

Dated:

NOA Mock-8 Jan 2024

GKI - General Science and Ability

Part II

Section I

Questions attempted: 2, 4

Question 2

(a) Key features of COP-28

COP 28, held in UAE from November to December 2023, was conducted under the motto "Now or Never".

This is because the world cannot afford any further delays in getting rid of fossil fuels.

At the Copenhagen Conference, it had been decided that the world's largest emitter would increase financial contribution to overcome negative implications of climate change. However, the fund was never fully contributed, and so, at COP-27 at Sharm el-Sheikh, more than 50 countries from the developing world demanded the establishment of a Loss and Damages Fund.

The Emir of the UAE announced \$30 billion to be allocated to the fund, overall, of which \$700 million were pledged at the conference.

Key agreements were as follows:

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- All signatory states had agreed to end fossil fuel dependency by 2050, achieving net zero (emissions and removal of emissions are equal).
- Global renewable energy capacity to be tripled by 2030
- Approximately \$85 billion pledged to different climate issues.

Financial concerns of developing countries:

- Developing countries such as Pakistan and others claim that they are the worst affected by climate change, and yet suffer the most (e.g. 2022 floods). Therefore, these countries demanded that the Loss and Damages fund should aim to mitigate some of this damage
- Phasing out of fossil fuels is expensive, and many developing countries are in debt and cannot afford renewable energy.
- Developing countries would be forced to choose between allocating budget towards climate change, or social welfare, as funds are scarce.

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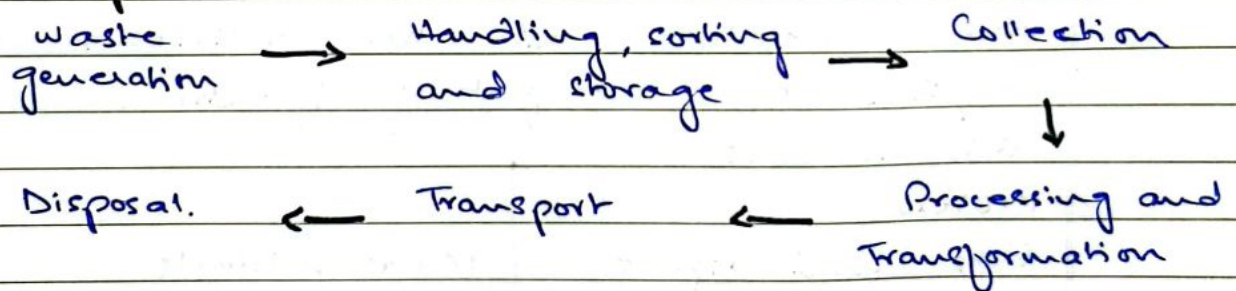
(b) Solid Waste Management (SWM)

What is solid waste?

Solid waste is any refuse or waste material, including semi-solid sludge, produced via domestic, commercial, or industrial processes like mining and agriculture.

Solid Waste Management is the management of the generation, collection, treatment, recycling, and disposal of solid waste.

SWM process:



Methods of SWM:

1) Source reduction and reuse

Refers to reducing waste at the source and making products less wasteful, through better packaging, and less toxic substances. Reusing involves products being used multiple times, e.g. shopping bags, bottles.

2) Recycling

waste is collected, processed, and transformed into raw materials, which then makes new products. One example is using food scraps to create compost.

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3) Energy recovery

The conversion of non-recyclable waste into heat or electricity via combustion or other process. This reduces emissions.

4) Treatment and disposal.

Waste is treated to reduce toxicity before disposal. For example, paper may be shredded.

Waste is then disposed in a landfill.

(c) Balanced diet

A balanced diet is when the human body receives all the nutrients it requires to adequately function.

This includes

- Protein
- Fats and lipids
- Carbohydrates
- Fibre

Macro-nutrients

Sources of protein are: eggs, milk, and meat, as well as fish.

Sources of fats: vegetables such as potatoes

Sources of carbohydrates: bread

Sources of fibre: cereal.

In order for the human body to function adequately, it requires all of the above macro-nutrients, which then include the following:

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- Vitamins A, B, C, D, E and K.
 - Iron
 - Calcium
- Micro nutrients

(d) Renewable energy under CPEC.

Renewable energy is defined as any source of energy from a source that is not depleted under use.

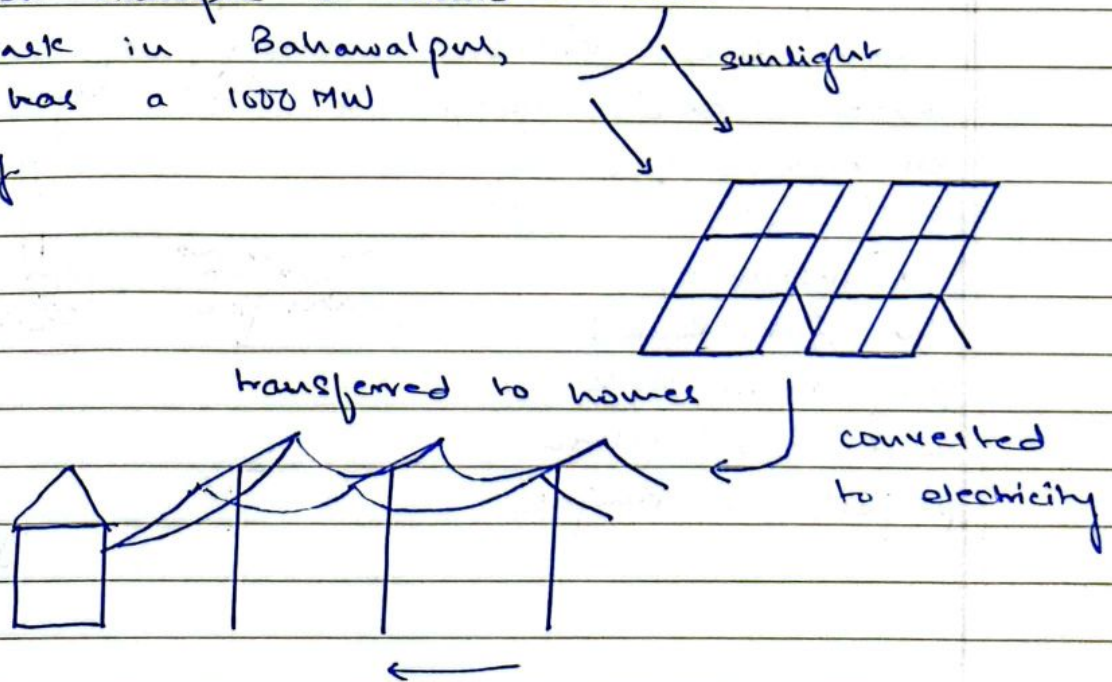
Examples of renewable energy include solar energy, wind energy, hydro energy.

1) Solar energy under CPEC

Solar energy refers to the generation of electricity by harnessing the energy of the sun via solar panels, which detect light.

One such example is Qaid-e-Azam

solar park in Bahawalpur, which has a 1000 MW capacity.



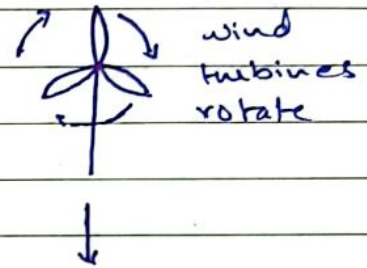
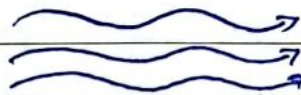
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2) Wind energy in CPEC

Wind energy refers to using the kinetic energy of the moving wind to turn turbines which then generate power.

An example is multiple wind farms built in Thatta, at Thimpir, which is in a wind corridor

Fast winds

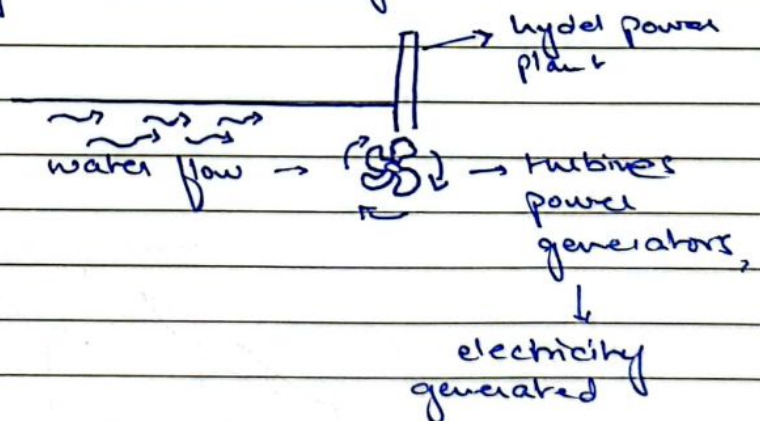


power is generated by a motor, sent to national grid.

3) Hydel energy in CPEC.

Hydel, or hydroelectric power refers to using the kinetic energy of flowing water and using it to generate electricity.

For instance, the Suki Kinari project in KPK and Azad Paltan project in Punjab



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Question 4

(a) Earthquakes

Earthquakes are ~~unstable~~ the phenomenon when the earth undergoes a sudden shaking, due to a large release of energy underground.

What causes earthquakes?

According to the theory of plate tectonics, the earth is made up of tectonic plates, that connect to one another along fault lines.

When these plates move towards each other, or away from each other, earthquakes are caused.

Tsunamis

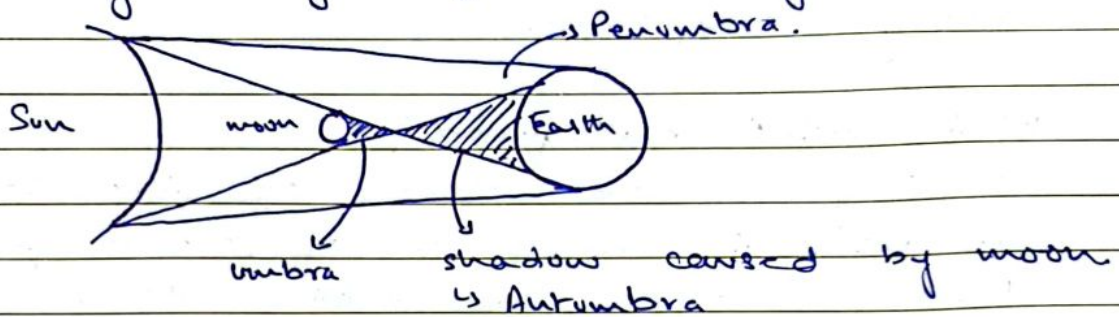
Tsunamis occur when earthquakes happen in the ocean floor. This causes energy to travel up through the water and cause a large destructive wave to ~~hit~~ travel outwards.

Dated:

(c) Solar and Lunar eclipses

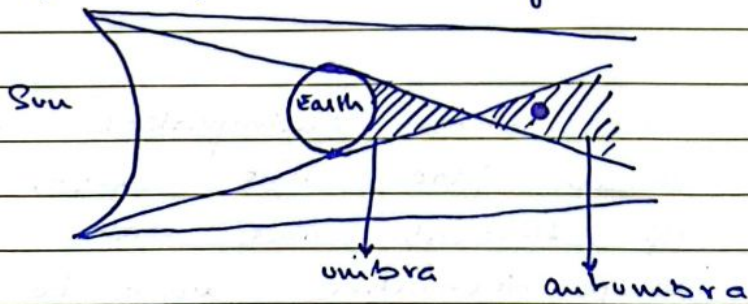
Solar eclipses

Solar eclipses occur when the moon travels between the earth and the sun, blocking sunlight from reaching the earth.



Lunar eclipses

Lunar eclipses occur when the Earth moves between the Sun and the moon, blocking sunlight from reaching the moon.



Dated:

Section II

Questions attempted: 6, 7.

Question 6

(a) Let the father's age be x
Let the son's age be y

5 years ago = $x - 5$ → thrice the age of the son

5 years ago, son's age = $y - 5$

$$\therefore x - 5 = 3(y - 5) \rightarrow \text{equation (1)}$$

If $y = 30$, $x = ?$

Substituting $y = 30$ into eq. (1):

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

$$\Rightarrow x - 5 = 90 - 15$$

$$\Rightarrow \boxed{x = 80}$$

The father is currently 80 years old.

(b) Mean = 50

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

$$90 + y = 200$$

$$\boxed{y = 110}$$

(c) i. 2, 6, 18, 54, 162 (Increase by factor of 3)
ii. 3125, 256, 9, 4, 1

(d) Let the numbers be x and y
 $xy = 320$ — (1) $x = 5y$ — (2)
 $x^2 - y^2 = ?$

Dated:

Using $(x-y)^2 = x^2 - 2xy - y^2$ — (3)

Substituting (1) and (2) into (3)

$$(5y-y)^2 = x^2 - y^2 - 2(320)$$

$$16y^2 = x^2 - y^2 - 640$$

$$x^2 - y^2 = 16y^2 + 640$$

$$x^2 - 17y^2 = 640 \text{ — (4)}$$

$$(5y)^2 - 17y^2 = 640$$

$$25y^2 - 17y^2 = 640$$

$$8y^2 = 640$$

$$y^2 = 80$$

$$\therefore x = 5y$$

$$\therefore 25y^2 = x^2$$

$$x^2 = 25(80)$$

$$x^2 = 2200$$

$$x^2 - y^2 = 2200 - 80$$

$$x^2 - y^2 = 2120$$

$$\begin{array}{r} 80 \\ \times 25 \\ \hline 400 \\ + 1600 \\ \hline 2200 \end{array}$$

Question 7

(a)

for first scooter:

96,000 = 120% of original price. (x)

for second scooter:

96,000 = 80% of original price. (y)

Original price of first =

$$120\% \rightarrow 96000$$

$$100\% \rightarrow x$$

$$x = \frac{96000 \times 100}{120}$$

$$x = 80,000$$

Original price of second:

$$80\% \rightarrow 96000$$

$$100\% \rightarrow y$$

$$y = \frac{96000 \times 100}{80}$$

$$y = 120000$$

Dated:

Total original cost = 80,000 + 120,000
= 200,000

Total revenue from sales = 96,000 + 96,000
= 192,000

8000 lost

$$\frac{8000}{200,000} \times 100 = \boxed{4\% \text{ loss in total}}$$

(b) 195 men take 10 hours for 20 days.
x men take 13 hours for 15 days.

~~Let productivity be y (no. of hours worked per man)~~
Total time taken by 195 men = 10 hours × 20 days
each = 200 hours

~~Productivity of each man = 2~~

Total hours of labour = 195 × 200
= 39,000 hours of work.

If the job takes 15 days, with 13 hours of work every day; 15 × 13 = 195 hours total each worker.

If the same job requires 39,000 hours of labour, then $\frac{39000}{195} = \boxed{200 \text{ men}}$ are needed for the job.

Dated:

$$(c) \quad A = \{a, e, i, o, u\}$$

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

$$A' = U - A \cap U$$

$$\Rightarrow A' = \{b, c, d, f, g, h, j, k, l, m, n, p, q, r, s, t, v, w, x, y, z\}$$

(d)

x — x