Q.1) Consider the following statements regarding the Genetic Diversity:

1. Genetic diversity exists between different species and not within the same species.
2. It ensures that some species survive drastic changes and thus carry on the desirable genes.

Which of the above statements are correct?

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

Q.1) Solution (b)

Genetic Diversity

• It is variation in genes within a particular species.
• A single species might show high diversity at the genetic level [E.g. Man: Chinese, Indian American, African etc.]. India has more than 50,000 genetically different strains of rice, and 1,000 varieties of mango.
• It is the total number of genetic characteristics in the genetic makeup of a species.
• It allows species to adapt to changing environment.
• It ensures that some species survive drastic changes and thus carry on the desirable genes (just like what they say in movie "Lucy", carrying information).
• The beautiful butterflies, roses, parakeets or coral in a myriad hue, shapes and sizes are result of Biodiversity.

Q.2) Consider the following statements:

1. Endemic species are species unique to a defined geographical location.
2. Endemic species are least prone to extinction due to habitat loss.
3. Among animals, insects are the most species rich taxonomical group.

Which of the above statements are correct?

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

Q.2) Solution (c)

Species Diversity

- It is the variety of living organisms on earth.
- Species have different genes and they do not inter – breed in nature.
- Closely - related species have many common hereditary characteristics. O For example - about 98.4% of the genes of humans and chimpanzees are the same.

Species Diversity is given by the formula: One specie population/total number of organisms across all species. (In a given biome.)

- "Zero" means infinite diversity and "one" represents only one species present.
- Endemism – it is the ecological state of a species being unique to a defined geographic location, such as an island, nation, country or other defined zone, or habitat type.

Organisms that are indigenous to a place are not endemic to it if they are also found elsewhere. A particular type of animal or plant may be endemic to a zone, a state or a country. The extreme opposite of endemism is cosmopolitan distribution.

Endemic species are most prone to extinction due to habitat loss.

- Among animals, insects are the most species – rich taxonomic group, making up more than 70 per cent of the total. That means, out of every 10 animals on this planet, 7 are insects.

Q.3) Which of the following statements correctly explains the term 'Bioprospecting'?

a) Finding a new habitat for a vulnerable specie.
b) Artificially mating two different species to get new species.
c) The search for economically valuable genetic and biochemical resources from nature.
d) The search for alternate keystone specie for an ecosystem.

Q.3) Solution (c)

Bioprospecting

- Bioprospecting can be defined as the systematic search for and development of new sources of chemical compounds, genes, micro – organisms, macro – organisms, and other valuable products from nature. It entails the search for economically valuable genetic and biochemical resources from nature. So, in brief, bioprospecting means looking for ways to commercialize biodiversity.
- Nations endowed with rich biodiversity explore molecular, genetic and species – level diversity to derive products of economic importance.

Q.4) According to Indian Forest Report 2015, approximately how much land in India is under forest cover?

a) 35%
b) 15%
c) 24%
d) 18%

Q.4) Solution (c)

India's geographical area under forest and tree cover – 24.16% (Indianforest report 2015).
Of the 34 globally identified biodiversity hotspots, India harbours two hotspots, i.e., Eastern Himalayas, Western Ghats and Sri Lanka

Q.5) Which of the following statements are correct about biogeographic Realms?

1. Realm is a continent or sub - continent sized area with unifying features of geography and fauna & flora.
2. The world has been divided into eight biogeographic realms.
3. Neotropical realm covers Central and South America.

Select the code from below:

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

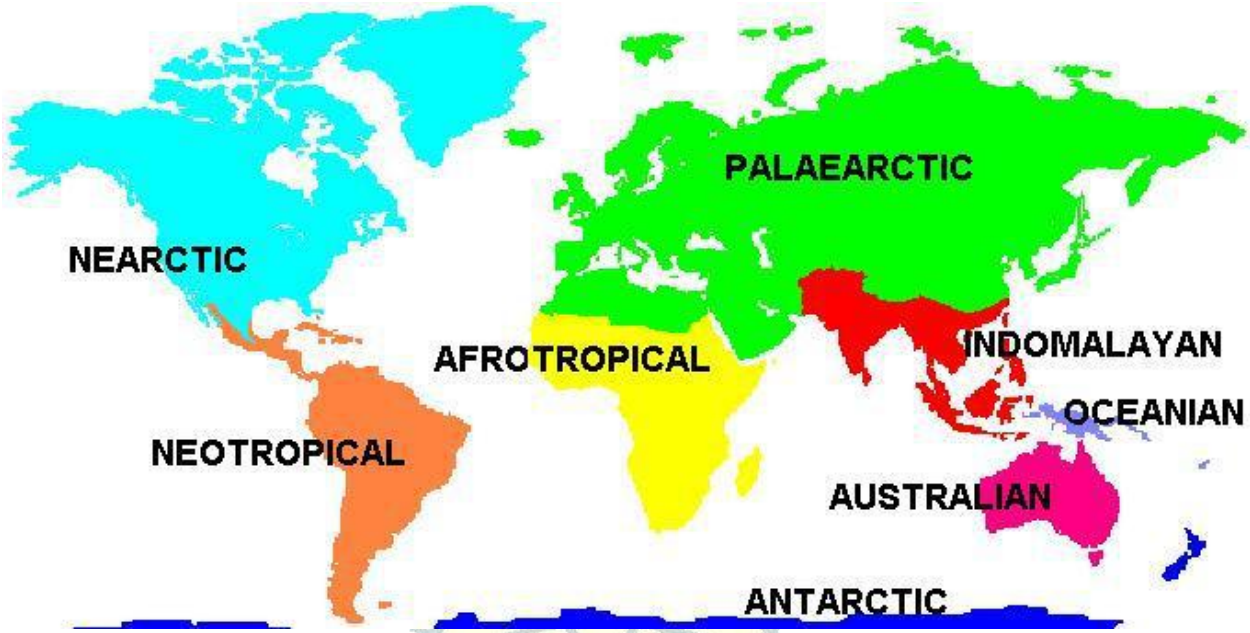
Q.5) Solution (d)

Realms
• Biogeographic realms are large spatial regions within which ecosystems share a broadly similar biological evolutionary history.

Realm is a continent or sub – continent sized area with unifying features of geography and fauna & flora.
• In world - 8 biogeographic realms are there –

- Nearctic realm
- Palaearctic realm
- Africotropical realm
- Indomalayan realm
- Ocenaia realm
- Australian realm
- Antarctic realm

- Neotropical realm



Q.6) Which of the following are the examples of Arachnids?

1. Mosquito
2. Tick
3. Spider
4. Scorpion

Select the code from below:

a) 1,2 and 3
b) 2,3 and 4
c) 1,3 and 4
d) All of the above

Q.6) Solution (b)

Arachnids

- They are a class of joint – legged in vertebrate animals (arthropods).
- Example – spiders, scorpions, ticks and mites.
- They do not have antennae.
- They have 2 body parts and 4 pairs of legs.

Q.7) Which of the following are correct differences between angiosperms and gymnospers?

1. Angiosperms have seeds while gymnosperms do not.
2. Angiosperms bear fruits while gymnosperms do not.

Select the code from following:

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

Q.7) Solution (b)

Gymnosperms (gymnos=naked, sperma = seed) are the naked – seeded plants.
Their naked condition stands in contrast to the seeds and ovules of flowering plants (angiosperms), which are enclosed within an ovary.
They have very simple flowers without accessory whorls and the microsporophylls (stamens) and carpels remain aggregated in cones.

• Ovules are present on the surface of the carpels and are directly pollinated by the pollen grains.
• There is nothing like ovary, style and stigma, and naturally there is no fruit.
• E.g. Cycas, Pinus, Gnetum.

Like gymnosperms, angiosperms are seed – producing plants.
They are distinguished from gymnosperms by characteristics including flowers, endosperm within the seeds, and the production of fruits that contain the seeds.
• Angiosperms are the most highly developed plants which bear flowers having conspicuous accessory and essential whorls.
O Carpels have the ovary, style and stigma.

Q.8) Which of the following is the correct criterion to keep a specie in Critically endangered list of IUCN red data book?

1. Reduction of population > 50% in last 10 years.
2. Reduction in population size (Less than 50 mature individuals).

Select the code from below:

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

Q.8) Solution (b)

Critically Endangered (CR)

- **Extremely high risk of extinction** in the wild.
- A taxon is Critically Endangered when the best available evidence indicates that it meets any of the criteria for Critically Endangered.

Criteria

- Reduction in population **(> 90%** over the last **10** years),
- Reduction in Population size (number less than **50** mature individuals)
- Quantitative analysis showing the probability of extinction in wild in at least **50%** in their **10** years)
- It is therefore considered to be facing an **extremely high risk of extinction** in the wild.

Q.9) Which of the following statements regarding Namdhapa Flying Squirrel are correct?

1. It is found only in Uttarakhand state of India.
2. Its status is critically Endangered in IUCN red list.
3. It is hunted for food.

Select the code from below:

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

Q.9) Solution (c)

The Namdapha Flying Squirrel

- It is a unique (the only one in its genus) flying squirrel that is restricted to a single valley in the Namdapha National park or wild life sanctuary in Arunachal Pradesh.
- **Habitat** - Tropical forest.
- **Distribution** - Found only in Namdapha Tiger Reserve in Arunachal Pradesh.
- **Threats** - Hunted for food.

Q.10) Which of the following statements are correct about the Primary criteria for selection of Biosphere Reserves in India?

1. A site that must contain an effectively protected and minimally disturbed core area.
2. It should include Additional land and water suitable for research.
3. Core area should be typical of a biogeographical unit and large enough to sustain viable populations representing all tropic levels in the ecosystem.

Select the code from below:

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

Q.10) Solution (a)

Criteria for selection of BRs

Primary criteria

• A site that must contain an effectively protected and minimally disturbed core area.

• It should include –
O Additional land and water suitable for research.
O Demonstration of sustainable methods of research and management.
• Core area should be typical of a biogeographical unit and large enough to sustain viable populations representing all tropic levels in the ecosystem.

Secondary criteria
• Areas having rare and endangered species.
• Areas having diversity of soil and micro – climatic conditions and indigenous varieties of biota.
• Areas potential for preservation of traditional tribal or rural modes of living for harmonious use of environment.

Q.11) Which of the following can be threats to the biodiversity of a geographical area?

1. Global warming
2. Fragmentation of habitat
3. Invasion of alien species
4. Promotion of vegetarianism

Select the correct answer using the codes given below:

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

Q.11) Solution (d)

The question was asked by UPSC in 2012.

First three points are straight forward.

Promotion of Vegetarianism would mean more demand of food grains and vegetables that will require more agricultural land hence clearing more forest and loss of habitat. This is the reason why alternate sources of food is being promoted by the government with different colourful revolutions like red revolution, pink revolution and blue revolution, to reduce pressure on agricultural land.

Q.12) Global warming potential (GWP) describes the impact of each gas on global warming. Which of the following gases has the highest GWP?

a) Methane

b) Sulphur hexafluoride
c) CFCs
d) HCFCs

Q.12) Solution (b)

Global warming Potential (GWP)

- Global warming potential describes the impact of each gas on global warming.
- Two most important characteristics of a GHG –

O How well the gas absorbs energy

O How long the gas stays in the atmosphere?

- The Global Warming Potential (GWP) for a gas is a measure of the total energy that a gas absorbs over a particular period of time (usually 100 years), compared to carbon dioxide.
- Higher GWP gases absorb more energy → Contribute more to warming earth.
- Carbon dioxide (C02) has a GWP of 1 and serves as a baseline for other GWP values.
- The larger the GWP, the more warming the gas causes.

O E.g.methane's 100 – year GWP is 21, which means that methane will cause 21 times as much warming as an equivalent mass of CO2 over a 100 – year time period.

Gas	Global Warming Potential
Carbon Dioxide (CO2)	1
Methane (CH4)	21
Nitrous Oxide (N2O)	310
HFC-23	11,700
HFC-125	2,800
HFC-134a	1,300
HFC-143a	3,800
HFC-152a	140
HFC-227ea	2,900
HFC-236fa	6,300
HFC-4310mee	1,300
CF4	6,500
C2F6	9,200
C4F10	7,000
C6F14	7,400
SF6	23,900

Q.13) Which of the following statements regarding Ocean Acidification are correct?

1. The pH of Oceans in certain areas have gone down less than 7.

2. There is an ongoing decrease in the pH of our oceans because of higher uptake of CO_2 from the atmosphere.

Select the code from below:

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

Q.13) Solution (b)

Ocean acidification is the ongoing decrease in the pH of the Earth's oceans, caused by the uptake of carbon dioxide (CO2) from the atmosphere.
It increases the concentration of hydrogen ions and decreases the concentration of carbonate ions.
Seawater is slightly basic (meaning pH > 7), and the process in question is a shift towards pH – neutral conditions rather than a transition to acidic conditions (pH < 7).

Q.14) Consider the following statements regarding IPCC:

1. It has been established by United Nations Environment Program (UNEP) and World Meteorological Organisation.
2. It does not conduct any research nor does it monitor climate related data or parameters.

Which of the above statements are correct?

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

Q.14) Solution (c)

The UN General Assembly adopted a resolution, in 1988, on the subject and endorsed the UNEP/WMO proposal for the setting up of the Inter – Governmental Panel on Climate Change (IPCC).

- Established by - United Nations Environment Programme (UNEP) and the World meteorological Organization (WMO)
- The IPCC is a scientific body. It reviews and assesses the most recent scientific, technical And socio – economic information produced worldwide relevant to the understanding of climate change.

- It is open to all member countries of the UN and WMO. Currently 195 countries are members of IPCC.
- It does not conduct any research nor does it monitor climate related data or parameters.
- Review is an essential part of the IPCC process, to ensure an objective and complete assessment of current information.
- By endorsing the IPCC reports, governments acknowledge the authority of their scientific content. The work of the organization is therefore policy – relevant and yet policy – neutral, never policy – prescriptive.
- It has also responded to the need of the UNFCCC for information on scientific and technical matters through Special Reports, Technical Papers and Methodology Reports.

Q.15) Recently Forest and Environment Department of an Indian state learnt tricks from Mankidia tribe to trap monkeys. Where are these tribes found?

a) Western Ghats of Karnataka
b) Odisha
c) Rajasthan
d) Uttar Pradesh

Q.15) Solution (b)

Faced with rising incidents of monkeys raiding vegetable gardens, invading homes and attacking villagers in coastal Odisha, the State's Forest and Environment Department has asked its personnel to learn a few tricks from the Mankidia tribe to contain the menace.

Upon spotting a monkey in a tree, the tribes surround the monkey by climbing nearby trees and structures. Once it is surrounded, they shake the tree till the animal falls. A team on the ground, who are ready with a net, quickly trap the animal

Source : http://www.thehindu.com/news/cities/Delhi/odisha-forest-staff-learn-how-to-trap-monkeys-from-mankidia-tribesmen/article18349053.ece

Q.16) Mughal era structure "Khooni Bhandara" in Madhya Pradesh has been recommended by the state for UNESCO World Heritage Site tag. What is it?

a) Dungeon believed to be Mughal prison
b) Arsenal and armoury of Mughals
c) Mughal Fort

d) Underground water management system

Q.16) Solution (d)

A unique underground water management structure of the Mughal era in Burhanpur district of Madhya Pradesh, known as the 'Kundi Bhandara' or 'Khooni Bhandara,' is eyeing the tag of UNESCO world heritage site as the state government makes a case for it with the Centre. Khooni Bhandara is a network of Kundis (well-like structures), which are inter-connected through an underground tunnel. The system ensured a smooth course of water from the first to the last Kundi, based on the law of gravity.

An iron stairs or rope is used to go down in the tunnel through these well-like structures. These structures were developed during the Mughal era for water supply.

The structure, also a popular tourist spot, is still functional and serves high-quality drinking water to a portion of Burhanpur.

Source : http://www.hindustantimes.com/india-news/mp-mughal-era-structure-khooni-bhandara-vies-for-unesco-world-heritage-tag/story-xs3a1lXSjCf5ODd3JnS1cO.html

Q.17) Consider the following statements on Bharatiya Nirdeshak Dravya (BND 4201)

1. It is India's own standard bar of gold that is 99.99% pure
2. It weighs 25g and is of the dimension of Parle-G biscuit
3. Bars are made by India Government Mint, Measurements would be done by Bhabha Atomic Research Centre and Certification would be by CSIR-National Physical Laboratory

Select the *incorrect* statements

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

Q.17) Solution (b)

India now has its own standard bar of gold that is 99.99% pure and can be used to verify the purity of gold sold in shops. Called the Bharatiya Nirdeshak Dravya (BND 4201), the bar, weighing 20gm and with the dimensions of a 'Parle-G' biscuit. The bars will be made by the India Government Mint (IGM), a unit of Security Printing and Minting Corp of India Ltd,

technical aspects such as measurement would be done by the Bhabha Atomic Research Centre and certifying the purity of the bars would be the responsibility of the CSIR-National Physical Laboratory (NPL).

Source : http://www.thehindu.com/business/indian-scientists-unveil-home-grown-gold-standard/article18447892.ece

Q.18) NASA named a new bacterium after APJ Abdul Kalam. Where was the bacteria found?

a) Satellite debris
b) International Space Station
c) Kuiper Belt
d) Mars

Q.18) Solution (b)

Researchers at the Jet Propulsion Laboratory (JPL), the foremost lab of NASA for work on interplanetary travel, discovered the new bacteria on the filters of the International Space Station (ISS) and named it *Solibacillus kalamii* to honour the late President, who was a renowned aerospace scientist. The species name is after Dr. Abdul Kalam and genus name is Solibacillus which is a spore-forming bacteria

Source : http://www.thehindubusinessline.com/news/nasa-names-bacteria-after-abdul-kalam/article9709264.ece

Q.19) National Institute of Immunology has developed Mycobacterium Indicus Pranii (MIP), an indigenous vaccine for

a) Tuberculosis
b) Leprosy
c) Diarrhoea
d) Tetanus

Q.19) Solution (b)

MIP is a non-pathogenic bacteria. In its heat-killed form, it acts by sprucing up the body's immunity. It has received approval as a leprosy vaccine from the Indian drug regulator, Central Drugs Standard Control Organisation, and the US Food and Drug Administration (FDA). It is now being introduced into the National Leprosy Elimination Programme (NLEP)

Apart from leprosy, it is also being tried as a vaccine against bladder cancer, warts, lung cancer and TB.

Leprosy

Caused by the bacterium Mycobacterium leprae, leprosy affects the skin, nervous system, respiratory tract and eyes but is most feared because of the unsightly skin lesions and in very advanced stages, disfigurement and disability.

Source: http://indianexpress.com/article/explained/home-grown-vaccine-latest-shot-at-checking-leprosy-numbers-4646778/

Q.20) 'Darwaza Band' campaign launched by Union government is against

a) Domestic violence
b) Child sexual abuse
c) Open defecation
d) Sexual harassment at workplaces

Q.20) Solution (c)

The centre launched an aggressive new campaign titled 'Darwaza Band' to promote toilet use and freedom from open defecation across the country's villages. The campaign produced by the Minsitry of Drinking Water and Sanitation under Swachh Bharat Mission is led by iconic actor, Shri Amitabh Bachchan.

The 'Darwaza Band' campaign has been supported by the World Bank and is being rolled out countrywide immediately after the launch. It is designed to encourage behaviour change in men who have toilets but are not using them. The campaign would encourage women to stand up for this issue in their villages and assume a leadership role.

Source : http://pib.nic.in/newsite/PrintRelease.aspx?relid=163260