Model Question Paper - I

Quantitative and Analytical

Q 1. The BIS standard for lead in drinking water is 0.01 mg/l. Which of the following groups below will have highest health risk on exposure to water containing lead?

A. Population exposed to water containing 0.005 mg/l of lead levels for 70 years
B. Population exposed to water containing 0.01 mg/l of lead levels for 50 years
C. Population exposed to water containing 0.20 mg/l of lead levels for 20 years
D. None of the above

Q 2. Which value is greatest?

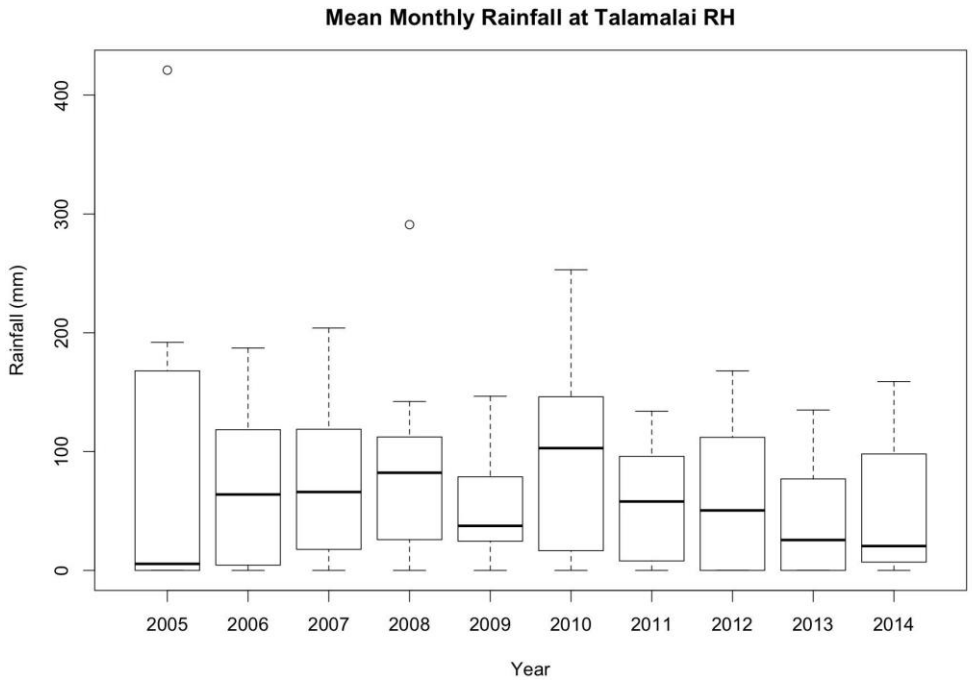
A. 3^2
B. $\square^2$
C. Log_{10} 1000000000
D. 2^3

Q 3. The island of Rutland in the Andamans has 10 distinct habitats (rainforest, wetlands, Mangroves, grassland, etc.); there is an average of 12 species of birds per habitat. Studies of the island's bird communities have determined that each species occupies, on average, 5 of the 10 habitats. How many species of birds occupy the island of Rutland?

A. 24 species
B. 120 species
C. 50 species
D. 60 species

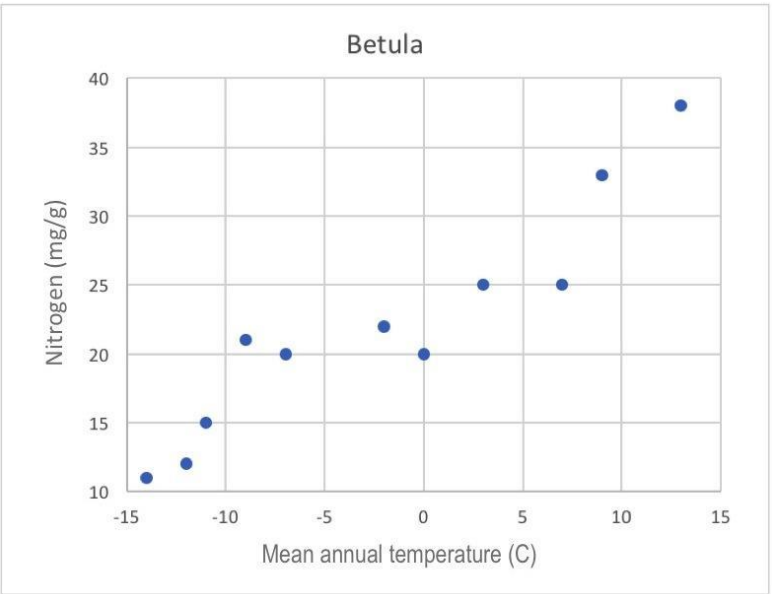
Q 4. The graph below represents the mean monthly rainfall recorded at Talamalai in the Sathyamangalam Tiger Reserve between 2005-2014. Based on the graph which of the following statements is not true?

A. On average, the driest year on record is 2009
B. The highest mean monthly rainfall was recorded in 2010
C. The highest within-year variability in rainfall was observed in 2005
D. B and C



Q 5. On 23 July 1983, Air Canada Flight 143 ran completely out of fuel during its flight from Montreal to Edmonton. Fuel loading was miscalculated through misunderstanding of the recently adopted metric system. For the trip, the pilot calculated a fuel requirement of 22,300 kilograms. There were 7,682 liters already in the fuel tanks. If a litre of jet fuel has a mass of 0.803 kilograms, how much more fuel in liters should have been added for the trip?

A. 17,907
B. 27,771
C. 20,089
D. Cannot be determined with information given



Q 6. The graph, above, shows average measured foliar (leaf) nitrogen concentrations of the temperate tree genus, Betula, across the range of mean annual temperatures where the genus occurs. Based on the graph, which of the following is true?

A. Higher foliar nitrogen endows Betula with tolerance for higher mean annual temperature.
B. With increasing anthropogenic global nitrogen deposition, the range of Betula will shift to more tropical climates.
C. Higher mean annual temperatures are correlated with higher foliar nitrogen concentrations.
D. Higher mean annual temperature causes, Betula to allocate more nitrogen to its leaves.

Ecology and Environmental Science

Q 7. Two species of herbivores compete for resources in a grassland. In general, species A is better at utilising the resources and is more abundant than species B. A predator is introduced that has no preference for the species. The relative abundance of the two species changes as follows:

A. The relative abundance remains the same
B. Species A increases relative to Species B
C. Species B increases relative to Species A
D. The relative abundance can change in either direction

Q 8. Which one of these interactions will not promote co-evolution?

A. Commensalism
B. Competition
C. Parasitism
D. Mutualism

Q 9. A lake receives treated water from an STP and is in steady state condition (inflows = outflow). The dissolved chromium level in the treated water is 50µg/l. Given that there is no other source of inflow, what is the dissolved chromium levels in the lake?

A. Less than 50 µg/l
B. Equal to 50 µg/l
C. Greater than 50 µg/l
D. This is dependent on the volume of water in the lake

Q 10. African elephants are considered ecosystem engineers because they change the habitats they live in. Which of the following is not considered an ecosystem engineer?

A. Beavers
B. California redwoods
C. Termites
D. Weaverbirds

Q 11. Aquifers are...

A. Underground lakes.
B. Porous rock or deposits of sand and gravel that hold water like a sponge.
C. Underground tunnels built by our ancestors.
D. None of the above.

Q 12. Which of the following best describes soil?

A. A complex of minerals that provide energy for plant growth
B. A complex mixture of organic matter, minerals and living organisms
C. A mass of dead organic matter and dirt
D. A mixture inorganic matter and nutrients

Conservation and Sustainability

Q 13. The Forest Rights Act [formally, The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006] aims to:

A. Regulate forest diversion
B. Give urban people rights to wildlife viewing;
C. Allow forest dwellers to use forest produce
D. Grant the forest department rights to protect the forest.

Q 14. Which of the following greenhouse gases has been introduced into the atmosphere by human activity and does not occur naturally?

A. Methane
B. Nitrous oxide
C. Carbon dioxide
D. Chlorofluorocarbons

Q 15. The beneficial impact of a standing forest at climax on climate change is approximately proportional to:

A. the average height of the trees in the forest
B. the amount of photosynthesis being done by the forest annually
C. the standing biomass of the forest
D. the darkness of the forest

Q 16. The total amount of water on planet earth is:

A. Increasing over time.
B. Decreasing about 2 percent every 100,000 years.
C. Largely unchanged over millions of year.
D. Alternately increasing and decreasing over different geological eras.

Q 17. If the Andaman Serpent Eagle are found only in Andamans and nowhere else in the world, what is that species said to be to Andamans?

A. Native
B. Endemic
C. Rare
D. Exclusive
E.

Q 18. Some peninsular Indian rivers flow throughout the year in some stretches because:

A. This is impossible. Only snowfed rivers can be perennial.
B. They are fed by groundwater which slowly releases water in the dry season.
C. There is sewage feeding the river.
D. B and C

Economics, Society and Development

Q 19. Thermal power plants can operate on coal or nuclear energy (among others). In general, local communities tend to oppose nuclear power plants more than coal-based plants because:

A. Coal-based plants have a lower carbon footprint
B. Nuclear plants pollute the air and water regularly
C. Nuclear plants are much more expensive to operate
D. Nuclear plants have a low but non-zero probability of catastrophic failure

Q 20. The costs of an economic activity borne by the producers are:

A. Always less than social costs
B. The full resource cost of an economic activity
C. Private costs
D. All of the above are correct

Q 21. The uneven distribution of environmental risks and privileges in societies and the consequent disproportion in human exposures to risks is the primary concern of:

A. Environmental science
B. Ecological Economics
C. Environmental Justice
D. Public Health Studies

Q 22. Which items from the list below is a positive externality?

A. Public Immunization.
B. Traffic jams.
C. A neighbor's barking dog.
D. All answers above are correct.

Q 23. Which of the following stratification systems is characterised by occupational and ritual hierarchy, endogamy, and pollution norms?

A. Class
B. Caste
C. Race
D. Gender

Q 24. Environmental regulators have the option of setting air pollution standards in different ways: limits on concentration, limits on total emissions of pollutants (load-based standards), and specifications of which technology is to be used. The Supreme Court, in trying to tackle the air pollution problem in Delhi, said all public vehicles should convert to CNG. It adopted this technology based standard rather than any other method because:

A. CNG eliminates pollution entirely
B. the Court had no faith in the pollution control board
C. technology-based standards are easiest to enforce
D. the only source of air pollution in Delhi was vehicles

Model Question Paper – II

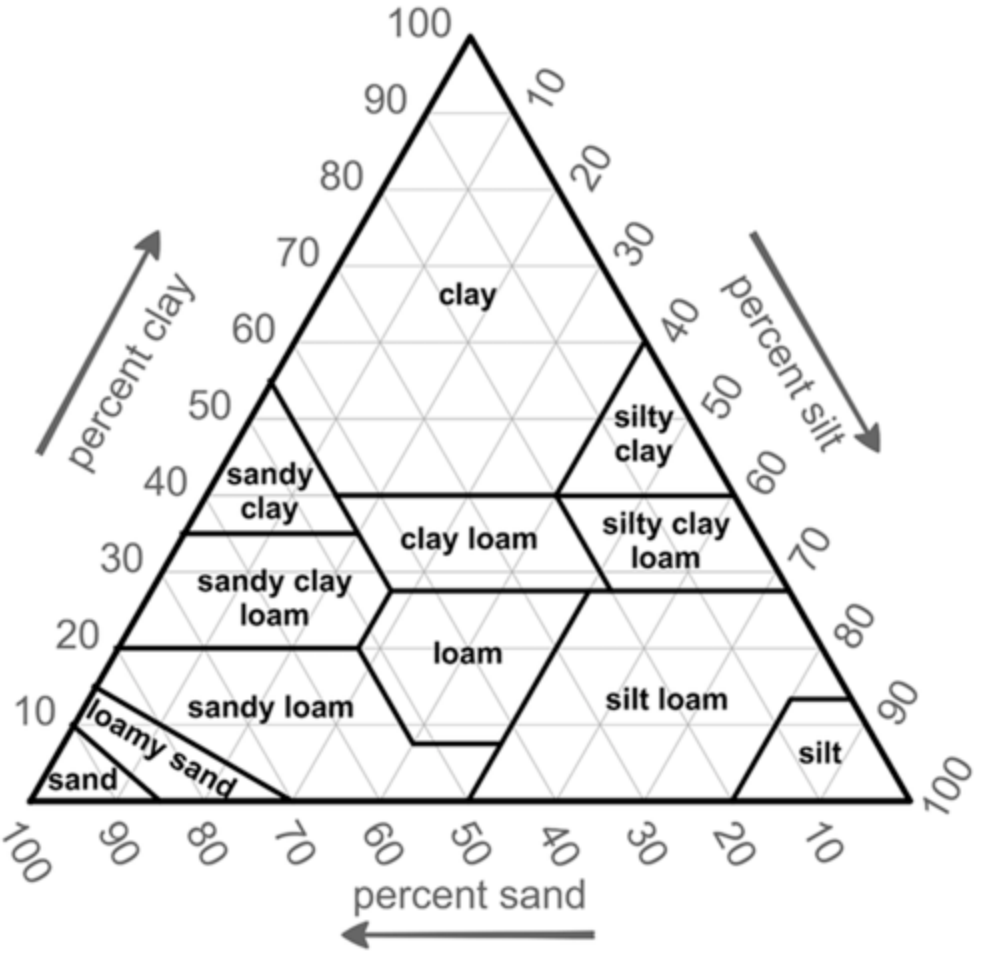
Quantitative and Analytical

Q 1. Indian coal is approximately 30% impurities, 20% moisture and 50% carbon, and has an energy content of 15 MJ/kg (million Joules per kg). A coal power plant needs 7.5 MJ of energy from coal per unit of electricity generated. Calculate the weight of CO_2 produced per unit given that the atomic mass of Carbon (C) is 12 and Oxygen (O) is 16?

A. 0.92 kg
B. 0.75 kg
C. 1.83 kg
D. insufficient information

Q 2. The diagram below is a soil texture triangle which categorizes the mineral fraction of a soil into various classes based on its content of sand, silt and clay. Clayey soil types are known for their large availability of mineral nutrients, poor permeability to water and large changes in volume with wetness, while sandy soil types allow high permeability and poor water retention.

In India, Black (regur = cotton) soils are a particularly well-known soil class distributed over the North and West of the Deccan Plateau. Based on the fact that black soils show widespread cracking during dry seasons and droughts, which of the following categories would these soils belong to?



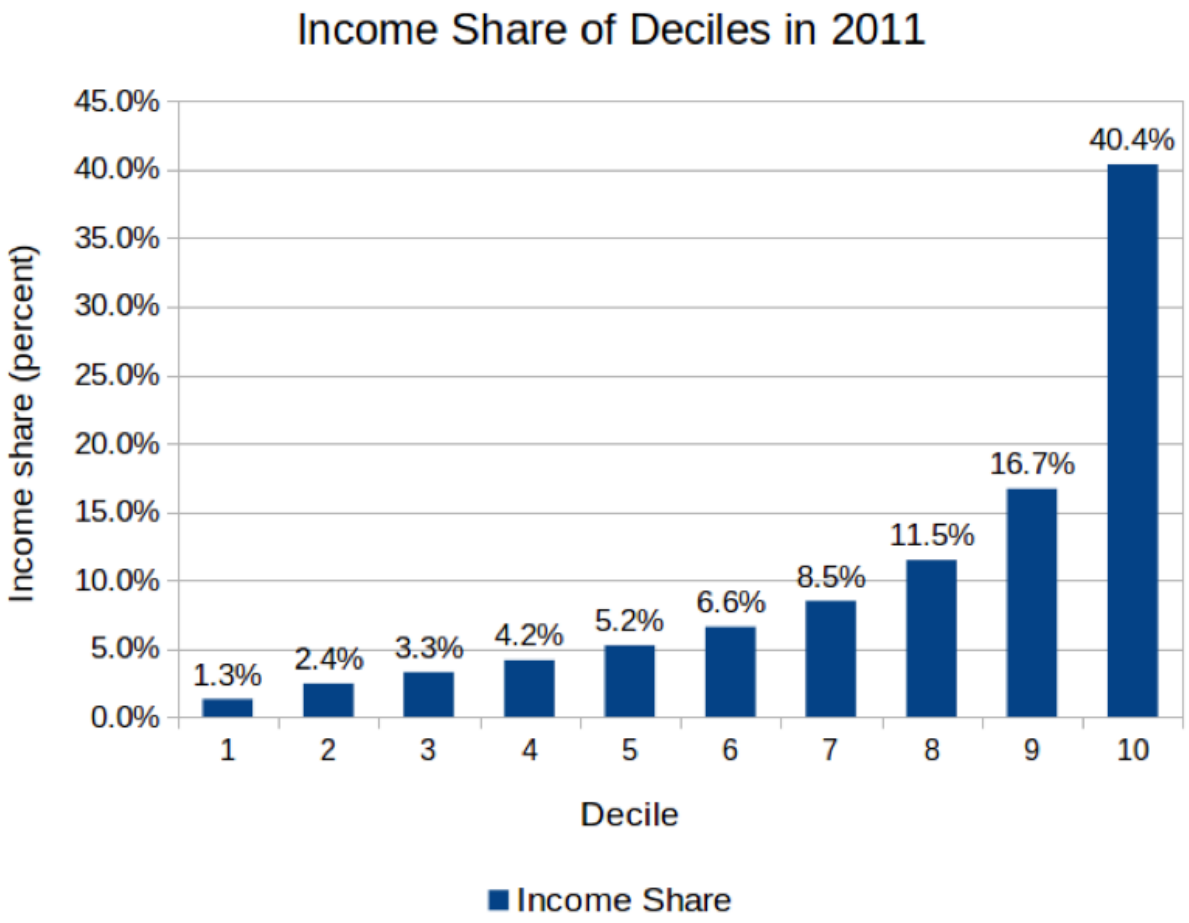
A. Sand, loamy sand and sandy loam
B. Clay loam, loam and silty clay loam
C. Sandy clay, sandy clay loam
D. Clay, silty clay and silty clay loam

Q 3. The coefficient of variation (CV) of annual precipitation is an indicator of year-to-year rainfall variability. Globally, there is an inverse relationship between CV of annual precipitation and mean annual precipitation (MAP). This suggests that in regions with high rainfall,

A. total rainfall tends to be extremely variable from one year to the next
B. droughts occur frequently
C. total rainfall tends not to vary very much from one year to the next
D. none of the above

Q 4. This figure shows the plot of the national share of income per decile. A decile is 10% of the population, ranked by income. For example,, the richest 10% earns 40.4% of the national income whereas the poorest 10% earns 1.3%. Which of the following statements is false?

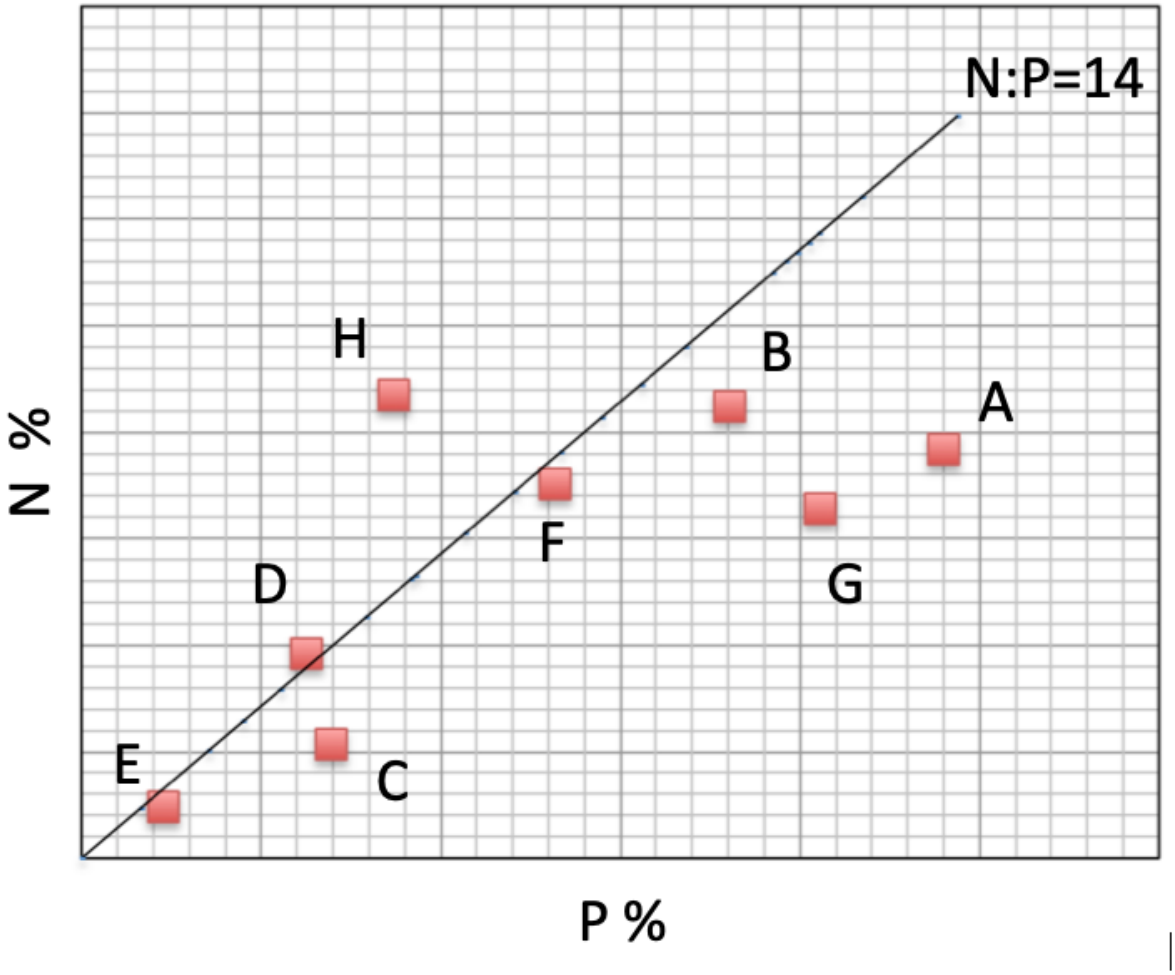
A. The top 10% earns more than the bottom 60% of the country.
B. The top 10% earns about 30 times the bottom 10%.
C. The top 10% earn about 5 times the average income
D. The bottom 80% earn less than than the top 20%



Q 5. The ratio of nitrogen (N) concentration to phosphorus (P) concentration in plant leaves is an index of plant nutrient status. Assume that an N:P value of 14 marks a threshold, above which plant growth is limited by the availability of phosphorus, and below which plant growth is limited by the availability of nitrogen.

In the figure, below, the points represent foliar N:P ratios for individual species denoted by the letters A to H. Would you say that species A is

A. limited by phosphorus availability
B. limited by nitrogen availability
C. limited by both phosphorus and nitrogen availability
D. limited by neither phosphorus nor nitrogen availability



Q 6.Statistics show that the number of visitors to BRT Wildlife Sanctuary increased by 190% between 2000 and 2010. In other words, between 2000 and 2010 the number of visitors to BRT

A. almost tripled
B. almost halved
C. more than tripled
D. almost doubled

Ecology and Environmental Science

Q 7. Inbreeding and small population size of a threatened species can combine to form a downward spiral for the species. This is known as…

A. a random mutation.
B. a random change of allele frequencies attributable to chance.
C. an extinction vortex.
D. an accelerated evolution of new traits.

Q 8. There are evolutionary tradeoffs between the number of seeds a plant produces and the size of those seeds. This statement implies that in a fruiting episode

A. a plant can produce numerous large seeds
B. a plant can produce numerous small seeds
C. a plant can produce a few large seeds
D. a plant can produce a few small seeds

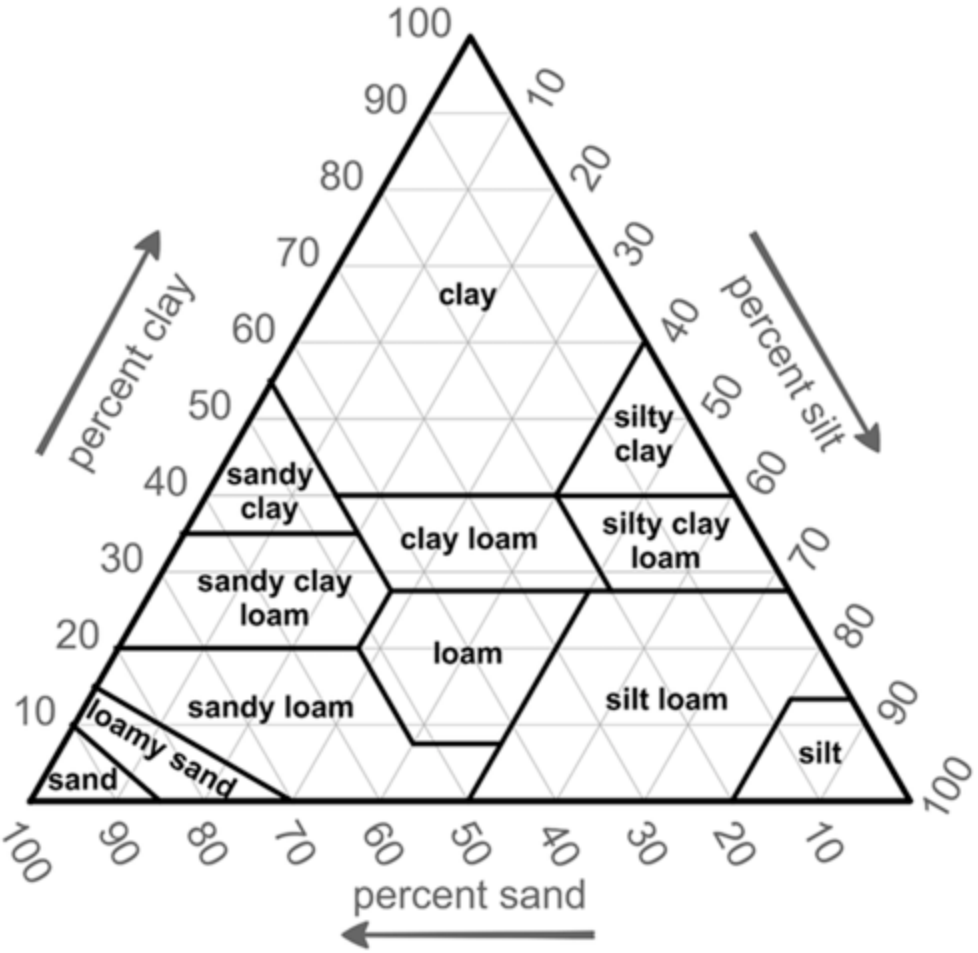
Q 9. The ecological biomass pyramid based on trophic levels in the marine ecosystem is

A. the same as in terrestrial ecosystems
B. the opposite of terrestrial ecosystems
C. dependent on the El Niño conditions prevailing over the marine system
D. not sensitive to climate change

Q 10. In developing countries, the most recent increases in agricultural productivity have come from:

A. Expansion in cultivated areas
B. Increased fertilization
C. New crop varieties
D. Irrigation, increased fertilization and new crop varieties

Q 11. In humid and rainier parts of India, one of the main issues with soil health is their low content of useful mineral nutrients available for proper growth of plants and crops. Organic matter in soil is useful to condition the soil texture and in retaining fine mineral matter, water and supports useful bacteria. Based on the understanding of the texture triangle below, and the details provided about organic matter, clay and sand, which type of soil with reason would be considered the best for growing rainfed crops.



A. Loamy sand with very high organic matter due to its good water permeability and lots of bacteria
B. Silt loam with little organic matter due to its good balance of all the mineral size fractions
C. Clay loam with medium organic matter due to its moderate water permeability and retention, and bacterial populations.
D. Clays with high organic matter due to its ability to stop rain-water at the surface, lots of mineral nutrients and large population of useful soil bacteria.

Q 12. Which of the following statements is true?

A. Dry air is heavier than wet air
B. Cold air is lighter than hot air
C. Cold wet air is heavier than cold dry air
D. Wet air is heavier than dry air

Conservation and Sustainability

Q 13. Which of the following countries is recorded as having the highest biodiversity?

A. India
B. Brazil
C. Philippines
D. South Africa

Q 14. In the rainforest, strangler fig seedlings begin growing on other trees, wrapping roots around the host tree. When the roots reach the ground, the strangler fig takes root and grows larger than the host tree, taking nutrients from the host tree and growing to the height of the rainforest. How does the strangler fig interact with its ecosystem in order to survive?

A. The fig produces its own food and does not use nutrients from other trees.
B. The rainforest floor does not receive much sunlight, the fig must compete for sunlight and nutrients (correct answer)
C. The fig roots rot in the wet rainforest.
D. None of the above

Q 15. In the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, which is commonly known as the Forest Rights Act (2006), other traditional forest dweller" implies:

A. Any member or community who has for at least three generations resided in and who depend on the forest.
B. Any member or community who has for at least two generations resided in and who depend on the forest.
C. Any member or community who has for at least 25 years resided in and who depend on the forest.
D. all of the above

Q 16. Spotted deer introduced in Andamans has now reached an invasive status with no predators and is now a threat to many endemic plants. Which of the following strategy may not work to control the growing population?

A. Culling
B. Capture and re-introduction elsewhere
C. Allow hunting tourism as followed in African countries
D. Allow the spotted deer population to grow beyond the ecosystem’s carrying capacity and then crash

Q 17. A generally healthy population of a tree species are represented by one of the following curves:

A. Cumulative frequency curve
B. Bell curve
C. J- Shaped curve
D. Inverse J-shaped curve

Q 18. In India, which of following water uses consumes the most water

A. Drinking and domestic
B. Industry
C. Agriculture
D. Car washing

Economics, Society and Development

Q 19. Marginal product of labour is close to zero, but wages are positive. This is a possibility in…

A. Paddy farming
B. Software development
C. Neither
D. Both

Q 20. In Bangalore, assume that there are 5000 petty vegetable vendors, selling fruits and vegetables every day from their carts. One of them decides to raise the prices of the vegetables after making her cart beautiful, but she finds that all the buyers have chosen to buy vegetables from other sellers instead. This is because the market for vegetables is operating under…

A. Monopolistic competition
B. Imperfect competition
C. Perfect competition
D. None of the above

Q 21. The Marxian view is that the history of all hitherto existing society is the history of

A. Power struggles
B. Class struggles
C. Neither
D. Both

Q 22. Political parties and movements that mobilise people with grievance and hostility against governing elites are called

A. Democratic
B. Socialist
C. Populist
D. Communist

Q 23. In the short run, if a monopoly firm earns a supernormal profit then in the long run...

A. it will continue to earn supernormal profits
B. it will earn no supernormal profits
C. Both of the above can occur
D. None of the above can occur

Q 24. Approaches that seek and establish links between class, caste, gender and race in assessing vulnerability to climate change are called:

A. Interdisciplinary
B. Institutional
C. Idiosyncratic
D. Intersectional