



G.S. PRE TEST FOR CLASSROOM: ANSWERS & EXPLANATION

GEOGRAPHY TEST – 1 – 3147

Q 1.B

- Earth's outer core is a liquid layer about 2,266 km thick composed of iron and nickel that lies above Earth's solid inner core and below its mantle. Its outer boundary lies 2,890 km beneath Earth's surface.

Q 2.B

- When the earth rotates on its axis the portion which comes into the rays of the Sun experiences daylight and the other portion experiences darkness or Night.

Q 3.A

- Mercury, Venus Earth and Mars are called the Inner planets or Terrestrial planets.
- Jupiter, Saturn, Uranus and Neptune are called outer planets or Jovian planets.
- Inner planets are small in size and have high density, whereas outer planets are larger in size and have a low density.
- Inner planets are relatively hotter than the outer planets.
- The planets closer to the sun than the earth i.e. Mercury and Venus are called the inferior planets.
- The planets located at a distance greater than the distance of the earth from the sun are called the superior planets. Mars, Jupiter, Saturn, Uranus and Neptune are the superior planets.

Q 4.A

Earth's major discontinuities:

1. Conrad - Outer and Inner Crust
2. Mohorovicic - Crust and mantle
3. Wicht - Gutenberg - Mantle and core
4. Lehmann - Outer and Inner Core
5. Repitite - Outer and Inner Mantle

Q 5.C

- Mercury and Venus have no moons. Earth has 1 moon, named Luna in scientific terminology. Mars has 2 moons Deimos and Phobos. Jupiter has 67 confirmed moons. Io, Europa, Ganymede and Callisto are the four largest moons of Jupiter. Ganymede is the largest moon in the Solar System. Saturn has 3 named moons, including Titan, the second largest moon in the solar system. Other important moons of Saturn include Rhea and Enceladus. Uranus has 27 moons. Its 5 major moons - Miranda, Titania, Oberon, Ariel and Umbriel, are named after characters in Shakespeare's works. Neptune has 14 moons, Triton being the major one. Pluto has 5 moons, Charon being the largest.

Q 6.C

- After metamorphism, Sandstone is converted into Quartzite and not Schist. Hence Statement 1 is incorrect. Limestone is converted into marble; Granite is converted into Gneiss and Shale into Slate after the process of metamorphism.

Q 7.A

- Statement 1 is Correct. The oceanic crust is much younger than the continental crust. The age of rocks in the oceanic crust is nowhere more than 200 million years old. Some of the continental rock formations are as old as 3,200 million years.
- Statement 2 is Correct. The thickness of both the crusts varies. For the oceanic crust, the thickness is around 5 to 10 km. The continental crust is much thicker when compared to the oceanic crust. It has a thickness about 35 km., on the plains, to as much as 70 km., on the highest mountains. Thus, the oceanic crust is thinner than the continental crust.
- Statement 3 is Incorrect. The density of the continental crust is much less as compared to the oceanic crust. It has an approximate value of 2.6 g/cm³, while the density of the oceanic crust is about 3.0 g/cm³.

Q 8.C

The Major Elements of the Earth's crust:

<i>Elements</i>	<i>By Weight (%)</i>
1. Oxygen	46.60
2. Silicon	27.72
3. Aluminium	8.13
4. Iron	5.00
5. Calcium	3.63

Q 9.A

- Planetesimals are a large number of smaller bodies formed from dust, rock, and other materials existed at an early stage of the Planet formation. In the final stage, these large number of small planetesimals accrete to form a fewer large bodies in the form of planets.

Q 10.B

- A light year is a measure of distance and not of time. Light travels at a speed of 300,000 km/second. Considering this, the distances the light will travel in one year is taken to be one light year. This equals to 9.4611012 km. The mean distance between the sun and the earth is 149,598,000 km. In terms of light years, it is 8.311 minutes.

Q 11.B

- Statement 1 is incorrect as rotational speed of earth depends on radius. Earth's rotational speed increases as we move towards equator as earth has maximum radius at equator.
- Statement 2 is correct because of earth's rotation a centrifugal force is created that has led to creation of bulge at the middle of earth and flattened the poles at top.

Q 12.A

- Statement 1 is correct. A cluster of fragmented solid rocks of varying sizes are found between the orbits of planets Mars and Jupiter. They are called asteroids.
- Statement 2 is incorrect. The rock pieces which enter the earth's atmosphere at high speed and get burnt due to friction are called as Meteoroids. Meteorites are the rock pieces which doesn't incinerate wholly and land on earth. Thus statement 3 is incorrect.

Q 13.D

- Statement 1 is incorrect. The angle of Pole star decreases towards the Equator. At the Equator, the angle is 0 degree and it is 90 degree at the Poles.
- Statement 2 is incorrect. It is the gradual change in angle of the Pole star from pole to equator proves spherical shape. No such conclusion can be drawn from its fixed position throughout the night.

Q 14.C

- Statement 1 is incorrect. A traveller crossing the date line from east to west loses a day. A traveller crossing the date line from west to east gains a day.
- Statement 2 is correct. When one crosses IDL, there is only change of date not time, as there is no change in time zone.
- Statement 3 is correct. IDL in the mid-Pacific deviates from normal 180 degree meridian at the Bering Strait, Fiji, Tonga and other islands to prevent confusion of day and date in some of the island groups that are cut through by the meridian. Otherwise the same island will have two different dates.

Q 15.C

- Venus is often considered as 'Earth's twin' because of its close proximity in size, mass (weight) and density. No other planet is as similar to the Earth as Venus.

Q 16.D

The various sources of information about the Earth's interior can be classified into direct and indirect sources.

Direct sources include:

- Study of surface rock or the rocks - from mining areas
- Deep Ocean Drilling Projects
- Volcanic eruption

Indirect sources include:

- Analysis of properties of matter indirectly provides information about the interior.
- Meteors
- Gravitation
- Magnetic field, and
- Seismic activity etc.

Q 17.B

- All sedimentary rocks are lithified into some collective mass. **Lithification is any process that turns raw rock sediment into consolidated sedimentary rock.** The process of lithification usually produces identifiable layering in these type of rocks. Lithification can occur by way of:
 - Drying and compaction.
 - Oxidation of iron and aluminum.
 - Precipitation of calcium and silica.
- Lithification is complex process whereby freshly deposited loose grains of sediment are converted into rock. Lithification may occur at the time a sediment is deposited or later. Cementation is one of the main processes involved, particularly for sandstones and conglomerates. In addition, reactions take place within a sediment between various minerals and between minerals and the fluids trapped in the pores; these reactions, collectively termed authigenesis, may form new minerals or add to others already present in the sediment.
- The difference between lithification and metamorphism is that lithification is (geology) the compaction and cementation of sediment into rock while metamorphism is (geology) the process by which rocks are changed into other forms by the application of heat and/or pressure.

Q 18.C

- A lunar eclipse is a spectacular celestial show, during which the bright, pearly-white disc of the full Moon turns dark, and sometimes takes on the colour of dark copper, or even dried blood. A lunar eclipse occurs when the Sun, the Earth and the Moon are so aligned that for a period of time, the full Moon passes through the shadow of Earth in space (called Earth's Umbra).
- During a total lunar eclipse, though the Moon gets shadowed by the Earth, sunlight passing through the Earth's atmosphere, break down in its constituent colours and the red part gets scattered by the atmosphere and falls on the Moon's surface, thereby making it take on a reddish copper hue. For this reason since antiquity, a totally eclipsed Moon is called a "**Blood Moon**". It has no other special relevance other than the fact that the colour of the Moon looks blackish-red.

- When full Moon occurs twice in a calendar month it is termed a “**Blue Moon**”. The Moon does not turn blue but historically the second full Moon of an English calendar month is termed as a Blue Moon. Hence the oft-quoted phrase of a rare occurrence of any event as “once in a Blue Moon”.
- When the Moon is near its perigee it looks larger than an average full Moon, and is termed a **Super Moon**.

Q 19.D

- The earth’s surface is being continuously subjected to external forces induced basically by energy (sunlight). That means, the earth’s surface is being continuously subjected to by external forces originating within the earth’s atmosphere and by internal forces from within the earth. **The external forces are known as exogenic forces and the internal forces are known as endogenic forces.**
- **The exogenic processes derive their energy from atmosphere determined by the ultimate energy from the sun and also the gradients created by tectonic factors. While, the energy emanating from within the earth is the main force behind endogenic geomorphic processes.** This energy is mostly generated by radioactivity, rotational and tidal friction and primordial heat from the origin of the earth. This energy due to geothermal gradients and heat flow from within induces diastrophism and volcanism in the lithosphere. **Hence, 1st statement is not correct.**
- **The actions of exogenic forces result in wearing down (degradation) of relief/elevations and filling up (aggradation) of basins/ depressions, on the earth’s surface.** The phenomenon of wearing down of relief variations of the surface of the earth through erosion is known as gradation. **The endogenic forces continuously elevate or build up parts of the earth’s surface** and hence the exogenic processes fail to even out the relief variations of the surface of the earth. **Hence, statement 2 is not correct.**

Q 20.D

- All observations from telescopes reveal that the planetary bodies, the Sun, Moon, satellites and stars have circular outlines from whichever angle they are seen. They are strictly spheres. Earth, by analogy, cannot be the only exception. **Hence, statement 1 is correct.**
- The distant horizon viewed from the deck of a ship at sea, or from a cliff on land always and everywhere is circular in shape. This circular horizon widens with increasing altitude and could only be seen on a spherical body.
- The sun sets and rises at different times at different places. As the earth rotates from west to east, places in east see the sun earlier than those in the west. If the earth were flat, the whole world would have sunrise and sunset at the same time. **Hence, statement 2 is correct.**
- During the lunar eclipse, the shadow cast by the earth on the moon is always circular. It takes the outline of an arc of a circle. Only an sphere can cast such a circular shadow. **Hence, statement 3 is correct.**

Q 21.B

- **Statement 1 is not correct:** Solar eclipse occurs when Moon is between Earth and Sun, while lunar eclipse occurs when Earth is between Moon and Sun.
- **Statement 2 is correct:** Solar eclipse happens once every 18 months, while at least two partial lunar eclipses happen every year. Solar eclipses last only for few minutes while lunar eclipses can last for few hours. At least two partial lunar eclipses happen every year, but total lunar eclipses are rare.
- **About Lunar Eclipse:** A lunar eclipse can be seen from Earth at night. There are two types of lunar eclipses: total lunar eclipses and partial lunar eclipses.
 - A total lunar eclipse occurs when the moon and the sun are on exact opposite sides of Earth. Although the moon is in Earth’s shadow, some sunlight reaches the moon. The sunlight passes through Earth’s atmosphere, which causes Earth’s atmosphere to filter out most of the blue light. This makes the moon appear red to people on Earth.
 - A partial lunar eclipse happens when only a part of the moon enters Earth’s shadow. In a partial eclipse, Earth’s shadow appears very dark on the side of the moon facing Earth. What people see from Earth during a partial lunar eclipse depends on how the sun, Earth and moon are lined up.
- **About Solar Eclipse:** There are three types of solar eclipses.
 - The first is a total solar eclipse. A total solar eclipse is only visible from a small area on Earth. The people who see the total eclipse are in the center of the moon’s shadow when it hits Earth. The sky

becomes very dark, as if it were night. For a total eclipse to take place, the sun, moon and Earth must be in a direct line.

- The second type of solar eclipse is a partial solar eclipse. This happens when the sun, moon and Earth are not exactly lined up. The sun appears to have a dark shadow on only a small part of its surface.
- The third type is an annular solar eclipse. An annular eclipse happens when the moon is farthest from Earth. Because the moon is farther away from Earth, it seems smaller. It does not block the entire view of the sun. The moon in front of the sun looks like a dark disk on top of a larger sun-colored disk. This creates what looks like a ring around the moon. During a solar eclipse, the moon casts two shadows on Earth. The first shadow is called the umbra. This shadow gets smaller as it reaches Earth. It is the dark center of the moon's shadow. The second shadow is called the penumbra. The penumbra gets larger as it reaches Earth. People standing in the penumbra will see a partial eclipse. People standing in the umbra will see a total eclipse. Solar eclipses happen once every 18 months. Unlike lunar eclipses, solar eclipses only last for a few minutes.

Q 22.D

- The Earth revolves around the Sun on an elliptical path at speed of 18.5 miles per second or 66,600 miles per hour. One complete revolution takes 365.25 days.
- The axis of the earth is inclined to the plane of the ecliptic (plane on which the earth orbits the sun) at an angle of 66.5 degree. Due to this inclination, as the earth revolves around the sun, the sun's overhead/midday position keeps oscillating between the Tropic of Cancer and Tropic of Capricorn. This leads to variation in length of day and night. Like on Equinoxes, all parts of earth will have equal days and nights, while in summer solstice, the northern hemisphere will have its longest day and shortest night. **Hence, statement 1 and 2 are correct.**
- Earth revolves around the sun in elliptical path, due to this the relative distance between sun and earth keeps on changing. This, along with other factors like cloudiness, variation in solar flare intensity etc, impacts the solar insolation (amount of solar radiation incident on the earth's surface). Like at Perihelion (when the Earth is closest to Sun) the solar insolation is higher compared to Aphelion (when Earth is farthest from Sun). **Hence, statement 3 is correct.**

Q 23.C

- **Statement 1 is correct:** On the day of equinoxes, the Sun is vertically overhead at the equator. It generally takes place on 21 March and 21 September, though dates may change because a year is not exactly 365 days. On such days, all parts of the world have equal days and nights.
- When Summer Solstice occurs in the Northern Hemisphere (June 20 or 21, when Sun is overhead at Tropic of Cancer), the Southern Hemisphere experiences Winter Solstice and when Summer Solstice occurs in the Southern hemisphere (December 21 or 22, when Sun is overhead at Tropic of Capricorn), the Northern hemisphere experiences Winter Solstice.
- **Statement 2 is correct:** During the day of Summer Solstice in a particular hemisphere, the hemisphere has longest day and shortest night while the other hemisphere, experiencing Winter Solstice, has shortest day and longest night. Hence, when Winter Solstice occurs in the Southern hemisphere, the Northern hemisphere will have Summer Solstice, that is, longest day and shortest night.

Q 24.C

- The brief period between sunrise and full daylight is called Dawn and that between sunset and complete darkness is called Twilight.
- It takes place when the earth receives diffused or refracted light from the sun whilst it is still below the horizon. **Hence, statement 1 is correct.**
- The time duration is directly related to the obliquity of the sun's rays. Like, at poles where the sun's rays have a highly oblique path, the time duration of dawn and twilight is largest. While at the equator, where the sun's rays are almost vertical, the time duration is small. This is due to the fact that with increase in obliquity, the period of refracted light increases. **Hence, statement 2 is correct.**

Q 25.C

- International Date Line, also called Date Line, an imaginary line extending between the North Pole and the South Pole and arbitrarily demarcating each calendar day from the next. It corresponds along most of

its length to the 180th meridian of longitude but deviates eastward through the Bering Strait to avoid dividing Siberia and then deviates westward to include the Aleutian Islands with Alaska. South of the Equator, another eastward deviation allows certain island groups to have the same day as New Zealand. It is not a straight line, but a zig-zag line.

- On crossing it from east to west, a day is lost. Like if a traveller starts from Kyoto (Japan) towards California (America) on 1st January 2019, on crossing International Date Line the date will be 31st December 2018. Similarly, on crossing it from west to east, a day is gained.

Q 26.A

- Countries having large longitudinal spread can adopt several time zones. Like Russia which extends through almost 165° of longitude is divided into eleven time zones. Similarly, USA and Canada are divided into five time zones. **Hence, option a is correct.**
- Countries with large latitudinal spread but limited longitudinal spread may adopt single time zone. Like India, which spreads across almost 30° latitude has adopted a single time zone. It has adopted 82.50 east for the standard time which is 5 hours and 30 minutes ahead of Greenwich Mean Time. **Hence, option b is not correct.**
- A country with very small latitudinal or longitudinal expanse may have large altitudinal variations. **Hence, option c is not correct.**
- Location of a country with respect to equator does not have any correlation with adoption of multiple time zones. One country in the Arctic zone may adopt single time zone if its longitudinal spread is small. **Hence, option d is not correct.**

Q 27.B

- **Statement 1 is not correct:** Longitudes is an angular distance, measured in degrees along the equator east or west of the Prime Meridian. This means one half of the world is measured in degrees of east longitude up to 180° , and the other half in degrees of west longitude up to 180° . Each line of longitude equals half of the circumference of the Earth because each extends from the North Pole to the South Pole and passes through the equator. Hence, all longitudes are of equal length irrespective of the location of the observer, whether one is at pole or equator.
- **Statement 2 is correct:** As the longitudes converge towards the poles, the distance between two corresponding longitudes decreases poleward. It is highest at the equator.
- **Statement 3 is not correct:** Altitude of place is its height of a place over sea level. It has no correlation with latitude or longitude of a place. Like Ural mountains in Russia have higher altitudes compared to Northern Indian plains and Mount Everest has altitude even higher than Ural mountains.

Q 28.C

The earth was initially a barren, rocky, and hot object with a thin atmosphere of hydrogen and helium. The earth evolved as a layered structure due to density differentiation, that is, heavier materials sank towards the centre and lighter ones moved towards surface, forming layers like Crust, Mantle, Outer Core and Inner Core.

The atmosphere also evolved from a thin atmosphere of hydrogen and helium to the present form with abundance of nitrogen and oxygen. It occurred in three phases(in sequence):

- **Loss of primordial atmosphere:** The early atmosphere, with Hydrogen and Helium, is supposed to have been stripped of as a result of solar winds.
- **Degassing:** During the cooling of the Earth, the gases were outpoured from the interior of the earth such as Carbon Dioxide, Methane, Ammonia etc.
- Modification by **Photosynthesis which added Oxygen to the atmosphere.**

Q 29.B

- Big Bang Theory or the expanding earth theory given by Edwin Hubble. According to it, in the beginning, all matters forming the universe existed in one place in form of a "tiny ball" with an unimaginable small volume, infinite temperature and infinite density. At the Big Bang, that took place 13.7 billion years before the present, the "tiny ball" exploded and thereafter the universe continues to expand. This is the most widely accepted theory. **Hence, option 1 is correct.**

- The Steady-state theory was first put forward in 1948 by British scientists Sir Hermann Bondi, Thomas Gold, and Sir Fred Hoyle as an alternative to the big-bang hypothesis. According to it, the universe is always expanding but maintaining a constant average density, with matter being continuously created to form new stars and galaxies at the same rate that old ones become unobservable as a consequence of their increasing distance and velocity of recession. A steady-state universe has no beginning or end in time, and from any point within it the view on the grand scale—i.e., the average density and arrangement of galaxies—is the same. Galaxies of all possible ages are intermingled. **Hence, option 2 is correct.**
- The Big Splat Theory: It is related to the formation of Moon as a satellite to earth. According to it, a body of the size one to three times that of Mars collided into the Earth sometimes shortly after earth was formed. It blasted a large part of the earth into space. This continued to orbit around the earth and eventually formed the present moon around 4.44 billion years ago. **Hence, option 3 is not correct.**

Q 30.A

- The Terrestrial and Jovian planets are separated by an Asteroid belt. But the Asteroid belt has no such property as to provide a shield to the Jovian planets against Solar winds. **Hence, option 2 is not correct.**
- **Large distance from the Sun** plays a big role as due to distance, the intensity of Solar winds is not so strong and the Since these planets are relatively far from the sun, the temperature here is lower. Because of this, there were more planetesimals which resulted in larger planets. However, the greater percent of the planetesimals in the outer solar system would be composed of ices (hydrogen and helium). These ices didn't form in the inner solar system because it is too hot there. Since different elements have different condensation temperatures, ices could not form until the particles were in a much cooler part of the disk, and therefore much further from the Sun. The temperature of the gas affects the condensation of the elements in the gas. If the gas were cooler when condensation began, particles now common in the outer solar system would also be common in the inner solar system. That is why Jovian planets are able to hold large quantities of gas. **Hence, option 1 is correct.**
- Unlike the terrestrial planets, the Jovian planets are large and their higher gravity allows them to hold the escaping gases.

Q 31.A

- **Statement 1 is correct:** All planets orbit around the sun in a counter-clockwise direction.
- **Statement 2 is correct:** Earth has the highest density with density of 5.517 gm/cm^3 . Second highest is Mercury with density of 5.44 gm/cm^3 .
- **Statement 3 is not correct:** All planets, except Mercury and Venus, have atleast one natural satellite. Like Earth has one, Mars has two, Jupiter has 16 and so on.

Other Information about Solar system:

- Jupiter is the largest planet by size.
- All planets have density above density of water (1 gm/cm^3), except Saturn (0.7 gm/cm^3). So if Saturn is placed in a very large pool of water, it will float, while all other planets will sink.

Q 32.D

Crust is the outer thin layer with a total thickness normally between 30-50 km. **Hence, statement 1 is not correct.** The continents are composed of lighter silicates; silica and aluminium also called 'sial' and they are made up of Granitic rocks while the oceans have the heavier silicates; silica and magnesium also called 'sima' and are made up of basaltic rocks. **Thus both statements 2 and 3 are also not correct.**

Q 33.D

- **When magma in its upward movement cools and turns into solid form it is called igneous rock.** The process of cooling and solidification can happen in the earth's crust or on the surface of the earth. **Hence, statement 1 is correct.**
- **As igneous rocks form out of magma and lava from the interior of the earth, they are known as primary rocks.** The igneous rocks (Ignis –in Latin means 'Fire') are formed when magma cools and solidifies. **Hence, statement 2 is correct.**

- They do not contain any fossils because when the ancient igneous rocks were formed due to cooling and solidification of molten rock materials at the time of the origin of the earth, there was no life on newly born earth and since the igneous rocks are formed due to cooling and solidification of very hot and molten materials and hence any remains of plants or animals (fossils) are destroyed because of very high temperature.
- **Granite, Pegmatite, Gabbro, tuff and Basalt** are some examples of it. **Hence statement 3 is correct.**

Q 34.B

- **Statement 1 is not correct:** Some planets, such as Mercury, Venus, and Jupiter, have axes that are almost completely perpendicular, or straight up-and-down. Earth's axis is not perpendicular. It has an axial tilt, or obliquity. Uranus has the largest axial tilt in the solar system. Its axis is tilted about 98 degrees, so its north pole is nearly on its equator.
- **Statement 2 is correct:** As the axial tilt increases, the seasonal contrast increases so that winters are colder and summers are warmer in both hemispheres. Today, the Earth's axis is tilted around 23.5 degrees from the plane of its orbit around the sun. But this tilt changes. During a cycle that averages about 40,000 years, the tilt of the axis varies between 22.1 and 24.5 degrees. Because this tilt changes, the seasons as we know them can become exaggerated. More tilt means more severe seasons—warmer summers and colder winters; less tilt means less severe seasons—cooler summers and milder winters. It's the cool summers that are thought to allow snow and ice to last from year-to-year in high latitudes, eventually building up into massive ice sheets. There are positive feedbacks in the climate system as well, because an Earth covered with more snow reflects more of the sun's energy into space, causing additional cooling.

Q 35.B

- **Statement 1 is correct:** Daylight Saving Time, also called summer time, is a system for uniformly advancing clocks, so as to extend daylight hours during conventional waking time in the summer months.
- **Statement 2 is correct:** The reason for daylight saving time has long been to save energy. The time change was first instituted in the United States during World War I. Even during the Arab oil embargo, when Arab members of the Organization of Petroleum Exporting Countries (OPEC) stopped selling petroleum to the United States, it even enacted a trial period of year-round daylight saving time in an attempt to save energy. But the evidence for energy savings is slim.
- **Statement 3 is not correct:** Regions farthest away from the equator and closer to the poles get the most benefit from the DST clock change, because there is a more dramatic change in sunlight throughout the seasons. DST is generally not observed near the equator, where sunrise times do not vary enough to justify it.

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