)

Let Ratio of angles of a triangle = 3 : 4 : 5

Let each angle be x

so

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

$$12x = 180$$

$$x = 15$$

putting x = 15 into 3x, 4x and 5x.

$$3(15) = 45$$

$$4(15) = 60$$

$$5(15) = 75$$

Thus three angles are 45, 60, 75 Ans

part (c)

Data

Group consists of boys = 4

Group consists of girls = 6

Girls available = 102

No. of Boys required = x.

Soln

$$4 : 6 :: x : 102$$

$$\frac{4}{6} = \frac{x}{102}$$

$$\frac{4 \times 102}{6} = x$$

$$x = \frac{204}{3}$$

$$\boxed{x = 68}. \text{Ans.}$$

part (d)

Present age = A : B :: 6 : 7

After 5 years ⇒ (A+5) : (B+5) = 7 : 8.

$$\frac{A+5}{B+5} = \frac{7}{8} \quad —(i)$$

Let age be x.

putting A = 6x and B = 7x in eq (i)

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

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

so x = 5

so Age of A = 6x = 6(5) = 30 Ans

Age of B = 7x = 7(5) = 35 Ans

Q. NO. 8

part(a)

Let x be the odd number

then first odd no. be $= x$

second odd no. be $= x+2$

third odd no be $= x+4$

so

$$x + (x+1) + (x+4) = 273$$
$$3x + 6 = 273$$
$$3x = 267$$
$$x = 89.$$

so the no.s would be

$x = 89,$ Ans

$x+2 = 91$ Ans

$x+4 = 93$ Ans

so the numbers are 89, 91 and 93

part (b)

(i) 4, 16, 36, 64, 100, 144

(ii) 30, 29, 27, 24, 20, 15

(iii) 1, 7, 15, 25, 37, 51

(iv) 0, 2, 6, 12, 20, 30, 42

part (c)

(i) SHIRT

(ii) DANGER,

(iii) STOMACH

(iv) LONDON

(v) HOLIDAY

part (d)

Let Saras age = x   —eq(i)

then Sara's mother age = 6x   —eq ii

brother age = 2x   — eq(iii)

After 3 years sum of their ages will be 72

so

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

$$9 + 9x = 72$$

$$9x = 72 - 9$$

$$9x = 63$$

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

$$x = 7$$

putting x = 7 in eq (i), (ii) & (iii) we get Sara's age, Mother's age and her brothers age

Sara   x = 7   Ans

Mother   6x = 6(7)

= 42   Ans

Brother   2x = 2(7)

= 14   Ans

The End...