4'10

(duration) 15 min

Day: Saturday **GSA NOA Test** Date: 29/03/2025

Name: Ali Arshad (39115-078)

Why does Mercury experience extreme temperature variation despite being the closest planet to the Sun?

Answer:

Introduction

Analysis

(i) Lack of atmosphere

(ii) Slow motion

(iii) Surface composition

Conclusion

∴ **Introduction:-**

Mercury is fastest and densest planet in our solar system. Its temperature fluctuate from -180°C to 430°C. Mercury one day is equal to 59 Earth days.

∴ **Analysis:-**

Though Mercury

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temperature fluctuate from -180°C to 480°C. The reasons are included:

i) Lack of Atmosphere:

Mercury have not dense atmosphere to regulate temperature.

⇒ The absence of insulating layers prevent retention of heat, cause drastic temperature drop at night.

ii) Slow Rotation:-

Mercury sidereal rotation is 59 Earth days.

⇒ Meaning one hemisphere faces Sun for extend period and other remaining in darkness.

iii) Surface Composition and Albedo:-

Mercury surface is composed of rocky silicate material and with low albedo.

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Due to absence of atmosphere, heat loss into atmospace at night.

∴ **Conclusion:-**

Mercury temperature variation are due to slow motion, lack of atmosphere and surface composition.

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Question NO:02 (b)

If Mercury has no atmosphere, how does it have a thin exosphere?

Answer:-

Introduction

Analysis

i) Solar wind Sputtering

ii) Micrometeorites bambardment

iii) Thermal disposition

conclusion

Introduction:-

Mercury is a innermost densest terrestrial planet and closest to the sun. The mercury has no dense atmosphere but have exosphere formed by oxygen, Sodium, Hydrogen, Helium and potassium

Analysis:-

i) Solar wind sputtering:-

Solar wind particls collide with mercury surface, eject atoms on it's surface

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ii) Micrometeorites Bombardment:-

Tiny meteorites impact surface, knocking loose atoms to contribute in exosphere

iii) Thermal Dispostion:-

Tentente heating create volatile substance on surface rocks to evaporate, forming an exosphere.

Conclusion:-

Mercury has not a true atmosphere while exosphere formed by solar winds. sputtering, meteorites, and thermal dispotion.

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Question NO:- 02 (c)

How does mercury compare with Moon in terms of surface feature and geological activity?

Answer:

Introduction

Analysis

conclusion

:) Introduction:-

Mercury is a densest terrestrial planet with lack of atmosphere, big craters and lack of active tectonic plates. It resembles the moon.

Analysis:-

Mercury resembles the moon as key factors are given below.

i) Both have lack of atmosphere

ii) Both have lack of active tectonics Plates

iii) Both have big craters.

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iv) Both have smooth planes.

Differences:-

Moon has no past activity of tactonics, while Mercury have past tactonics activity.

⇒ Mercury have big cliffs, becomes when it shrunk and Moon does not have these.

⇒ Mercury is heavier and massive while Moon is lightly massive and heavier.

⇒ Mercury has ability to hotter and colder more as extreme while Moon have not ~~too~~ cold and extreme hot day.

Conclusion:-

Mercury is resemble the Moon due to some similarities between them. Such as, big craters, lack of atmosphere and have smooth planes.

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Question NO:- 02 (d)
what is Synodic Period of Mercury and how does it effect its visibility from Earth?

Answer:

Introduction
Defination
Analysis
Conclusion

Introduction:-

Mercury is innermost and closet terrestrial planet of our solar system. Mercury one solar day is equal to 116 Earth days.

Definition:-

Solar day of a planet is a period it takes time to reappear at some position from Earth and Sun perspective.

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Visibility effects from Earth:-

Mercury is an inferior planet meaning closest to sun.

⇒ It is visible from greatest elongation, meaning far away from Sun.

⇒ Due to its short synodic Period. it appear and disappear quickly so, hard to see from earth.

Conclusion:-

Mercury Synodic Period is 116 earth days, so due to shot synodic period visibility affect from earth.

one day

Day: Date:

Question NO:-02(c)

Why Explain term Mercurian day and how one day on Mercury is longer than its year:

Answer:-

Introduction
Defination
Analysis
Conclusion

Introduction:-

Mercury innermost and closest of terrestrial planet to the sun. Mercury diameter is 4900 KM and one day of Mercury is equal to 243 Earth days.

Defination:

Mercurian:- It is a period of a planet where a planet complete its one full cycle day and night. It is equal to

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176 earth days.

why one day of mercury is longer than year?

i) It is due to 3:2 spin-orbit resonance.

3:2 spin-orbit resonance:-

Mercury rotate three times for '2' orbits around the Sun due to strong gravitational effects.

⇒ due to planet slow rotation and fast movement of orbit around sun, cause of one day

⇒ Orbital Speed vs Rotational Speed:

Mercury complete its orbit around the sun in just 88 Earth days.

⇒ Because of it's slow rotation, a single day and night cycle take 176 Earth days.

Conclusion:-

Mercury is unique in it's rotation and spining that's why one day of mercury day and night longer than year.