Q. 1) Consider the following statements

1. Ecosystem refers to everything around us including living organisms and non-living beings such as soil, air, water.
2. Environment refers to a community of living species and their interactions with non-living elements of the environment.
3. Ecology is the study of the relationships between living organisms, including humans, and their physical environment.

Choose the correct code:

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

Q.1) Solution: (d)

Explanation:

- Environment is everything around us including living organisms and non-living beings such as soil, air, water while ecosystem is a much broader term of which environment is a part of. **Hence, statement 1 is incorrect.**
- The primary difference between environment and ecosystem is that the environment relates to the immediate surroundings, whereas the ecosystem refers to a community of living species and their interactions with non-living elements of the environment. **Hence, statement 2 is incorrect.**
- Ecology is the study of the relationships between living organisms, including humans, and their physical environment; it seeks to understand the vital connections between plants and animals and the world around them. **Hence, statement 3 is correct.**

IASBABA

Q. 2) Consider the following statements about the Biosphere

1. It includes all living organisms on earth, exclusive of the dead organic matter produced by them.
2. The biosphere is absent at extremes of the North and South poles.
3. Occasionally metabolically active spores of fungi and bacteria do occur at a height beyond 8,000 metres

Choose the correct code:

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

Q.2) Solution: (b)

Explanation:

- It includes all living organisms on earth, inclusive of the dead organic matter produced by them**. Hence, statement 1 is incorrect.**
- The biosphere is absent at extremes of the North and South poles, the highest mountains and the deepest oceans since existing hostile conditions there do not support life (life is the characteristic feature of the biosphere). **Hence, statement 2 is correct.**
- Occasionally spores of fungi and bacteria do occur at a great height beyond 8,000 metres, but they are metabolically inactive, and hence represent only dormant life. **Hence, statement 3 is incorrect.**

Q. 3) Consider the following statements

1. A grazing food chain is a food chain that starts with green plants as the main source of energy.
2. The grazing food chain is absent in the aquatic ecosystem as the primary source of energy is dead organic matter.
3. The grazing food chain and the detritus food chain are independent of each other.

4. A detritus food chain is a food chain that starts with the either green plants or dead remains of organisms as a main source of energy.

Which of the above given statements are *incorrect*?

a) 1, 2 and 3only
b) 2, 3 and 4 only
c) 3 and 4 only
d) 1, 2 , 3 and 4

Q.3) Solution: (b)

Explanation:

- A grazing food chain is a food chain that starts with green plants as the main source of energy. **Hence, statement 1 is correct.**
- The **food chain** is a feeding hierarchy in which organisms in an ecosystem are grouped into trophic levels and are shown in a succession to represent the flow of food energy and the feeding relationships between them. The **grazing food chain is present in both the terrestrial ecosystem (green plants) and the aquatic ecosystem** (phytoplankton) as the primary source of energy.**Hence, statement 2 is incorrect.**
- The grazing food chain and the detritus food chain are linked to each other as the **initial energy source for the detritus food chain is the waste materials and dead organic matter from the grazing food chain**. **Hence, statement 3 is incorrect .**
- A detritus food chain is a food chain that starts with the dead remains of organisms(not green plants) as a main source of energy. **Hence, statement 4 is incorrect**

Q. 4) Consider the following statements

1. Bioaccumulation is any concentration of a toxin, such as pesticides, in the tissues of tolerant organisms at successively higher levels in a food chain.
2. Biomagnification is the gradual accumulation of substances, such as pesticides or other chemicals, in an organism.
3. When bioaccumulation takes place entirely due to absorption directly from water then it is termed as bioconcentration.

Choose the correct code:

a) 1 only
b) 2 only
c) 3 only
d) None of the above

Q.4) Solution: (c)

Explanation:

- **Biomagnification** is any concentration of a toxin, such as pesticides, in the tissues of tolerant organisms at successively higher levels in a food chain. **Hence, statement 1 is incorrect.**
- **Bioaccumulation** is the gradual accumulation of substances, such as pesticides or other chemicals, in an organism. **Hence, statement 2 is incorrect.**
- Bioaccumulation often occurs in two ways, simultaneously: by eating contaminated food, and by absorption directly from water. This second case is specifically referred to as bioconcentration. **Hence, statement 3 is correct.**

Q. 5) Consider the following statements

1. The process by which communities of plant and animal species in an area are replaced or changed into another over a time is known as ecological succession.
2. The pioneer **community is stable, mature, more complex, and long-lasting** as compared to climax community
3. Primary succession is the sequential development of biotic communities **after the complete or partial destruction of the existing community**.
4. Secondary succession takes place an **where no community has existed previously**.

Choose the correct code:

a) Only one statement is correct
b) Two statements are correct
c) Three statements are correct
d) Four statements are correct

Q.5) Solution: (a)

Explanation:

- The process by which communities of plant and animal species in an area are replaced or changed into another over some time is known as **ecological succession. Hence, statement 1 is correct.**
- The **climax community is stable, mature, more complex, and long-lasting**. **Hence, statement 2 is incorrect.**
- The first plant to colonize an area is called the **pioneer community**.
- The final stage of succession is called the **climax community.**
- Secondary succession is the sequential development of biotic communities **after the complete or partial destruction of the existing community**. **Hence, statement 3 is incorrect.**
- **Primary succession takes place an where no community has existed previously**. The stage leading to the climax community is called the successional stage or seres. Each transitional community that is formed and replaced during succession is called a stage in succession or a seral community. **Hence, statement 4 is incorrect.**

Q. 6) Consider the following statements

1. No two species can have the exact same niche.
2. A habitat is a place of an ecosystem occupied by a particular organism.
3. The amount of space an animal uses on a regular basis is called its home range.

Choose the correct code:

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

Q.6) Solution: (d)

Explanation:

- In general, species that have narrow or limited niches are considered to be specialist species. Koalas (Phascolarctos cinereus), which feed only on leaves from eucalyptus trees in Australia, are an example of a specialist species. Species with broader niches, like coyotes (Canis latrans) or raccoons (Procyon lotor), are considered generalists. No two species can have the exact same niche, otherwise they would be in direct competition for resources with one another. If this occurs, then one species will outcompete the other. If the losing species then does not adapt, it would lead to its extinction.**Hence, statement 1 is correct.**
- A **habitat** is a place of an ecosystem occupied by a particular organism. It reflects the living place of an organism. **Hence, statement 2 is correct.**
- The amount of space an animal uses on a regular basis is called its home range. Home ranges can stretch for many miles or they can be only a few feet. The size of a home range often depends on the size of an animal. Large animals, like the moose, need more space to survive than smaller animals like the chipmunk.**Hence, statement 3 is correct.**

Q. 7) Consider the following statements about Ecoline

1. It is a transition zone between two biomes where organisms can survive.
2. It is determined by physiochemical factors such as humidity, temperature, rainfall, and chemicals.

Choose the correct code:

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

Q.7) Solution: (b)

Explanation:

- **Ecotone** is a transition zone between two biomes where organisms can survive. Ex: mangroves. **Hence, statement 1 is incorrect.**
- Ecoline can be defined as the zone where there is a continuous change from an ecosystem to another ecosystem when there is no proper boundary present between two different

species present in that ecosystem. The flow that governs the ecoline is environmental gradients like changes in abiotic factors gradually.It is determined by physiochemical factors such as humidity, temperature, rainfall, and chemicals. **Hence, statement 2 is correct.**

- **Note:Ecoline includes both ecosystem as well as the transition zone, whereas eco tone includes only transition zone.**

Q. 8) Consider the following statements

1. The Carrying Capacity refers to the maximum rate at which a population can increase when resources are unlimited and environmental conditions are ideal.
2. The maximum number of a given species that can be sustained by resources in a given environment is the species' biotic potential .

Choose the correct code:

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

Q.8) Solution: (d)

Explanation:

- The **Biotic Potential** refers to the maximum rate at which a population can increase when resources are unlimited and environmental conditions are ideal.
- The **Carrying Capacity** refers to the maximum number of individuals of a given species that an area's resources can sustain indefinitely without significantly depleting those resources. **Hence, statement 1 is incorrect.**
- The maximum number of a given species that can be sustained by resources in a given environment is the species' carrying capacity, a concept often discussed alongside biotic potential. When a population is nearing its carrying capacity, the amount of resources used is equal to the amount of resources being produced. It is at this time individuals start competing; some may die and others may not reproduce because of the lack of resources. Conditions are no longer ideal and as a result, these individuals cannot reach their full biotic potential.**Hence, statement 2 is incorrect .**

Q. 9) Consider the following statements

1. India is home to the largest number of organic farmers.
2. In India, Madhya Pradesh has the largest Area under organic farming.
3. Australia has the largest area under organic farming in the world.

Choose the correct code:

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

Q.9) Solution: (d)

Explanation:

- India continues to be the country with the highest number of producers (13,66,000), followed by Uganda (2,10,000), and Ethiopia (2,04,000). Most small-scale producers are certified in groups based on an internal control system. (FiBL Survey 2021) **Hence, statement 1 is correct.**
- Organic farming is in a nascent stage in India. About 2.30 million hectares of farmland was under organic cultivation as of March 2019. This is two per cent of the 140.1 million ha net sown area in the country. A few states have taken the lead in improving organic farming coverage, as a major part of this area is concentrated only in a handful of states. Madhya Pradesh tops the listwith 0.76 million ha of area under organic cultivation — that is over 27 per cent of India's total organic cultivation area. **Hence, statement 2 is correct.**
- Organic agriculture is practiced in 187 countries, and 72.3 million hectares of agricultural land were managed organically by at least 3.1 million farmers. With the most organic agricultural land in Australia (35.69 m hectares) followed by Argentina (3.63 m hectares) and the Spain (2.35 m hectares). **Hence, statement 3 is correct .**

Q. 10) Match the following

Ecological Interactions	**Examples**

1. Commensalism	a) Lion and Cheetah for similar preys
2. Mutualism	b) Lice on the human Scalp
3. Competition	c) Sea anemone attached to a hermit crab
4. Predation	d) Suckerfish attached to a shark
5. Parasitism	e) Owl eating mice

Choose the correct code:

a) 1-d; 2-c; 3-e; 4-a; 5-b;
b) 1-c; 2-d; 3-a; 4-e; 5-b;
c) 1-d; 2-c; 3-b; 4-e; 5-a;
d) 1-d; 2-c; 3-a; 4-e; 5-b;

Q.10) Solution: (d)

Explanation:

Ecological Interactions	**Examples**
1. Commensalism	Suckerfish are small tiny fish that are of length three feet. They have an organ on their head which is modified into a suction cup. This organ acts as a sucker and helps in the attachment of the fish to the sharks' belly. The attachment of these fishes to the sharks benefits them greatly in terms of providing food. They feed on the leftover food eaten by the sharks. Hence, they don't need to hunt and eat food. They also feed on the parasites growing on the body of the shark helping them in having clear skin. As the fishes are benefitted from the attachment and the sharks are neither

	benefited nor are at a loss such type of association is known as commensalism.
2. Mutualism	Sea anemones have stinging cells which are useful for both stunning prey as well as for protection against possible predators. Hermit crab also benefits as it gets protection from predators with sea anemone attached to its shell. At the same time, sea anemone feeds on the prey that floats or swims into its tentacles. As the crab moves sea anemone has a greater chance of utilizing different food sources.
3. Competition	In the African Savanna, there are cats that hunt the same prey species. For example, the lion and the cheetah both hunt zebras, antelopes, gazelles, and wildebeest. To compete for this resource, lions have adapted to hunt in packs and through teamwork. Cheetahs use speed to succeed in catching prey.
4. Predation	Owls are an example of predator organisms. They feed on smaller organisms such as mice. The mice therefore serve as prey for the owls. As predators, owls occur high in a food chain of forest organisms.
5. Parasitism	Lice on the scalp is an example of a parasitic relationship, as the lice benefit from feeding on the blood of the host (human) while the host is harmed by the lice's presence and feeding activities.

Q. 11) Consider the following statements

1. The biogeochemical cycles in which the nutrients are replaced as fast as they are utilized are called the perfect nutrient cycle.
2. All sedimentary cycles are examples of perfect nutrient cycles.
3. The Phosphorus cycle and the Carbon cycle are examples of the perfect nutrient cycle.

Choose the correct code:

a) 1 only
b) 2 only
c) 3 only

d) None

Q.11) Solution: (a)

Explanation:

- The biogeochemical cycles in which the nutrients are replaced as fast as they are utilized are called the **perfect nutrient cycle**. **Hence, statement 1 is correct.**
- **Most gaseous cycles are perfect nutrient cycles**. Most **sedimentary cycles are imperfect nutrient cycles** i.e. some nutrients are lost from the cycles and get stored in the sediments. **Hence, statement 2 is incorrect.**
- The **Nitrogen cycle and Carbon cycle** are examples of the **perfect nutrient cycle**. **Phosphorus cycle is totally sedimentary in nature.Hence, statement 3 is incorrect.**

Q. 12) Consider the following statements

1. Th Ecotopes are the smallest ecologically distinct landscape features in a landscape mapping and classification system.
2. The Ecosystem consists of a community of living beings and a physical environment both interacting and exchanging materials between them.
3. A population is a group of individuals of the same species living in the same area at the same time.

Choose the correct code:

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

Q.12) Solution: (c)

Explanation:

- The Ecotopes are the smallest ecologically distinct landscape features in a landscape mapping and classification system. As such, they represent relatively homogeneous,

spatially explicit landscape functional units that are useful for stratifying landscapes into ecologically distinct features for the measurement and mapping of landscape structure, function and change.Like ecosystems, ecotopes are identified using flexible criteria, in the case of ecotopes, by criteria defined within a specific ecological mapping and classification system. Just as ecosystems are defined by the interaction of biotic and abiotic components, ecotope classification should stratify landscapes based on a combination of both biotic and abiotic factors, including vegetation, soils, hydrology, and other factors.. **Hence, statement 1 is correct.**

- The **Ecosystem** consists of a community of living beings and a physical environment both interacting and exchanging materials between them. **Hence, statement 2 is correct.**
- A population is a group of individuals of the same species living in the same area at the same time. Populations are dynamic and can change in size and composition over time.**Hence, statement 3 is correct.**

Q. 13) Consider the following statements

1. The Edge Effect refers to a lower density of organisms within an ecotone as compared to adjacent ecosystems
2. The Ecological Amplitude refers to a specific range within which a species can tolerate ecological changes.

Choose the correct code:

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

Q.13) Solution: (b)

Explanation:

- The **Edge Effect** refers to a **higher density of organisms** and diversity of species within an ecotone. The organisms which occur most abundantly in this zone are called edge species. **Hence, statement 1 is incorrect.**

- The **Ecological Amplitude** refers to a specific range within which a species can tolerate ecological changes. **Hence, statement 2 is correct.**

Q. 14) Consider the following statements

1. The flow of energy from heterotrophs to autotrophs is called energy flow.
2. The energy flow in the ecosystem is always unidirectional.
3. In a four level pyramid, only 0.1% of fixed energy ultimately reaches the top.

Choose the correct code:

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

Q.14) Solution: (b)

Explanation:

- The flow of energy from **producers(Autotrophs) to consumers(Heterotrophs**)is called **energy flow**. **Hence, statement 1 is incorrect.**
- The energy flow is always **unidirectional**. The energy always flows from lower to higher trophic levels and it never flows in the reverse direction. **Hence, statement 2 is correct.**
- In a four level pyramid, only 0.1% of fixed energy ultimately reaches the top. In all ecosystem, first base level of pyramid will be occupied by producers, consumers occupy higher trophic levels. Energy is lost when it is transferred from one trophic level to the next. Approximately 10% of the stored energy of a trophic level could be transferred to the consumers of next level. Thus very less number of individuals could be supported at the top level**. Hence, statement 2 is correct.**

Q. 15) Consider the following statements about Ecological Pyramids

1. The saprophytes are not considered in any of the pyramids
2. These pyramids are applicable only to complex food chains
3. This system does not take into account food webs.

Choose the correct code:

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

Q.15) Solution: (a)

Explanation:

Limitations of Ecological Pyramid

- The saprophytes are not considered in any of the pyramids even though they form an important part of the various ecosystem. **Hence, statement 1 is correct.**
- These pyramids are applicable only to simple food chains, which usually do not occur naturally. **Hence, statement 2 is incorrect.**
- These pyramids do not deliver any concept in relation to variations in season and climate.
- They do not consider the possibility of the existence of the same species at different levels.
- More than one species may occupy multiple trophic levels as in case of the food web. Thus, this system does not take into account food webs. **Hence, statement 3 is correct.**

Q. 16) Consider the following statements

1. Gross Primary Productivity describes how much glucose is produced during photosynthesis and its value is always comparatively higher than Net Primary Productivity.
2. The Net Primary Productivity of an ecosystem is the available biomass for consumption by herbivores and carnivores.

Choose the correct code:

a) 1 only
b) 2 only
c) Both 1 and 2
d) Neither 1 or 2

Q.16) Solution: (c)

Explanation:

- Gross Primary Productivity refers to the amount of organic substance synthesized by the producers in unit time per unit area.It describes how much glucose is produced during photosynthesis.The value of GPP is always comparatively higher than NPP . **Hence, statement 1 is correct .**
- The **Net Primary Productivity** of an ecosystem is the available biomass for consumption by herbivores and carnivores. Net Primary Productivity = Gross Primary Productivity - Respiration losses (R). It describes how much glucose is produced excluding the amount of energy utilized for respiratory processes. The value of NPP is always comparatively lower than GPP. **Hence, statement 2 is correct .**

Q. 17) Consider the following statements about the Food Web

1. It includes at maximum two food chains only.
2. It is a representation of all possible paths of energy flow in an ecosystem.
3. Food webs are static and cannot change in response to changes in the environment.

Choose the *Incorrect* code:

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

Q.17) Solution: (c)

Explanation:

- The **Food Web** includes multiple interlinked food chains. **Hence, statement 1 is incorrect.**
- It is a representation of all possible paths of energy flow in an ecosystem. **Hence, statement 2 is correct.**

- It has **more than one alternative for food for most of the organisms** as a result it increases the chances of survival. Ex: Grass may serve as food for deer, rabbit, or cow.
- Food webs are dynamic and can change in response to changes in the environment, such as the introduction or removal of a species or changes in climate. **Hence, statement 3 is incorrect.**

Q. 18) Consider the following statements about the Nitrogen Cycle

1. Nitrogen fixation is a process where nitrogen is converted into ammonia with the help of bacteria such as Clostridium and Rhodosprillium.

2. Ammonification converts organic nitrogenous matter from living organisms into ammonium.

3. Nitrate present in the soil is reduced to elemental nitrogen by the process of denitrification

Choose the correct code:

a) 1 and 2 only

b) 2 and 3 only

c) 1 and 3 only

d) 1, 2 and 3

Q.18) Solution: (d)

Explanation:

- Nitrogen fixation is a process where nitrogen is converted into ammonia with the help of bacteria such as Clostridium and Rhodosprillium. **Hence, statement 1 is correct.**
- Ammonification converts organic nitrogenous matter from living organisms into ammonium. **Hence, statement 2 is correct.**
- Nitrate present in the soil is reduced to nitrogen by the process of denitrification.In the soil as well as oceans there are special denitrifying bacteria (Pseudomonas and Thiobacillus), which convert the nitrates/nitrites to elemental nitrogen.This nitrogen escapes into the atmosphere, thus completing the cycle. **Hence, statement 3 is correct.**

Q. 19) Consider the following statements about the processes involved in decomposition

1. The detritivores break down detritus into smaller particles in a process called leaching.
2. The bacterial and fungal enzymes degrade detritus into simpler inorganic substances in a process called catabolism.
3. The accumulation of a dark-colored amorphous substance called humus during decomposition in the soil in a process called humification.

Choose the correct code:

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

Q.19) Solution: (d)

Explanation:

- The detritivores break down detritus into smaller particles in a process called **fragmentation**. **Hence, statement 1 is incorrect.**
- The bacterial and fungal enzymes degrade detritus into simpler inorganic substances in a process called **catabolism**. **Hence, statement 2 is correct.**
- The accumulation of a dark-colored amorphous substance called humus during decomposition in the soil in a process called **humification**. **Hence, statement 3 is correct.**

Q. 20) Which of the following statement is 'incorrect' regarding the Sulphur Cycle?

a) It is a gaseous cycle.
b) The sulphur reservoir is found in pyrite rock and soil.
c) The decomposition of organic matter releases sulphur.
d) The volcanic eruptions emit sulphur into the atmosphere.

Q.20) Solution: (a)

Explanation:

The question asks for an incorrect option.

Sulphur also has a small gaseous phase as sulphur dioxide, but is not considered a gaseous cycle because the biggest sulphur reservoir is the ocean.Thus the Sulphur Cycle is a sedimentary cycle. **Hence, option a is incorrect.**

Q.21) Consider the following statements regarding 'Konark Sun Temple'

1. The temple was constructed by the Western Ganga dynasty in Kalinga style of architecture
2. It is the only sun temple in India to be declared as a UNESCO world heritage site
3. It was referred to as the 'White Pagoda' by the visiting merchants and sailors
4. The temple houses artwork consisting of all major cults like Shaktism, Vaishnavism and Shaivism

Choose the correct answer using the options given below

a) 1 and 2 only
b) 2, 3 and 4 only
c) 2 and 4 only
d) 1,2 and 3 only

Q.21) Solution (c)

Explanation:

- Statement 1 – Incorrect, The temple is attributed to **king Narasimhadeva I of the Eastern Ganga dynasty**. The 13th Century temple is dedicated to **Hindu Sun God Surya**. The temple follows the traditional style of **Kalinga architecture.**
- Statement 2 – Correct, Out of the total **40 Indian sites** listed in UNESCO's world heritage sites, Sun temple in **Konark is the only sun temple to be listed.**
- Statement 3 – Incorrect, This **temple was called the "Black Pagoda"** in European sailor accounts as early as 1676 because it looked like a great tiered tower which appeared black. Similarly, the **Jagannath Temple in Puri was called the "White Pagoda".** Both temples served as important landmarks for sailors in the Bay of Bengal.

- Statement 4 – Correct, The artwork inside the temple comprises of images from Shaktism, Shaivism and Vaishnavism. These include images of musicians and mythological narratives as well as sculptures of Hindu deities, including **Durga in her Mahishasuramardini aspect killing the shape-shifting buffalo demon (Shaktism), Vishnu in his Jagannatha form (Vaishnavism), and Shiva as a (largely damaged) linga (Shaivism).**

Q.22) Consider the following statements about 'Alluri Sitarama Raju'

1. He led a non-violent resistance named the Rampa Rebellion against British rule
2. He had adopted aspects from the Non-cooperation movement, such as promoting temperance to attract people's support
3. Lord Reading was the viceroy during the Rampa Rebellion.

Choose the correct answer using the code given below

a) 1 and 2 only
b) 2 and 3 only
c) 1 and 3 only
d) All the above

Q.22) Solution (b)

Explanation:

- Statement 1 – Incorrect, **The Rampa Rebellion of 1922**, also known as the **Manyam Rebellion**, was a tribal uprising led by **Alluri Sitarama Raju in Godavari Agency of Madras Presidency, British India.** It was a violent rebellion which included raids on police stations, robbery and guerilla warfare.
- Statement 2 – Correct, Alluri had adopted aspects from the **Non-cooperation movement, such as promoting temperance**, and the **boycott of colonial courts** in favour of local justice, administered by panchayat courts, to attract people's support
- Statement 3 – Correct, **Lord Reading (1921 to 1926)** was the viceroy during Rampa Rebellion.

Q.23) 'IS40M' seen in news recently is related to

a) Translation device
b) Standard certification
c) Oilseeds
d) Space debris

Q.23) Solution (d)

Explanation:

The ISRO System for Safe and Sustainable Space Operations & Management (IS4OM) is ISRO's holistic approach to ensure the safety of space assets and sustaining the utilization of outer space for national development. S4OM facility will aid India in achieving its SSA (Space Situational Awareness) goals by providing a comprehensive and timely information of the Space environment to users.

Q.24) With reference to 'Bail', consider the following statements

1. The Code of Criminal Procedure defines the terms bailable offence and non-bailable offence
2. Non-bailable offences are non-cognisable which enables the police officer to arrest without a warrant
3. A Bailable offence is defined as an offence which is mentioned so in the First Schedule of the Code

Choose the correct answer using the code given below

a) 1 and 2 only
b) 2 and 3 only
c) 1 and 3 only
d) All the above

Q.24) Solution (c)

Explanation:

- Statement 1 – Correct, **The Code of Criminal Procedure, 1973 does not define bail**, although the terms bailable offence and non-bailable offence have been defined in section 2(a) of the Code.
- Statement 2 – Incorrect, **Non-bailable offences are cognisable**, which enables the police officer to **arrest without a warrant**. In such cases, a magistrate would determine if the accused is fit to be released on bail.
- Statement 3 – Correct, **A Bailable offence** is defined as an offence which is shown as **bailable in the First Schedule of the Code** or which is made bailable by any other law, and non-bailable offence means any other offence.

Q.25) With reference to 'Trade Infrastructure for Export Scheme (TIES) scheme', consider the following statements

1. Financial assistance in the form of grant-in-aid is provided to Central/State Government owned agencies
2. The scheme is being implemented by Directorate General of Foreign Trade

Select the correct statement(s)

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

Q.25) Solution (a)

Explanation:

- Statement 1 – Correct, under the scheme, **financial assistance in the form of grant-in-aid is provided to Central/State Government owned agencies** (or their Joint Ventures with major stake-holding by them) for setting up or up-grading export infrastructure in States/UTs.
- Statement 2 – Incorrect, **The Department of Commerce**, Government of India is implementing the Trade Infrastructure for Export Scheme (TIES) w.e.f. FY 2017-18 with the objective of assisting Central and State Government agencies in the creation of appropriate infrastructure for growth of exports.

Q.26) How many 3-digit numbers can be formed by using the digits 1 to 9 if no digit is repeated?

a) 408
b) 504
c) 560
d) 680

Q.26) Solution (b)

Explanation:

3-digit numbers have to be formed using the digits 1 to 9.
Here, the order of the digits matters.
Therefore, there will be as many 3-digit numbers as there are permutations of 9 different digits taken 3 at a time.
Therefore, required number of 3-digit numbers = 3P3 = 9!/(9-3)!
= 9*8*7*6!/6! = 504

Q.27) There are three stations A, B and C, five routes for going from station A to station B and four routes for going from station B to station C. Find the number of different ways through which a person can go from station A to C via B

a) 12
b) 16
c) 20
d) 18

Q.27) Solution (c)

Explanation:

Since there are five routes for going from station A to station B
So number of ways of going from A to B is 5

And there are four routes for going from B to C, so the number of ways of going from B to C is 4

Thus using multiplication rule, number of ways of going from A to C via B is, 5×4=20

Q.28) The English alphabet has 5 vowels and 21 consonants. How many words with two different vowels and 2 different consonants can be formed from the alphabet?

a) 40,800

b) 48,800

c) 50,400

d) 50,800

Q.28) Solution (c)

Explanation:

2 different vowels and 2 different consonants are to be selected from the English alphabet.

Since there are 5 vowels in the English alphabet, number of ways of selecting 2 different vowels from the alphabet = 5C 2 = 5!/2!3! = 10

Since there are 21 consonants in the English alphabet, number of ways of selecting 2 different consonants from the alphabet = 21C 2 = 21!/19!2! = 210

Therefore, number of combinations of 2 different vowels and 2 different consonants = 10 × 210 = 2,100

Each of these 2,100 combinations has 4 letters, which can be arranged among themselves in 4! Ways.

Therefore, required number of words = 2100 × 4! = 50,400

Q.29) In an examination, a question paper consists of 12 questions divided into two parts i.e.,Part I and Part II, containing 5 and 7 questions, respectively. A student is required to attempt 8 questions in all, selecting at least 3 from each part. In how many ways can a student select the questions?

a) 420 ways

b) 460 ways

c) 510 ways

d) 540 ways

Q.29) Solution (a)

Explanation:

It is given that the question paper consists of 12 questions divided into two parts – Part I and Part II, containing 5 and 7 questions, respectively.

A student has to attempt 8 questions, selecting at least 3 from each part.

This can be done as follows.

(a) 3 questions from part I and 5 questions from part II

(b) 4 questions from part I and 4 questions from part II

(c) 5 questions from part I and 3 questions from part II

3 questions from part I and 5 questions from part II can be selected in 5C 3 * 7C 5 ways

4 questions from part I and 4 questions from part II can be selected in 5C 4 * 7C 4 ways.

5 questions from part I and 3 questions from part II can be selected in 5C 5 * 7C 3 ways.

Thus, required number of ways of selecting questions =[5C3 * 7C5] *[5C4 * 7C4]* [5C5 * 7C3]

On solving, we get 420 ways

Read the following passage and answer the items that follow. Your answer to these items should be based on the passages only

Passage

Many scientific studies have found links between genius and mental illness, particularly bipolar disorder in which patients have violent mood swings between elation and depression. In one interesting Swedish study, 700,000 Swedes had intelligence tests at age 16 and again 10 years later. Those who scored well were four times more likely than the others to have developed bipolar disorder. The US neurologist James Fallon came up with a convincing argument based on his own findings in the field: the brain area involved in mood swings is the same area where creativity is born. This may explain why some people can

draw previously unseen connections among ideas, images, shapes and the like.

Q.30) Which of the following can be inferred from the above passage?

a) Those with bipolar disorder are likely to be highly intelligent.
b) Most people who excel in creativity are likely suffering from a mental problem.
c) Often there is a correlation between mental illness and genius.
d) Mental disorders give birth to genius.

Q.30) Solution (c)

Explanation:

Option a: This is not implied. The study shows that those who fared well in intelligence tests were four times more likely to develop bipolar disorder. However, this does not imply that the converse is true.
Option b: Again, this statement is not implied. Correlation does not imply causation.
Option c: This is clearly inferred from the paragraph.
Option d: It cannot be concluded from what is stated in the study that this is true. While there is a correlation between genius and mental illness, it does not imply one causes the other.

IASBABA