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**GS Foundation Program 2024 | D6 | Benchmark Assignment #155**

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**Subjective Questions:**

**Q.1)** What do you understand by the term Renaissance? Why did the Renaissance begin in Italy first? (15 marks, 250 words)

**Objective Questions:**

**Q.1)** Consider the following statements:

1. Only about 10 per cent of the energy is transferred to each trophic level from the lower trophic level.
2. Pyramid of energy is always upright.

Which of the statements given above is/are correct?

- a) 1 only
- b) 2 only
- c) Both 1 and 2
- d) Neither 1 nor 2

**Q.2)** Consider the following statements:

1. Bioaccumulation is the process by which a pollutant from the environment enters a food chain.
2. In Biomagnification, there is an increase in concentration of pollutants from one link in a food chain to another.
3. In order for biomagnification to occur, the pollutant must be biologically inactive.

Which of the statements given above is/are correct?

- a) 1 only
- b) 1 and 2 only
- c) 2 and 3 only
- d) 1, 2 and 3

**Q.3)** With reference to the Phosphorus Cycle, consider the following statements:

1. Phosphorus is released in the ecosystem by weathering of rocks, erosion and respiration of organisms.
2. Phosphorus occurs most abundantly in nature in the form of phosphate ion.
3. The Phosphorus cycle are unidirectional moving from soil to plants and to animals.

Which of the statement(s) given above is/are correct?

- a) 1 only
- b) 2 only
- c) 1 and 2 only
- d) 1 and 3 only

**Q.4)** Consider the following statements:

1. Maximum concentration of global carbon is found in the atmosphere followed by the oceans.
2. Carbon component of the atmosphere decreases during photosynthesis.

Which of the statement(s) given above is/are correct?

- a) 1 only
- b) 2 only
- c) Both 1 and 2
- d) Neither 1 nor 2

**Q.5)** With reference to the Nitrogen Cycle, consider the following statements:

1. Nitrogen fixation is the process of conversion of elemental nitrogen to ammonia, nitrites or nitrates.
2. Atmospheric phenomenon such as thunder and lightning contribute to nitrogen fixation.
3. Microorganisms like Azotobacter are capable of fixing atmospheric nitrogen into ammonium ions.

Which of the statement(s) given above is/are correct?

- a) 1 only
- b) 1 and 2 only
- c) 1 and 3 only
- d) 1, 2 and 3

## GS Foundation Program 2024 | D6 | Benchmark Assignment #155

### Subjective Questions:

**Q.1) What do you understand by the term Renaissance? Why did the Renaissance begin in Italy first?**

#### Approach:

1. First define the term, renaissance.
2. Briefly mention the timeline, key ideas and importance.
3. In second part of the answer, write the reasons why it started in Italy first.
4. Then conclude by specifying how it spread to other areas.

The term Renaissance means '**rebirth**'. The period of Renaissance began from 14th Century and lasted till 17th century. Renaissance period is regarded as the cultural bridge between the Middle Ages and modern history. It started as a cultural movement in Italy in the Late Medieval period and later spread to the rest of Europe, marking the beginning of the Early Modern Age. Key ideas of renaissance include development of humanism, art, architecture, music and self-awareness.

The Renaissance marked a transition from the medieval period to the early modern era and witnessed a significant cultural and intellectual revival.

#### The Renaissance began in Italy primarily due to the following reasons:

1. **Geographic and Historical Factors:** Italy's strategic location at the crossroads of Europe and the Mediterranean made it a hub of trade and commerce during the medieval period. The wealth accumulated from trade, particularly with the Byzantine Empire and the Islamic world, created a prosperous urban class known as the patricians. This economic prosperity provided the necessary financial support for the patronage of arts and sciences.
2. **Legacy of Ancient Rome and Greece:** Italy was the center of the Roman Empire, and the remnants of ancient Roman civilization were still visible in its cities, architecture, and literature. The study of classical works, such as those of Plato, Aristotle, and Cicero, was highly valued during the Renaissance. Italian scholars had greater access to these ancient texts and were able to translate and study them, fostering a revival of classical knowledge and ideas.
3. **City-States and Independent Republics:** Italy was divided into numerous independent city-states and republics, including Florence, Venice, Rome, and Milan. These city-states fostered a competitive environment, where wealthy merchants and political leaders sought to enhance their prestige and assert their power through the patronage of artists, writers, and intellectuals. The flourishing of arts and culture was closely linked to the rivalries between these city-states.

4. **Revival of Greco-Roman Art and Architecture:** The Renaissance witnessed a renewed interest in Greco-Roman art and architecture, characterized by a departure from the Gothic style prevalent in medieval Europe. Italian artists and architects sought inspiration from ancient ruins and classical principles, resulting in the development of influential styles like the Renaissance architecture and the revival of techniques such as perspective in painting.
5. **Humanism and Intellectual Centers:** Humanism, a cultural and intellectual movement that emphasized the importance of human potential, education, and the study of classical literature, thrived in Italy during the Renaissance. Prominent intellectual centers, such as Florence and Rome, attracted scholars, writers, and artists, who engaged in intellectual discourse, exchanged ideas, and produced significant works of art and literature.
6. **Patronage of the Church and Wealthy Elite:** The Catholic Church, headquartered in Rome, played a significant role in the patronage of arts and culture during the Renaissance. Popes, cardinals, and other church officials commissioned and supported the work of artists and intellectuals, contributing to the flourishing of artistic and intellectual endeavors. Wealthy families like the Medici in Florence also served as patrons, supporting artists and scholars.

The Renaissance began in Italy due to a combination of factors, including Italy's economic prosperity, its connection to the ancient Roman and Greek civilizations, the presence of independent city-states, the revival of classical art and architecture, the influence of humanist ideas, and the patronage of the Church and wealthy elite. These factors created a fertile environment for the intellectual, artistic, and cultural revival that defined the Renaissance

### Objective Questions:

**Q.1)** Consider the following statements:

1. Only about 10 per cent of the energy is transferred to each trophic level from the lower trophic level.
2. Pyramid of energy is always upright.

Which of the statements given above is/are correct?

- a) 1 only
- b) 2 only
- c) Both 1 and 2
- d) Neither 1 nor 2

**Ans) c**

**Exp) Option c is correct.**

**Statement 1 is correct.** According to **Raymond Lindeman**, during the transfer of organic food energy from one trophic level to the next higher level, only about **ten percent** of the

transferred energy is stored as flesh. The remaining is lost during transfer, broken down in respiration, or lost to incomplete digestion by higher trophic level.

**Statement 2 is correct.** An energy pyramid, **reflects the laws of thermodynamics, with conversion of solar energy to chemical energy and heat energy at each trophic level.** There is also **loss of energy** which is depicted **at each transfer** to another trophic level. Hence the **pyramid is always upright, with a large energy base at the bottom.**

**Q.2)** Consider the following statements:

1. Bioaccumulation is the process by which a pollutant from the environment enters a food chain.
2. In Biomagnification, there is an increase in concentration of pollutants from one link in a food chain to another.
3. In order for biomagnification to occur, the pollutant must be biologically inactive.

Which of the statements given above is/are correct?

- a) 1 only
- b) 1 and 2 only
- c) 2 and 3 only
- d) 1, 2 and 3

**Ans) b**

**Exp) Option b is correct.**

**Statement 1 is correct.** **Bioaccumulation refers to how pollutants enter a food chain.** In bioaccumulation there is an increase in concentration of a pollutant from the environment to the first organism in a food chain.

**Statement 2 is correct.** **Biomagnification refers to the tendency of pollutants to concentrate** as they move from one trophic level to the next. Hence, there is an **increase in concentration** of a pollutant from **one link in a food chain to another.**

**Statement 3 is incorrect.** In order for biomagnification to occur, the pollutant must be: **long-lived, mobile, soluble in fats, biologically active. But even if a pollutant is not active biologically, it may biomagnify,** but we really don't worry about it much, since it probably won't cause any problems. Ex, DDT.

**Q.3)** With reference to the Phosphorus Cycle, consider the following statements:

1. Phosphorus is released in the ecosystem by weathering of rocks, erosion and respiration of organisms.
2. Phosphorus occurs most abundantly in nature in the form of phosphate ion.
3. The Phosphorus cycle are unidirectional moving from soil to plants and to animals.

Which of the statement(s) given above is/are correct?

- a) 1 only
- b) 2 only
- c) 1 and 2 only
- d) 1 and 3 only

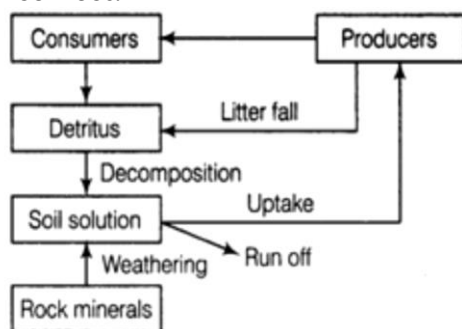
Ans) b

Exp) Option b is correct.

**Statement 1 is incorrect.** On land phosphorus is usually found in the form of phosphates. By the process of weathering and erosion phosphates enter rivers and streams that transport them to oceans. **Unlike carbon cycle, there is no respiratory release of phosphorus into atmosphere.**

**Statement 2 is correct.** Phosphorus occurs most abundantly in nature in the form of **phosphate ion**. The natural reservoir of phosphorus is rocks, which contains phosphorus in the form of phosphates.

**Statement 3 is incorrect.**



A simplified model of phosphorus cycling in a terrestrial ecosystem

From the above figure, we can say that the **phosphorus cycle is made up of a series of smaller processes. They are not unidirectional i.e.** moving in one direction from soil to plants and to animals.

Q.4) Consider the following statements:

1. Maximum concentration of global carbon is found in the atmosphere followed by the oceans.
2. Carbon component of the atmosphere decreases during photosynthesis.

Which of the statement(s) given above is/are correct?

- a) 1 only
- b) 2 only
- c) Both 1 and 2
- d) Neither 1 nor 2

Ans) b

Exp) Option b is correct

**Statement 1 is incorrect.** Maximum concentration of global carbon is found in the Oceans (71%), while only 1% is found in the atmosphere.

**Statement 2 is correct.** Carbon component of the atmosphere decreases during photosynthesis while it is replenished by Respiratory activities of the producers and consumers

- 1) Decomposition of organic wastes and dead organic matter by decomposers
- 2) Burning of wood, and fossil fuels
- 3) Combustion of organic matter
- 4) Weathering of carbonate containing rocks
- 5) Volcanic eruptions and hot springs
- 6) Forest fires, deforestation

**Q.5)** With reference to the Nitrogen Cycle, consider the following statements:

1. Nitrogen fixation is the process of conversion of elemental nitrogen to ammonia, nitrites or nitrates.
2. Atmospheric phenomenon such as thunder and lightning contribute to nitrogen fixation.
3. Microorganisms like Azotobacter are capable of fixing atmospheric nitrogen into ammonium ions.

Which of the statement(s) given above is/are correct?

- a) 1 only
- b) 1 and 2 only
- c) 1 and 3 only
- d) 1, 2 and 3

**Ans) d**

**Exp) Option d is correct.**

**Statement 1 is correct.** Nitrogen fixation is the process of conversion of elemental nitrogen to ammonia, nitrites or nitrates. Nitrogen needs to be fixed, before it can be taken up by plants.

**Statement 2 is correct.** It can be achieved in 3 different ways. One of the ways is by thunder and lightning. **The periodic thunderstorms convert the gaseous nitrogen in the atmosphere to ammonia and nitrates.**

**Statement 3 is correct.** Certain microorganisms like Azotobacter, anaerobic Clostridium are capable of fixing atmospheric nitrogen into ammonium ions.