

Q1. In India, the organisation responsible for assessing the safety of introducing genetically modified organisms for public use is

- (a) Indian Council of Medical Research (ICMR)
- (b) Council for Scientific and Industrial Research (CSIR)
- (c) Research Committee on Genetic Manipulation (RCGM)
- (d) Genetic Engineering Appraisal Committee (GEAC)

Q2. Which of the following is commonly used as a vector for introducing a DNA fragment in human lymphocytes ?

- (a) Retrovirus
- (b) Ti plasmid
- (c) λ phage
- (d) pBR 322

Q3. Use of bioresources by multinational companies and organisations without authorisation from the concerned country and its people is called

- (a) Bio-infringement
- (b) Biopiracy
- (c) Biodegradation
- (d) Bioexploitation

Q4. A 'new variety of rice was patented by a foreign company though such varieties have been present in India for a long time. This is related to

- (a) Co-667
- (b) Sharbati Sonora
- (c) Lerma Rojo
- (d) Basmati

Q5. The correct order of steps in Polymerase Chain Reaction (PCR) is

- (a) Extension, Denaturation, Annealing
- (b) Annealing, Extension, Denaturation
- (c) Denaturation, Extension, Annealing
- (d) Denaturation, Annealing, Extension

Q6. RNA interference which is employed in making tobacco plant resistant to *Meloidogyne incognita* is essentially involved in

- (a) Preventing the process of translation of mRNA
- (b) Preventing the process of transcription
- (c) Preventing the process of replication of DNA
- (d) Preventing the process of splicing of hnRNA.

Q7. ADA deficiency results in

- (a) Increased risk of infertility
- (b) Inability of immune system to function normally

(c) Chromosomal disorders

(d) Decrease in the yield of crop plants.

Q8. Roquefort cheese is ripened by using

- (a) Type of yeast
- (b) Fungus
- (c) Bacterium
- (d) Cyanobacteria.

Q9. 'Flocs' is

- (a) The primary sludge produced in sewage treatment
- (b) A type of biofortified food
- (c) A mesh-like structure formed by the association of bacteria and fungal filaments in sewage treatment
- (d) The effluent in primary treatment tank obtained during sewage treatment.

Q10. Parbhani Kranti, a variety of bhindi (lady's finger), is resistant to

- (a) Bacterial blight
- (b) Yellow mosaic virus
- (c) Black rot
- (d) Leaf curl.

Q11. During somatic hybridisation in plants

- (a) Somaclones are produced in large numbers
- (b) Apical meristems are cultured to get virus-free plants
- (c) Cell walls and middle lamella are digested before fusing the cells
- (d) Crop plants with higher levels of vitamins, proteins and minerals are hybridised.

Q12. Mating of two varieties of a cattle breed like Red Dane which have no common ancestors on either side of their pedigree up to 4-6 generations is an example for

- (a) Inbreeding
- (b) Cross breeding
- (c) Out crossing
- (d) Interspecific hybridisation.

Q13. Bioreactors are useful in

- (a) Separation and purification of a product
- (b) Processing of large volumes of culture
- (c) Micro-injection
- (d) Isolation of genetic material

Q14. The polymerase chain reaction (PCR) is a technique that is used for

- (a) *In vivo* replication of specific DNA sequence using thermostable DNA polymerase
- (b) *In vitro* synthesis of mRNA

(c) *In vitro* replication of specific DNA sequence using thermostable DNA polymerase

(d) *In vivo* synthesis of mRNA

Q15. The first recombinant DNA was constructed by linking an antibiotic resistant gene with the native plasmid of

(a) *Escherichia coli*

(b) *Salmonella typhimurium*

(c) *Clostridium butylicum*

(d) *Acetobacter aceti*

Q16. In DNA finger printing technique, probe is used for hybridisation of DNA fragments

(a) Double stranded RNA

(b) Double stranded non-radioactive DNA

(c) Single stranded radioactive DNA

(d) Single stranded radioactive RNA.

Q17. The inactive protoxin is activated in the gut of the insect by

(a) Acidic pH

(b) Alkaline pH

(c) Low temperature

(d) High temperature.

Q18. cry gene is obtained from

(a) *Agrobacterium tumefaciens*

(b) *Bacillus thuringiensis*

(c) *Rhizopus leguminosarum*

(d) *Rhizobium phaseoli*.

Q19. In plant breeding the entire collection of plants/ seeds having diverse alleles in a particular organism is called

(a) Gene bank

(b) cDNA library

(c) Genomic library

(d) Germplasm.

Q20. Strategy used to prevent nematode infection of tobacco roots is

(a) Use of agrochemicals

(b) Bt toxin gene

(c) Gene mutation

(d) RNA interference.

Q21. Somatic hybridisation is carried out by

(a) Protoplast fusion

(b) Cell culture

(c) Pollen culture

(d) Anther culture.

Q22. Protein encoded by gene *cry IAb* controls the infestation of which of the following insects

(a) Cotton boll worm

(b) *Anopheles* mosquito

(c) Corn borer

(d) *Aedes* mosquito.

Q23. Which of the following techniques is most widely employed to check the progress of a restriction enzyme digestion

(a) Agarose gel electrophoresis

(b) Centrifugation

(c) Polyacrylamide gel electrophoresis

(d) PCR.

Q24. The 'sticky ends' on which of the two strands of a DNA generated by treatment with restriction enzymes facilitate action of enzyme

(a) DNA ligase

(b) Endonuclease

(c) Exonuclease

(d) DNA polymerase.

Q25. In order to induce the bacterial uptake of plasmids, the bacteria are made "competent" by first treating with

(a) Sodium chloride

(b) Potassium chloride

(c) Magnesium chloride

(d) Calcium chloride.

Q26. What gases are produced in anaerobic sludge digesters

(a) Methane, Hydrogen sulphide and O₂

(b) Methane, Hydrogen sulphide and CO₂

(c) Hydrogen sulphide and CO₂

(d) Methane and CO₂ only.

Q27. To obtain virus-free healthy plants from a diseased one by tissue culture technique, which part/parts of the disease plant will be taken

(a) Palisade parenchyma

(b) Both apical and axillary meristems

(c) Epidermis only

(d) Apical meristem only.

Q28. Commonly used vectors for human genome sequencing are

(a) BAC and YAC

(b) Expression vectors

(c) T/A cloning vectors

(d) T-DNA.

Q29. Select the correct group of biocontrol agents.

(a) *Bacillus thuringiensis*, Tobacco mosaic virus, Aphids

(b) *Trichoderma*, Baculovirus, *Bacillus thuringiensis*

(c) *Oscillatoria*, *Rhizobium*, *Trichoderma*

(d) *Nostoc*, *Azospirillum*, Nucleopolyhedrovirus

Q30. DNA precipitation out of a mixture of biomolecules can be achieved by treatment with :

- (a) Isopropanol
- (b) Chilled ethanol
- (c) Methanol at room temperature
- (d) Chilled chloroform

Q31. Expressed Sequence Tapes (ESTs) refers to :-

- (a) Genes expressed as RNA
- (b) Polypeptide expression
- (c) DNA polymorphism
- (d) Novel DNA sequences

Q32. Which of the following can be used as a biocontrol agent in the treatment of plant disease ?

- (a) Trichoderma
- (b) Chlorella
- (c) Anabaena
- (d) Lactobacillus

Q33. Match the following organisms with the products they produce :-

- | | |
|----------------------|-------------------|
| a) Lactobacillus | (i) Cheese |
| b) Saccharomyces | (ii) Curd |
| c) Aspergillus niger | (iii) Citric Acid |
| d) Acetobacter aceti | (iv) Bread |
| | (v) Acetic Acid |

Select the correct option.

- | | | | |
|---------|-------|------|--------|
| a) ii | b) iv | c) v | d) iii |
| (a) ii | iv | v | iii |
| (b) ii | iv | iii | v |
| (c) iii | iv | v | i |
| (d) ii | i | iii | v |

Q34. Which of the following is true for Golden rice ?

- (a) It is Vitamin A enriched, with a gene from daffodil
- (b) It is pest resistant, with a gene from *Bacillus thuringiensis*
- (c) It is drought tolerant, developed using *Agrobacterium* vector
- (d) It has yellow grains, because of a gene introduced from a primitive variety of rice

Q35. The region of Biosphere Reserve which is legally protected and where no human activity is allowed is known as:

- (a) Buffer zone
- (b) Transition zone
- (c) Restoration zone
- (d) Core zone

Q36. Which ecosystem has the maximum biomass ?

- (a) Grassland ecosystem
- (b) Pond ecosystem
- (c) Lake ecosystem
- (d) Forest ecosystem

Q37. Alexander Von Humbolt described for the first time:

- (a) Laws of limiting factor
- (b) Species area relationships
- (c) Population Growth equation
- (d) Ecological Biodiversity

Q38. Which one of the following is related to Ex-situ conservation of threatened animals and plants ?

- (a) Biodiversity hot spots
- (b) Amazon rainforest
- (c) Himalayan region
- (d) Wildlife safari parks

Q39. Asymptote in a logistic growth curve is obtained when :

- (a) $K = N$
- (b) $K > N$
- (c) $K < N$
- (d) The value of 'r' approaches zero

Q40. Match the items given in Column I with those in Column II and select the correct option given below:

- | Column I | Column II |
|----------------------|--------------------------|
| a. Eutrophication | i. UV-B radiation |
| b. Sanitary landfill | ii. Deforestation |
| c. Snow blindness | iii. Nutrient enrichment |
| d. Jhum cultivation | iv. Waste disposal |
- (a) a ii b i c iii d iv
 (b) a i b iii c iv d ii
 (c) a iii b iv c i d ii
 (d) a i b ii c iv d iii

Q41. All of the following are included in 'Ex-situ conservation' except

- (a) Wildlife safari parks
- (b) Sacred groves
- (c) Botanical gardens
- (d) Seed banks

Q42. In stratosphere, which of the following element acts as a catalyst in degradation of ozone a release of molecular oxygen ?

- (a) Carbon
- (b) Cl
- (c) Fe
- (d) Oxygen

Q43. Gross primary productivity is the rate of production of during photosynthesis.

- (a) Organic matter
- (b) Oxygen
- (c) Carbon dioxide
- (d) Chlorophyll.

Q44. Afforestation is

- (a) Restoring a forest
- (b) Plantation in barren land
- (c) Cultivation under agriculture
- (d) Jhum cultivation.

Q45. The term biomagnification means
(a) Increase in concentration of nondegradable pollutant in food chain
(b) Growth of organisms by consumption of food
(c) Decrease in population size
(d) Increase in population size.

Q46. In IUCN Red List (2004) extinction of 784 species includes
(a) 335 vertebrates, 360 invertebrates and 89 plants
(b) 337 vertebrates, 362 invertebrates and 88 plants
(c) 338 vertebrates, 359 invertebrates and 87 plants
(d) 340 vertebrates, 357 invertebrates and 87 plants.

Q47. The process of nutrient enrichment of water, and subsequent loss of species diversity is referred to as .
(a) Bioconcentration
(b) Biomagnification '
(c) Eutrophication
(d) Nitrification.

Q48. A citizen group called *Friends of the Arcata Marsh* (FOAM) basically belong to
(a) Germany
(b) USA
(c) Canada
(d) UK.

Q49. According to IUCN Red list, during the last two decades, the maximum increase in the number of threatened species is among
(a) Amphibians
(b) Reptiles
(c) Birds
(d) Mammals.

Q50. Which of the following is an example of alien species invading a new ecosystem resulting in biodiversity losses
(a) Introduction of Nile Perch into Lake Victoria in east Africa
(b) Introduction of Water Hyacinth into India
(c) Introduction of African Catfish into Indian rivers
(d) All the above.

Q51. A scrubber in the exhaust of a chemical industrial plant removes
(a) Particulate matter of the size of 5 micrometre or above
(b) Gases like ozone and methane
(c) Particulate matter of the size of 2.5 micrometre or less
(d) Gases like sulphur dioxide.

Q52. The organisation which publishes the Red List of species is
(a) IUCN
(b) UNIP
(c) WWF
(d) ICFRE.

Q53. An example of *ex situ* conservation is
(a) Seed bank
(b) Wild life sanctuary
(c) Sacred grove
(d) National park.

Q54. A species facing extremely high risk of extinction in the immediate future is called
(a) Endemic
(b) Critically endangered
(c) Extinct
(d) Vulnerable.

Q55. Which of these following methods is the most suitable for disposal of nuclear waste ?
(a) Shoot the waste into space
(b) Bury the waste under Antarctic ice-cover
(c) Dump the waste within rocks under deep ocean
(d) Bury the waste within rocks deep below the Earth's surface

Q56. Which one of the following is not a method of in situ conservation of biodiversity ?
(a) Biosphere Reserve
(b) Wildlife Sanctuary
(c) Botanical Garden
(d) Sacred Grove

Q57. One of the chief reasons among the following for the depletion in the number of species making it endangered is
(a) Greenhouse effect
(b) Habitat destruction
(c) Overhunting and poaching
(d) Competition and predation.

Q58. The interaction between the organisms of one of the following pairs is an example for commensalism
(a) Wasp and Fig tree
(b) Cuckoo and Crow
(c) Cattle or Sheep and grass
(d) Orchid and Mango tree.

Q59. The ozone hole over Antarctica develops each year between
(a) Late December and early February
(b) Late February and early April
(c) Late April and early June
(d) Late August and early October

Q60. Which one among these is not an *ex-situ* conservation strategy

- (a) Seed banks
- (b) Botanical gardens
- (c) Cryopreservation
- (d) Biosphere reserves

Q61. The pioneer species in xerarch and hydrarch succession are respectively

- (a) Lichens and sedges
- (b) Lichens and rooted hydrophytes
- (c) Phytoplankton and lichens
- (d) Lichens and phytoplankton

Q62. The breakdown of detritus into small particles by detritivores is called

- (a) Fragmentation.
- (b) Humification
- (c) Catabolism
- (d) Mineralisation

Q63. Pyramid of energy in a pond ecosystem is always

- (a) Linear
- (b) Inverted
- (c) Irregular
- (d) Upright.

Q64. Maximum biodiversity is found in

- (a) Tropical rain forest
- (b) Temperate rain forests
- (c) Mangrove vegetation
- (d) Tundra.

Q65. Which helps in maintaining species diversity in a community.

- (a) Omnivores
- (b) Predators
- (c) Herbivores
- (d) Facultative parasites.

Q66. Which of the following is the most important causes for animals and plants being driven to extinction?

- (a) Habitat loss and fragmentation
- (b) Drought and floods
- (c) Economic exploitation
- (d) Alien species invasion

Q67. Each trophic level has a certain mass of living material at a particular time called as

- (a) Standing crop
- (b) Biomass
- (c) Net productivity
- (d) None.

Q68. Vertical distribution of different species occupying different levels is called

- (a) Energy flow
- (b) Productivity
- (c) Nutrient cycling
- (d) Stratification.

Q69. In which of the following areas does the primary succession occur

- (a) Abandoned farm land
- (b) Land which has been flooded
- (c) Forest destroyed by fire
- (d) Newly created pond.

Q70. Mycorrhiza is an example of

- (a) Decomposers
- (b) Symbiotic relationship
- (c) Ectoparasitism
- (d) Endoparasitism.

Q71. Which of the following ecological pyramids is generally inverted ?

- (a) Pyramid of numbers in grassland
- (b) Pyramid of energy
- (c) Pyramid of biomass in a forest
- (d) Pyramid of biomass in a sea

Q72. All successions whether taking place in water or on land proceeds to a similar climax community which is

- (a) Hydric
- (b) Xeric
- (c) Mesic
- (d) None of the above.

Q73. Which of the following statement about the food chain is false

- (a) Detritus food chain begins with dead organic matter
- (b) Carnivores are secondary consumers
- (c) Primary consumers are herbivores
- (d) Earthworm in detritus food chain is a primary producer.

Q74. Which of the following statements is **incorrect**

- (a) The species that invade a bare area are called pioneer species
- (b) The entire sequence of communities that successively change in a given area are called sere
- (c) Pyramid of energy is always inverted
- (d) Pyramid of numbers in a tree ecosystem can be inverted.

Q75. Most hazardous metal pollutant of automobile exhaust is

- (a) Lead
- (b) Mercury
- (c) Cadmium
- (d) Copper.

Q76. Polyblend, a fine powder of recycled modified plastic, has proved to be a good material for:

- (a) making plastic sacks
- (b) use as a fertilizer
- (c) construction of roads
- (d) making tubes and pipes

Q77. If two species compete for same resource avoid competition by choosing different times for feeding or different foraging pattern, it is

- (a) Resource partition
- (b) Competitive release
- (c) Mutualism
- (d) Commensalism.

Q78. Which of the following forest plants control the light conditions at the ground ?

- (a) Lianas and climbers
- (b) Shrubs
- (c) Tall trees
- (d) Herbs.

Q79. The plant which produces highly poisonous cardiac glycosides is :

- (a) Cactus
- (b) *Calotropis*
- (c) *Acacia*
- (d) Bhang.

Q80. An orchid growing as an epiphyte on a mango tree is an example for

- (a) Parasitism
- (b) Predation
- (c) Commensalism
- (d) Mutualism

Q81. According to Robert Constanza, 50% of the total cost for ecosystem services goes to

- (a) Recreation
- (b) Soil formation
- (c) Nutrient cycling
- (d) Climate regulation

Q82. If there was no carbon dioxide in the earth's atmosphere, the temperature of the earth's surface would be

- (a) Same as the present level
- (b) More than the present level
- (c) Less than the present level
- (d) Dependent on O₂ content of atmosphere.

Q83. Which of the following is true for eutrophicated water body

- (a) High mineral content
- (b) High oxygen content
- (c) Rich species diversity
- (d) Low organic content.

Q84. Which of the following is true for Golden rice ?

- (a) It is Vitamin A enriched, with a gene from daffodil
- (b) It is pest resistant, with a gene from *Bacillus thuringiensis*

(c) It is drought tolerant, developed using *Agrobacterium* vector

(d) It has yellow grains, because of a gene introduced from a primitive variety of rice

Q85. Select the incorrect statement :-

- (a) Inbreeding increases homozygosity
- (b) Inbreeding is essential to evolve purelines in any animal
- (c) Inbreeding selects harmful recessive genes that reduce fertility and productivity
- (d) Inbreeding helps in accumulation of superior genes elimination of undesirable genes

Q86. Which of the following features of genetic code does allow bacteria to produce human insulin by recombinant DNA technology?

- (a) Genetic code is not ambiguous
- (b) Genetic code is redundant
- (c) Genetic code is nearly universal
- (d) Genetic code is specific

Q87. What triggers activation of protoxin to active Bt toxin of *Bacillus thuringiensis* in boll worm?

- (a) Body temperature
- (b) Moist surface of midgut
- (c) Alkaline pH of gut
- (d) Acidic pH of stomach

Q88. Identify the correct pair representing the causative agent of typhoid fever and the confirmatory test for typhoid.

- (a) *Plasmodium vivax*/UTI test.
- (b) *Streptococcus pneumoniae*/Widal test
- (c) *Salmonella typhi*/Anthrone test
- (d) *Salmonella typhi*/Widal test

Q89. During "gene cloning" which is called as "gene taxi" ?

- (a) Vaccine
- (b) Plasmid
- (c) Bacterium
- (d) Protozoa.

Q90. Name the nematode which infects the roots of tobacco plants

- (a) *Bacillus thuringiensis*
- (b) Cry 1AC
- (c) *Meloidogyne incognita*
- (d) None of these.