02
Biological Classification

TOPIC 1
Kingdom-Monera

01 Which of the following statement is correct? **[NEET 2021]**

(a) Fusion of two cells is called karyogamy
(b) Fusion of protoplasm between two motile or non-motile gametes is called plasmogamy
(c) Organisms that depend on living plants are called saprophytes
(d) Some of the organisms can fix atmospheric nitrogen in specialised cells called sheath cells

Ans. ***(b)***

Statement in option (b) is correct. Plasmogamy, the fusion of two protoplasts (the contents of the two cells), brings together two compatible haploid nuclei. At this point, two parent cells are present in the same cell, but the nuclei have not yet fused.
Incorrect statements can be corrected as Organisms that can fix atmospheric nitrogen in specialised cells are called heterocyst.

Karyogamy is nothing but the fusion of two nuclei means production of diploid cell (2*n* condition).

Organisms that depends on living plants are called heterotrophs.

02 The size of Pleuropneumonia Like Organism (PPLO) is **[NEET (Oct.) 2020]**

(a) 0.02 μm (b) 1-2 μm
(c) 10–20 μm (d) 0.1 μm

Ans. ***(d)***

The size of various organisms/cells are
Pleuropneumonia Like Organism (PPLO)-0.1 μm Viruses-0.02 - 0.2 μm
Bacterial cell- 1–2 μm
Eukaryotic cell-10–20 μm

03 Which of the following is incorrect about cyanobacteria? **[NEET (Oct.) 2020]**

(a) They are photoautotrophs
(b) They lack heterocysts
(c) They often form blooms in polluted water bodies
(d) They have chlorophyll-*a* similar to green plants

Ans. ***(b)***

Cyanobacteria or blue-green algae are photosynthetic organisms which perform oxygenic photosynthesis. They have the ability of nitrogen fixation due to the presence of large pale cells called heterocyst in their filaments. Due to the presence of thick walls, heterocysts are impermeable to oxygen.

04 Oxygen is **not** produced during photosynthesis by **[NEET 2018]**

(a) *Cycas*
(b) *Nostoc*
(c) Green sulphur bacteria
(d) *Chara*

Ans. ***(c)***

Green sulphur bacteria are anaerobic bacteria. They do not evolve oxygen during photosynthesis. Such type of photosynthesis is known as anoxygenic photosynthesis.

They do not use water as a source of reducing power. Instead, hydrogen is obtained from hydrogen sulphide.

$$\underset{\text{Hydrogen sulphide}}{H_2S} \longrightarrow 2[H]+S$$

$$6CO_2 + 12H_2 \xrightarrow[\text{Enzymes}]{\text{Light}} C_6H_{12}O_6 + 6H_2O$$

Concept Enhancer Green sulphur bacteria, e.g. *Chlorobium limicola*, possesses bacteriophaeophytin as photosynthetic pigment.

Cycas is a gymnosperm, *Nostoc* is a blue-green algae and *Chara* is a green algae. All of these produce oxygen during photosynthesis.

05 Which of the following organisms are known as chief producers in the oceans? **[NEET 2018]**

(a) Cyanobacteria (b) Diatoms
(c) Dinoflagellates (d) Euglenoids

Ans. ***(b)***

Diatoms are chief producers in the oceans and they contribute 40% of marine primary productivity. They constitute a major group of unicellular eukaryotic microalgae and are among the most common types of phytoplanktons.

The other given organisms also exhibit autotrophic mode of nutrition.

06 Which of the following are found in extreme saline conditions? **[NEET 2017]**

(a) Archaebacteria
(b) Eubacteria
(c) Cyanobacteria
(d) Mycobacteria

Ans. ***(a)***

Archaebacteria are the most primitive form of bacteria. These live in diverse habitat, e.g. extreme hot temperature, saline condition, variable pH, etc. Saline bacteria are called Halophiles (e.g. *Halobacterium, Halococcus*).

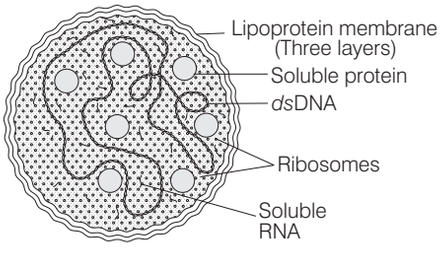
Concept Enhancer The ability of archaebacteria to survive in such conditions is due to the presence of branched lipid chain in their membrane, which reduces the fluidity of their membrane.

07 Which among the following are the smallest living cells, known without a definite cell wall, pathogenic to plants as well as animals and can survive without oxygen? **[NEET 2017]**

(a) *Bacillus*
(b) *Pseudomonas*
(c) *Mycoplasma*
(d) *Nostoc*

Ans. ***(c)***

Mycoplasma is triple layered smallest living cells. It does not have definite cell wall. It is an anaerobic organism. It cause diseases in plants (little leaf of brinjal) as well as in animals (pleuromorphic pneumonia in man).



08 The primitive prokaryotes responsible for the production of biogas from the dung of ruminant animals, include the **[NEET 2016 Phase I]**

(a) thermoacidophiles
(b) methanogens
(c) eubacteria
(d) halophiles

Ans. ***(b)***

Methanogens are group of obligate anaerobic ancient and primitive bacteria. They are involved in methanogenesis and produce methane gas in ruminant of cattles.

09 Which one of the following statements is wrong? **[NEET 2016 Phase I]**

(a) Golden algae are also called desmids
(b) Eubacteria are also called false bacteria
(c) *Phycomycetes* are also called algal fungi
(d) Cyanobacteria are also called blue-green algae

Ans. ***(b)***

Eubacteria are true bacteria which exhibit all true characteristic features of group Eubacteria.

10 Methanogens belong to **[NEET 2016 Phase II]**

(a) eubacteria (b) archaebacteria
(c) dinoflagellates (d) slime moulds

Ans. ***(b)***

Methanogens belong to archaebacteria. It contains three major classes of primitive bacteria, i.e. methanogens, halophilic and thermoacidophilic.

Methanogens are strict anaerobes, present in the gut of several ruminant animals (e.g. cows, etc.) and are responsible for production of methane gas from the dung of these animals.

Concept Enhancer Halophilic bacteria usually occur in salt rich substrate like salt marshes, etc. and are aerobic chemoheterotrophs. Thermophilic bacteria have the dual ability to tolerate high temperature as well as high acidity. These are basically chemosynthetic.

11 Chromatophores take part in **[CBSE AIPMT 2015]**

(a) photosynthesis (b) growth
(c) movement (d) respiration

Ans. ***(a)***

Chromatophores are found in members of phototrophic bacteria. They contain bacteriochlorophyll pigments and carotenoids and take part in photosynthesis. In purple bacteria, such as *Rhodospirillum rubrum*, the light-harvesting proteins are intrinsic to the chromatophore membranes. However, in green sulphur bacteria, they are arranged in specialised antenna complexes called chlorosomes.

12 Archaebacteria differ from eubacteria in **[CBSE AIPMT 2014]**

(a) cell membrane structure
(b) mode of nutrition
(c) cell shape
(d) mode of reproduction

Ans. ***(a)***

Archaebacteria different from eubacteria in that eubacteria have cell membrane composed mainly of glycerol-ester lipids, while archaebacteria have membrane made up of glycerol-ether lipid.

Ether lipids are chemically more resistant then ester lipids. This stability helps archaebacteria to survive at high temperture and in very acidic or alkaline environment.

13 Besides paddy fields, cyanobacteria are also found inside vegetative part of **[NEET 2013]**

(a) *Pinus* (b) *Cycas*
(c) *Equisetum* (d) *Psilotum*

Ans. ***(b)***

Cyanobacteria within the coralloid roots of *Cycas* are chemoheterotrophic and specifically adapted to life in symbiosis. Only a few species of cyanobacteria form associations with *Cycas*. *Pinus* is a gymnosperm. *Equisetum* belongs to vascular plants and to horse tail family. *Psilotum* belongs to division–Pteridophyta and is a fern-like plant.

14 Pigment-containing membranous extensions in some cyanobacteria are **[CBSE AIPMT 2012]**

(a) heterocysts
(b) basal bodies
(c) pneumatophores
(d) chromatophores

Ans. ***(d)***

Cyanobacteria contain chlorophyll but the chlorophyll is not located in chloroplasts, rather it is found in chromatophores which are infolding of the plasma membrane, where photosynthesis is carried out. Heterocysts are specialised nitrogen fixing cells formed by some filamentous cyanobacteria such as *Nostoc*. A basal body is an organelle formed from a centriole and a short cylindrical array of microtubules.

Pneumatophores are lateral roots that grow upward for varying distance and function as the site of oxygen intake for the submerged primary roots of mangrove plants.

15 Which of the following are likely to be present in deep sea water? **[CBSE AIPMT 2012]**

(a) Archaebacteria
(b) Eubacteria
(c) Blue-green algae
(d) Saprophytic fungi

Ans. ***(a)***

Archaebacteria can flourish in hot springs and deep sea hypothermal vents. Eubacteria are true bacteria, characterised by the presence of rigid cell wall and if motile a flagellum. Most fungi are heterotrophic and absorb soluble organic matter from dead substrates and hence, are called saprophyte. The cyanobacteria have chlorophyll-*a* similar to green plants and are photosynthetic autotrophs.

16 The cyanobacteria are also referred to as **[CBSE AIPMT 2012]**

(a) protists
(b) golden algae
(c) slime moulds
(d) blue-green algae

Ans. ***(d)***

Cyanobacteria, also known as blue-green algae (BGA) are most primitive prokaryotic organisms. These are considered to be the most ancient of all the chlorophyll bearing organisms on earth.

17 Nuclear membrane is absent in **[CBSE AIPMT 2012]**

(a) *Penicillium* (b) *Agaricus*
(c) *Volvox* (d) *Nostoc*

Ans. ***(d)***

Nostoc is a prokaryote. Prokaryotic cells lack membrane bound organelles and well organised nucleus, i.e. nuclear envelope is absent.

Penicillium, *Agaricus* and *Volvox* are eukaryotic.

18 In eubacteria, a cellular component that resembles eukaryotic cells is **[CBSE AIPMT 2011]**

(a) nucleus
(b) ribosomes
(c) cell wall
(d) plasma membrane

Ans. ***(d)***

The plasma membrane of eubacteria resembles to that of eukaryotic cell. It is made of phospholipid, protein and some amount of polysaccharides. However, it lacks sterol, the characteristic of eukaryotic cell membrane. Instead, there is sterol like compounds called hopanoid.

19 Organisms called methanogens are most abundant in a **[CBSE AIPMT 2011]**

(a) cattle yard (b) polluted stream
(c) hot spring (d) sulphur rock

Ans. ***(a)***

Methanogens are present in the gut of several ruminants animals such as cows and buffaloes and they are responsible for the production of methane (biogas) from the dung of these animals. Thus, they are most abundant in a cattle yard.

20 A prokaryotic autotrophic nitrogen fixing symbiont is found in **[CBSE AIPMT 2011]**

(a) *Cycas* (b) *Cicer* (c) *Pisum* (d) *Alnus*

Ans. ***(a)***

The coralloid root of *Cycas* is symbiotically associated with nitrogen fixing blue-green algae, *Anabaena cycadae* and *Nostoc punctiforme*. These blue green-algae (cyanobacteria) are prokaryotic, photosynthetic and autotrophic.

21 Maximum nutritional diversity is found in the group **[CBSE AIPMT 2010]**

(a) Fungi (b) Animalia
(c) Monera (d) Plantae

Ans. ***(c)***

Maximum nutritional diversity is shown by the members of kingdom-Monera. Some of them are autotrophic (e.g. photosynthetic autotrophic or chemosynthetic autotrophic) while the vast majority are heterotrophs (e.g. saprotrophic or parasitic). Ecologically, these may be producers or decomposers.

22 Some hyperthermophilic organisms that grow in highly acidic habitats belong to the two groups called **[CBSE AIPMT 2010]**

(a) eubacteria and archaea
(b) cyanobacteria and diatoms
(c) protists and mosses
(d) liverworts and yeasts

Ans. ***(a)***

Thermophiles live in very hot places, with temperature ranging from 60°-80°C. Many thermophiles (some eubacteria and archaebacteria) are autotrophs and have metabolisms based on sulphur.

Some thermophilic archaebacteria form the basis of food webs around deep-sea thermal vents, where they must withstand extreme temperature and pressures. Archaebacteria can grow in highly acidic (pH = 0.7) and very basic (pH = 11) environments.

23 *Thermococcus*, *Methanococcus* and *Methanobacterium* exemplify **[CBSE AIPMT 2008]**

(a) archaebacteria that contain protein homologous to eukaryotic core histones
(b) archaebacteria that lack any histones resembling those found in eukaryotes but whose DNA is negatively supercoiled
(c) bacteria whose DNA is relaxed or positively supercoiled but which have a cytoskeleton as well as mitochondria
(d) bacteria that contain a cytoskeleton and ribosomes

Ans. ***(a)***

Inspection of domain Archaea shows that two sub-divisions exist, the Euryarchaeota and the Crenarchaeota.

The Euryarchaeota includes *Methanobacterium*, *Methanococcus*, *Thermococcus*.

24 Bacterial leaf blight of rice is caused by a species of **[CBSE AIPMT 2008]**

(a) *Xanthomonas*
(b) *Pseudomonas*
(c) *Alternaria*
(d) *Erwinia*

Ans. ***(a)***

Disease	**Causing Organism**
Leaf blight of rice	— *Xanthomonas oryzae*
Red strip of suga cane	— *Pseudomonas rubrilineans*
Fire blight of apple	— *Erwinia amylovora*
Early blight of potato	— *Alternaria solani*

25 Which one of the following statements about *Mycoplasma* is wrong? **[CBSE AIPMT 2007]**

(a) They are also called PPLO
(b) They are pleomorphic
(c) They are sensitive to penicillin
(d) They cause disease in plants

Ans. ***(c)***

Penicillin acts on cell wall and *Mycoplasma* lacks cell wall. Thus *Mycoplasma* is not sensitive to penicillin. *Mycoplasma* are inhibited by metabolic inhibitors like chloramphenicol and tetracyclin.

26 Barophillic prokaryotes **[CBSE AIPMT 2005]**

(a) grow slowly in highly alkaline frozen takes at high altitudes
(b) occur in water containing high concentrations of barium hydroxide
(c) grow and multiply in very deep marine sediments
(d) readily grown and divides in sea water enriched in any soluble salt of barium

Ans. ***(c)***

Barophillic prokaryotes grow and multiply in very deep marine sediments.

27 A free living nitrogen fixing cyanobacterium which can also form symbiotic association with the water fern *Azolla* is **[CBSE AIPMT 2004]**

(a) *Tolypothrix* (b) *Chlorella*
(c) *Nostoc* (d) *Anabaena*

Ans. ***(d)***

Anabaena is a free living nitrogen fixing cyanobacterium which can form symbiotic association with water fern *Azolla*.

28 Chromosomes in a bacterial cell can be 1-3 in number and **[CBSE AIPMT 2003]**

(a) can be circular as well as linear within the same cell
(b) are always circular
(c) are always linear
(d) can be either circular or linear, but never both within the same cell

Ans. ***(b)***

Bacterial chromosomes are circular DNA molecules.

29 Organisms which obtain energy by the oxidation of reduced inorganic compounds are called **[CBSE AIPMT 2002]**

(a) homoautotrophs
(b) chemoautotrophs
(c) saprozoic
(d) coproheterotrophs

Ans. ***(b)***

The organisms obtaining energy by chemical reactions independent of light are called chemotrophs. The reductants obtained from the environment may be inorganic (in case of chemoautotrophs) or organic (in case of chemoheterotrophs).

Photoautotrophs organisms that make their own food by photosynthesis, using the light energy.

Saprozoic organisms obtain food from dead and decaying matter.

30 In bacteria, plasmid is **[CBSE AIPMT 2002]**

(a) extra-chromosomal material
(b) main DNA
(c) non-functional DNA
(d) repetitive gene

Ans. ***(a)***

Plasmid is an extrachromosomal material capable of replicating independently from the main chromosome. Plasmids usually possess antibiotic resistance genes.

31 What is true for archaebacteria? **[CBSE AIPMT 2001]**

(a) All halophiles
(b) All photosynthetic
(c) All fossils
(d) Oldest living beings

Ans. ***(d)***

The archaebacteria are able to flourish in extreme conditions of environment that are believed to have existed on the primitive earth. It is believed that these represent the early forms of life. Hence, archaebacteria are called "oldest living beings".

32 What is true for cyanobacteria? **[CBSE AIPMT 2001]**

(a) Oxygenic with nitrogenase
(b) Oxygenic without nitrogenase
(c) Non-oxygenic with nitrognase
(d) Non-oxygenic without nitrogenase

Ans. ***(a)***

Cyanobacteria (Gk. *Kyanos* = dark blue; *bakterion* = a staff) also known as blue-green algae. It is a very important group of photosynthetic bacteria in the history of life on earth.

The cyanobacteria fix atmospheric nitrogen through the help of enzyme nitrogenase and also show oxygenic photosynthetic.

33 What is true for photolithotrophs? **[CBSE AIPMT 2001]**

(a) Obtain energy from radiations and hydrogen from organic compounds
(b) Obtain energy from radiations and hydrogen from inorganic compounds
(c) Obtain energy from organic compounds
(d) Obtain energy from inorganic compounds

Ans. ***(b)***

Photolithotrophs used light as energy and inorganic electron donor (like H_2, H_2S) as hydrogen source. Purple and green sulphur bacteria are examples of photolithotrophs.

34 Photosynthetic bacteria have pigments in **[CBSE AIPMT 1999]**

(a) leucoplasts
(b) chloroplasts
(c) chromoplasts
(d) chromatophores

Ans. ***(d)***

In photosynthetic bacteria, small particles of 60 μm diameter, called chromatophores, are present. These are attached to the inner surface of the cell membrane, have no limiting membrane and possess bacteriochlorophyll.

Chloroplast, leucoplast and chromoplasts are plastids present in eukaryotic cells.

(a) **Chromoplasts** Coloured plastids except green, give different type of colour appearance to different parts of the plant.
(b) **Chloroplasts** Green plastids take part in the process of photosynthesis.
(c) **Leucoplasts** Colourless plastids, mainly function as store house of various types of food.

35 A few organisms are known to grow and multiply at temperatures of 100-105°C. They belong to **[CBSE AIPMT 1998]**

(a) marine archaebacteria
(b) thermophilic sulphur bacteria
(c) hot-spring blue-green algae (cyanobacteria)
(d) thermophilic, subaerial fungi

Ans. ***(a)***

The cell membrane of archaebacteria is consists of branched chain lipids, long chain branched alcohols, phytanals, ether linked to glycerol. This helps them to withstand extreme conditions and temperature.

36 The hereditary material present in the bacterium *Escherichia coli* is **[CBSE AIPMT 1997, 98]**

(a) single stranded DNA
(b) deoxyribose sugar
(c) double stranded DNA
(d) single stranded RNA

Ans. ***(c)***

Bacterial chromosome is single circular, double-stranded DNA molecule.

37 Bacterium divides every 35 minutes. If a culture containing 10^5 cells per mL is grown for 175 minutes, what will be the cell concentration per mL after 175 minutes? **[CBSE AIPMT 1998]**

(a) 5×10^5 cells (b) 35×10^5 cells
(c) 32×10^5 cells (d) 175×10^5 cells

Ans. ***(c)***

$$1\times10^5 \xrightarrow{35\text{ min}} 2\times10^5 \xrightarrow{70\text{ min}} 4\times10^5 \xrightarrow{105\text{ min}} 8\times10^5 \xrightarrow{140\text{ min}} 16\times10^5 \xrightarrow{175\text{ min}} 32\times10^5$$

38 The site of respiration in bacteria is **[CBSE AIPMT 1997]**

(a) episome
(b) mesosome
(c) ribosome
(d) microsome

Ans. ***(b)***

The cytoplasmic membrane of bacteria is invaginated at certain places into the cytoplasm in the form of tubules, which are called mesosomes; on their surface are found enzymes associated with respiration. Mesosome works as mitochondia in bacterial cell.

39 In bacterial chromosomes, the nucleic acid polymers are **[CBSE AIPMT 1996]**

(a) linear DNA molecule
(b) circular DNA molecule
(c) of two types — DNA and RNA
(d) linear RNA molecule

Ans. ***(b)***

Nucleoid or chromatin body or genophore in bacteria occupies 10-20% of cell, is present near the centre of cell. It consists of a single, circular DNA molecule in which all the genes are linked. It is over a thousand times longer than the cell itself and is, therefore, highly folded. It lacks the histone proteins.

40 Sex factor in bacteria is **[CBSE AIPMT 1996]**

(a) chromosomal replicon
(b) F-replicon
(c) RNA
(d) sex-pilus

Ans. ***(b)***

Bacterial strains such as of *E. coli* show sexual differences. Each male cell possesses a sex factor or fertility factor called F-factor. Infact, it is a small circular piece of DNA, self-replicating like bacterial chromosome but only 1/100 in size. The F-factor codes for the protein of a special type of pilus, the sex pilus which enables cell to cell contact and transfer of genetic material through a conjugation tube.

41 The plasmid **[CBSE AIPMT 1995]**

(a) helps in respiration
(b) genes found inside nucleus
(c) is a component of cell wall of bacteria
(d) is the genetic part in addition to DNA in microorganisms

Ans. ***(d)***

Plasmids are small, self-replicating, extrachromosomal, non-essential genetic elements in bacteria. Each plasmid has a ring of circular, supercoiled, double stranded DNA. They carry genes for replication and for one or more cellular non-essential functions. These are also called minichromosomes or dispensable autonomous elements.

42 Temperature tolerance of thermal blue-green algae is due to **[CBSE AIPMT 1994]**

(a) cell wall structure
(b) cell organisation
(c) mitochondrial structure
(d) homopolar bonds in their proteins

Ans. ***(a)***

Cyanobacteria provide a good example of the adaptability of life to extremes of environment (high temperature of hot springs and low temperature of polar regions). It is due to their gelatinous sheath, that can withstand long periods of desiccation. The compactness of protein molecules and their bonds in the protoplasm also help the cells to face the extremes.

43 *Escherichia coli* is used extensively in biological research as it is **[CBSE AIPMT 1993]**

(a) easily cultured (b) easily available
(c) easy to handle
(d) easily multiplied in host

Ans. ***(a)***

Escherichia coli, a commensal bacterium is most studied bacterium and widely used in research because it is easily cultured on minimal medium and has fast rate of multiplication and short generation time.

44 Genophore bacterial genome or nucleoid is made of **[CBSE AIPMT 1993]**

(a) histones and non-histones
(b) RNA and histones
(c) a single double stranded DNA
(d) a single stranded DNA

Ans. ***(c)***

In bacteria nucleoid or genophore is haploid and consists of single, naked, double stranded, circular ring like highly folded supercoiled DNA with no free ends, no histone proteins.

The nucleoid of *E. coli* has a central core of RNA surrounded by about 50 super coilings of DNA which is then associated with some basic proteins but never histones. Some proteins like polyamines rich in alanine are also found associated with DNA.

45 Bacteria lack alternation of generation because there is **[CBSE AIPMT 1992, 91]**

(a) neither syngamy nor reduction division
(b) distinct chromosomes are absent

(c) no conjugation
(d) no exchange of genetic material

Ans. ***(a)***

Bacteria reproduces asexually by transverse binary fission, conidia, budding, cyst and sporulation. No true sexual reproduction (involving formation of gametes, their fusion and meiosis) is known to occur in bacteria.

However, in bacteria the transfer of genetic material from donor to recipient cell to bring genetic recombinations/variations is reported that occurs not through gametes/sex cells, but by other methods like conjugation, transduction and transformation. It does not result in any multiplication of cells.

46 Which one belongs to the Monera? **[CBSE AIPMT 1990]**

(a) *Amoeba* (b) *Escherichia*
(c) *Gelidium* (d) *Spirogyra*

Ans. ***(b)***

The kingdom–Monera (Gr. *monera* = simple) includes simple, prokaryotic primitive organisms. It includes bacteria, archaebacteria, Actinomycetes, *Mycoplasma*, spirochaetes, rickettsiae, chlamydiae and cyanobacteria. *Escherichia coli* is the most studied bacterium. *E. coli* is an enteric bacteria, found in entire colon, secretes vitamin-K, B_3, B_6, B_{12} and folic acid.

TOPIC 2
Kingdom–Protista

47 Ciliates differ from all other protozoans in **[NEET 2018]**

(a) using pseudopodia for capturing prey
(b) having a contractile vacuole for removing excess water
(c) using flagella for locomotion
(d) having two types of nuclei

Ans. ***(d)***

Ciliates differ from all other protozoans in having two types of nuclei.

These two nuclei are usually of different size, *i.e.* one is meganucleus and the other is micronucleus. The former controls metabolism whereas the latter is concerned with reproductions, e.g. *paramecium*.

In other protozoans, like *Amoeba*, single nucleus is present which is involved in metabolism and reproduction.

Other options are incorrect because Ciliates use filtre feeding mechanism for obtaining food.

Like other protozoans, they also possess contractile vacuoles.

Ciliates use cilia for locomotion.

48 Chrysophytes, euglenoids, dinoflagellates and slime moulds are included in the kingdom **[NEET 2016, Phase I]**

(a) Protista
(b) Fungi
(c) Animalia
(d) Monera

Ans. ***(a)***

All single celled eukaryotic organisms like chrysophytes [diatoms and desmids], euglenoids *[Euglena]*, dinoflagellates and slime moulds are included in kingdom–Protista.

49 Select the wrong statement. **[NEET 2016, Phase II]**

(a) The walls of diatoms are easily destructible
(b) 'Diatomaceous earth' is formed by the cell walls of diatoms
(c) Diatoms are chief producers in the oceans
(d) Diatoms are microscopic and float passively in water

Ans. ***(a)***

Diatoms are single celled plant like protists that produce intricately structured cell walls made of nano(–) silica (SiO_2). Thus, the walls are indestructible. Hence, only option (a) is wrong and rest of the options are correct.

50 Pick up the wrong statement. **[CBSE AIPMT 2015]**

(a) Cell wall is absent in Animalia
(b) Protista have photosynthetic and heterotrophic modes of nutrition
(c) Some fungi are edible
(d) Nuclear membrane is present in Monera

Ans. ***(d)***

In Protista kingdom members exhibit both autotrophic as well as heterotrophic nutrition. Animal cells lack cell wall and there are a few fungi that are edible. Monera is the kingdom that contains unicellular organisms with a prokaryotic cell organisation, i.e. which lacks nuclear membrane and other membrane bound organelles.

51 In which group of organisms the cell walls form two thin overlapping shells which fit together? **[CBSE AIPMT 2015]**

(a) Chrysophytes (b) Euglenoids
(c) Dinoflagellates (d) Slime moulds

Ans. ***(a)***

Chrysophytes are placed under the kingdom– Protista. This group includes diatoms and golden algae (desmids). Most of them are photosynthetic. In diatoms, the cell walls form two thin overlapping cells, which fit together as in a soap box.

52 What is common about *Trypanosoma, Noctiluca, Monocystis* and *Giardia*? **[CBSE AIPMT 2006]**

(a) These are all unicellular protists
(b) They have flagella
(c) They produce spores
(d) These are all parasites

Ans. ***(a)***

Trypanosoma, Noctiluca, Monocystis and *Giardia* are all unicellular protists.

Trypanosoma gambiense is the single celled, parasitic zooflagellate causing **trypanosomiasis** or **sleeping sickness.**

Giardia or the 'Grand old man of the intestine' is a parasitic flagellate occurring in the intestine of man and other animals and causes giardiasis or diarrhoea (i.e. very loose and frequent stool containing large quantity of fat).

Noctiluca is a marine, colourless dinoflagellate. It is a voracious predator and has a long, motile tentacle, near the base of which, its single short flagellum emerges.

Monocystis is a microscopic, unicellular endoparasitic protozoan found in the coelom and seminal vesicles of earthworm. As it is an endoparasite, it does not possess any special structure for locomotion.

53 Auxospores and hormocysts are formed respectively by **[CBSE AIPMT 2005]**

(a) several diatoms and a few cyanobacteria
(b) several cyanobacteria and several diatoms
(c) some diatoms and several cyanobacteria
(d) some cyanobacteria and many diatoms

Ans. ***(a)***

Auxospores and hormocysts are formed by several diatoms and a few cyanobacteria respectively. Bacillariophyceae members (diatoms) are microscopic, eukaryotic, unicellular or colonial coccoid algae. These algae are sexually reproduced by the formation of auxospores in most cases. **Bozi** (1914) and **Fermi** (1930) reported that short sections of living cells at the tips of the trichomes of *Wertiella lanosa* become invested by a thick, lamellated, pigmented sheath. Such mullticellular spore like structures function as perennating bodies. They are specially modified hormogones and are called hormospores or hormocysts.

54 Which of the following unicellular organism has a macro-nucleus for trophic function and one or more micro-nuclei for reproduction?

[CBSE AIPMT 2005]

(a) *Euglena* (b) *Amoeba*
(c) *Paramecium* (d) *Trypanosoma*

Ans. ***(c)***

Paramecium is a heterokaryotic organism, i.e. it has two nuclei near the cytostome (oral-shaped opening called mouth). The macronucleus, which is a conspicuous larger ellipsoidal vegetative nucleus, divides amitotically and controls the vegetative characters and micronucleus is a small compact reproductive nucleus which divides mitotically and controls the reproduction.

55 When a freshwater protozoan possessing a contractile vacuole is placed in a glass containing marine water, the vacuole will

[CBSE AIPMT 2004]

(a) increase in number
(b) disappear
(c) increase in size
(d) decrease in size

Ans. ***(b)***

Fresh water protozoans live in hypotonic environment so, for regulation of excess of water which comes in the protoplasm through the process of endosmosis, contractile vacuoles have developed. When these protozoans are placed in marine water, i.e. hypertonic water, the contractile vacuoles become disappear because the process of endosmosis does not occur and thus, water does not come in the protoplasm.

56 The chief advantage of encystment to an *Amoeba* is

[CBSE AIPMT 2003]

(a) the chance to get rid of accumulated waste products
(b) the ability to survive during adverse physical conditions
(c) the ability to live for some time without ingesting food
(d) protection from parasites and predators

Ans. ***(b)***

Encystment of *Amoeba* is occurred regularly to tide over unfavourable conditions like drought and extreme temperature, etc. During these conditions, the *Amoeba* forms a covering or cyst wall around itself. Thus, it is an adaptation to sunrise during adverse conditions (extranuclear inheritance adverse condition).

57 In which animal, dimorphic nucleus is found?

[CBSE AIPMT 2002]

(a) *Amoeba*
(b) *Trypanosoma gambiense*
(c) *Plasmodium vivax*
(d) *Paramecium caudatum*

Ans. ***(d)***

Paramecium is heterokaryotic, it possesses a dimorphic nuclear apparatus (a single large macronucleus which controls metabolism and one or more small micronuclei concerned with reproduction).

58 Extranuclear inheritance occurs in

[CBSE AIPMT 2001]

(a) killer strain in *Paramecium*
(b) colour blindness
(c) phenylketonuria
(d) Tay Sachs disease

Ans. ***(a)***

Paramecium exhibits cytoplasmic inheritance due to the presence of Kappa particles (self replicating bodies that produce toxin called paramecin). Besides binary fission and conjugation other reproductive processes that occurs in *Paramecium* are autogamy, endomixis and cytogamy.

Tay Sachs disease It is a rare autosomal recessive genetic disorder.

Colour blindness It is X-chromosome related disease. So, it is a sex-linked disease.

PKU autosomal recessive genetic disorder characterised by homozygous or compound heterozygous mutation in the gene.

59 Which of the following organisms possesses characteristics of both a plant and an animal?

[CBSE AIPMT 1995]

(a) Bacteria (b) *Mycoplasma*
(c) *Euglena* (d) *Paramecium*

Ans. ***(c)***

Euglena is a connecting link between animals and plants. *Euglena* contains chlorophyll, yet it resembles animals, because it feeds like animals in the absence of sunlight. It resembles the ancestral form from which the plants and animals evolved.

60 Macro and micronucleus are the characteristic feature of

[CBSE AIPMT 1995, 2002, 05]

(a) *Paramecium* and *Vorticella*
(b) *Opelina* and *Nictothirus*
(c) *Hydra* and *Ballantidium*
(d) *Vorticella* and *Nictothirus*

Ans. ***(a)***

Paramecium and *Vorticella* have dimorphic nuclei (heterokaryotic). **Micronucleus** that is inactive except during cell division and houses the master copy of the genome. **Macronucleus** controls daily synthetic activities or on going metabolic functions of the cell and asexual reproduction. Macronucleus contains multiple copies of DNA.

61 When a freshwater protozoan possessing a contractile vacuole, is placed in a glass containing marine water, the vacuole will

[CBSE AIPMT 2004]

(a) increase in number
(b) disappear
(c) increase in size
(d) decrease in size

Ans. ***(b)***

Freshwater protozoans live in hypotonic solution so, for regulation of excess of water which comes in the protoplasm through the process of endosmosis, contractile vacuoles have developed.

When these protozoans are placed in marine water, i.e. hypertonic water, the contractile vacuoles disappear because the process of endosmosis does not happen and thus, water does not come in the protoplasm.

62 In Protozoa like *Amoeba* and *Paramecium*, an organelle is found for osmoregulation which is **[CBSE AIPMT 2002]**

(a) contractile vacuole
(b) mitochondria
(c) nucleus
(d) food vacuole

Ans. ***(a)***

Unicellular organisms such as *Amoeba, Paramecium* have some organelles called contractile vacuole for excretion. These are freshwater animals, i.e. they live in hypotonic solution. Therefore, water flows from outside to inside of the body of the organism.

The contractile vacuoles in these organisms collect this excess water and gradually increase in size. When the vacuoles reach a critical size they contract, squeezing out their contents through the process of simple diffusion.

63 Excretion in *Amoeba* occurs through **[CBSE AIPMT 1995]**

(a) lobopodia
(b) uroid portion
(c) plasma membrane
(d) contractile vacuole

Ans. ***(d)***

Endoplasm of *Amoeba* in the posterior part contains a single clear rounded and pulsating contractile vacuole. Contractile vacuole is analogous to uriniferous tubules of frog, it functions in excretion and osmoregulation.

64 Protistan genome has **[CBSE AIPMT 1994]**

(a) membrane bound nucleoproteins embedded in cytoplasm
(b) free nucleic acid aggregates
(c) gene containing nucleoproteins condensed together in loose mass
(d) nucleoprotein in direct contact with cell substance

Ans. ***(a)***

Eukaryotic (e.g. protistan) genome is organised in the form of nucleus. It is differentiated into nuclear envelope, chromatin, one or more nucleoli and nucleoplasm. Nuclear DNA is linear, associated with histone proteins. A small quantity of DNA is also found in the plastids and mitochondria. In contrast, prokaryotic (bacterial) DNA is circular and lies freely in the cytoplasm.

65 *Entamoeba coli* causes **[CBSE AIPMT 1994]**

(a) pyorrhoea
(b) diarrhoea
(c) dysentery
(d) None of these

Ans. ***(d)***

Entamoeba coli is the common parasitic genera of phylum—Protozoa. It harbours the upper part of large intestine (colon) and very often in the liver, brain and testes and causes constipation.

66 Protists obtain food as **[CBSE AIPMT 1994]**

(a) photosynthesisers, symbionts and holotrophs
(b) photosynthesisers
(c) chemosynthesisers
(d) holotrophs

Ans. ***(a)***

Protistans have variable modes of nutrition. They are photosynthetic heterotrophic, i.e. saprophytic, parasitic and ingestive.

67 African sleeping sickness is due to **[CBSE AIPMT 1991]**

(a) *Plasmodium vivax* transmitted by tse-tse fly
(b) *Trypanosoma lewsii* transmitted by bed bug
(c) *Trypanosoma gambiense* transmitted by *Glossina palpalis*
(d) *Entamoeba gingivalis* spread by house fly

Ans. ***(c)***

The disease African sleeping sickness is caused by *Trypanosoma gambiense* and this is transmitted by tse-tse fly (*Glossina palpalis*).

68 In *Amoeba* and *Paramecium* osmoregulation occurs through **[CBSE AIPMT 1991, 95, 2002]**

(a) pseudopodia
(b) nucleus
(c) contractile vacuole
(d) general surface

Ans. ***(c)***

Amoeba and *Paramecium* contains two contractile vacuoles (anterior and posterior, the latter being faster) for osmoregulation, i.e. maintaining water balance in the body.

69 Genetic information in *Paramecium* is contained in **[CBSE AIPMT 1990]**

(a) micronucleus
(b) macronucleus
(c) Both (a) and (b)
(d) mitochondria

Ans. ***(a)***

Ciliates (*Paramecium*) show nuclear dimorphism, large macronucleus controls metabolic activities and growth. It is called vegetative nucleus. Micronucleus contains genetic informatioin and thus, takes part in reproduction.

70 *Plasmodium*, the malarial parasite, belongs to class **[CBSE AIPMT 1990]**

(a) Sarcodina
(b) Ciliata
(c) Sporozoa
(d) Dinophyceae

Ans. ***(c)***

Plasmodium, the malarial parasite belongs to class—**Sporozoa**. Sporozoans are intracellular parasites, reproduce by multiple fission and life cycle may include the two different hosts.

71 What is true about *Trypanosoma?* **[CBSE AIPMT 1990]**

(a) Polymorphic
(b) Monogenetic
(c) Facultative parasite
(d) Non-pathogenic

Ans. ***(a)***

Trypanosoma is an obligate parasite, it is digenetic polymorphic (*Trypanosoma* is adult form in human, whereas, crithidal and leptomonal are developmental forms in tse-tse fly).

72 *Trypanosoma* belongs to class **[CBSE AIPMT 1989]**

(a) Sarcodina (b) Zooflagellata
(c) Ciliata (d) Sporozoa

Ans. ***(b)***

Zooflagellates are protozoan parasites which possess one to several flagella for locomotion. They are generally uninucleate (occasionally multinucleate), body is covered by a firm pellicle, e.g. *Trypanosoma, Leishmania, Trichomonas*, etc.

TOPIC 3
Kingdom–Fungi

73 Select the **wrong** statement. **[NEET 2018]**

(a) Pseudopodia are locomotory and feeding structures in sporozoans
(b) Mushrooms belong to Basidiomycetes
(c) Cell wall is present in members of Fungi and Plantae
(d) Mitochondria are the powerhouse of the cell in all kingdoms except Monera

Ans. ***(a)***

Sporozoans are endoparasites. They lack locomotory organelles like cilia, flagella, pseudopodia, etc., *e.g. Plasmodium*. Pseudopodia are found in amoeboid protozoans, *e.g., Amoeba, Entamoeba,* etc. Therefore, statement (a) is wrong while rest of the statements are correct.

74 Which of the following would appear as the pioneer organisms on bare rocks? **[NEET 2016, Phase I]**

(a) Liverworts (b) Mosses
(c) Green algae (d) Lichens

Ans. ***(d)***

In primary succession on rocks, lichens secrete acids to dissolve rock, helps in weathering and soil formation. So, lichens are pioneer species to colonise the bare rock.

75 One of the major components of cell wall of most fungi is **[NEET 2016, Phase I]**

(a) peptidoglycan (b) cellulose
(c) hemicellulose (d) chitin

Ans. ***(d)***

Cell wall of most fungi is made up of chitin. Chemically it is N-acetyl glucosamine. It is also found in the exoskeleton of insects.

76 Which one of the following is wrong for fungi? **[NEET 2016, Phase II]**

(a) They are eukaryotic
(b) All fungi possess a purely cellulosic cell wall
(c) They are heterotrophic
(d) They are both unicellular and multicellular

Ans. ***(b)***

In fungi, cell wall contains chitin or cellulose along with other polysaccharides, proteins and lipids. Only in some fungi, e.g. *Phytophthora* or other oomycetes a purely cellulosic cell wall is present. Hence, only option (b) is wrong, rest of the options are correct.

Concept Enhancer Chitin is chemically N-acetyl glucosamine. The exoskeleton of insects also contains this chemical.

77 Choose the wrong statement. **[CBSE AIPMT 2015]**

(a) *Penicillium* is multicellular and produces antibiotics
(b) *Neurospora* is used in the study of biochemical genetics
(c) Morels and truffles are poisonous mushrooms
(d) Yeast is unicellular and useful in fermentation

Ans. ***(c)***

All statements are correct, except statement (c), which can be corrected as Morels and truffles are edible and members of Ascomycetes in fungi.

78 The imperfect fungi which are decomposers of litter and help in mineral cycling belong to **[CBSE AIPMT 2015]**

(a) Deuteromycetes (b) Basidiomycetes
(c) Phycomycetes (d) Ascomycetes

Ans. ***(a)***

The imperfecti fungi which are decomposers of litter and help in mineral cycling belong to Deuteromycetes. They are fungi which do not fit into the commonly established taxonomic classification of fungi. They include all those fungi in which the perfect stage (sexual stage) is not reported.

79 The highest number of species in the world is represented by **[CBSE AIPMT 2012]**

(a) fungi (b) mosses
(c) algae (d) lichens

Ans. ***(a)***

Fungi represent the highest number of species in the world. Around 100000 species of fungi have been formally described by taxonomists but the global biodiversity of kingdom—Fungi is not fully understood.

80 Which one of the following has haplontic life cycle? **[CBSE AIPMT 2009]**

(a) *Funaria*
(b) *Polytrichum*
(c) *Ustilago*
(d) Wheat

Ans. ***(c)***

Ustilago has haplontic life cycle. In their sexual phase, only zygospore is diploid structure. All others are haploid, such a sexual cycle is termed as haploid or haplontic.

81 Which one is the wrong pairing for the disease and its causal organism? **[CBSE AIPMT 2009]**

(a) Late blight of potato — *Alternaria solani*
(b) Black rust of wheat — *Puccinia graminis*
(c) Loose smut of wheat — *Ustilago nuda*
(d) Root-knot of vegetables — *Meloidogyne* sp.

Ans. ***(a)***

The causative agent of late blight of potato is fungus *Phytophthora infestans*, class–Oomycetes, order–Peronosporales, family–Pythiaceae. In India, the late blight of potato is a seed borne disease.

82 *Trichoderma harzianum* has proved a useful microorganism for **[CBSE AIPMT 2008]**

(a) bioremediation of contaminated soils
(b) reclamation of wastelands
(c) gene transfer in higher plants
(d) biological control of soil-borne plant pathogens

Ans. ***(d)***

Some common fungal inhabitants of soil help to combat diseases caused by soil borne plant pathogens. These include *Trichoderma harzianum* which are found in damp soils. They have an inhibitory effect on the growth of the mycelium of *Pythium*. They serve to supress fungi causing damping off disease of the seedlings and thereby influence favourably the growth of crops.

83 Cellulose is the major component of cell walls of **[CBSE AIPMT 2008]**

(a) *Pythium* (b) *Xanthomonas*
(c) *Pseudomonas* (d) *Saccharomyces*

Ans. ***(a)***

Cellulose does occur in cell walls of Oomycetes (e.g. *Pythium*) and Hyphochytridiomycetes. Fungal cell wall contains 80–90% carbohydrates, the remainder being proteins and lipids. The typical feature of fungal cell wall is presence of chitin.

84 Which of the following is a slime mold? **[CBSE AIPMT 2007]**

(a) *Rhizopus* (b) *Physarum*
(c) *Thiobacillus* (d) *Anabaena*

Ans. ***(b)***

The genus *Physarum* with about 100 species is the largest and best-studied slime mold in the class-Myxomycetes.

85 Ergot of rye is caused by a species of **[CBSE AIPMT 2007]**

(a) *Phytophthora* (b) *Uncinula*
(c) *Ustilago* (d) *Claviceps*

Ans. ***(d)***

The fungus *Claviceps purpurea* is responsible for ergot disease of rye which lowers the yield of rye plant.

86 Which pair of the following belongs to Basidiomycetes? **[CBSE AIPMT 2007]**

(a) Birds nest fungi and puff balls
(b) Puff balls and *Claviceps*
(c) *Peziza* and stink horns
(d) *Morchella* and mushrooms

Ans. ***(a)***

Birds nest fungi (Nidulariales) and puff ball fungi (Lycoperdales) belongs to Basidiomycetes. The common example of class-Basidiomycetes are smut, rusts, the mushrooms, the toad stools, the puff balls and the pore fungi.

87 The thalloid body of a slime mold (Myxomycetes) is known as **[CBSE AIPMT 2006]**

(a) *Plasmodium* (b) fruiting body
(c) mycelium (d) protonema

Ans. ***(a)***

The thalloid body of a slime mould is known as *Plasmodium*. The members of Myxomycetes are called slime molds because they contain and secrete slime. They are included in lower fungi. Their somatic phase is a multinucleate, diploid holocarpic *Plasmodium* (a product of syngamy).

In *Plasmodium*, propagation occurs through fission or thick walled cysts or sclerotium like structures. Reproduction takes place by the formation of uninucleate, thick walled resting spores which are produced within minute fruiting bodies like structures, i.e. the sporangia.

Fruiting bodies and mycelium are absent in lower fungi. Protonema is not formed in fungi.

88 Which of the following environmental conditions are essential for optimum growth of *Mucor* on a piece of bread? **[CBSE AIPMT 2006]**

(i) Temperature of about 25°C
(ii) Temperature of about 5°C
(iii) Relative humidity of about 5%
(iv) Relative humidity of about 95%
(v) A shady place
(vi) A brightly illuminated place

Choose the answer from the following options

(a) (i), (iv) and (v) only
(b) (ii), (iv) and (v) only
(c) (ii), (iii) and (vi) only
(d) (i), (iii) and (v) only

Ans. ***(a)***

Mucor shows the best growth on a piece of bread at a temperature of about 25°C, relative humidity of about 95% in a moist and shady place. *Mucor* is a saprophytic fungus belonging to the order–Mucorales and family–Mucoraceae and grows on decaying dung and on some food stuffs.

89 There exists a close association between the alga and the fungus within a lichen. The fungus **[CBSE AIPMT 2005]**

(a) provides protection, anchorage and absorption for the alga
(b) provides food for the alga
(c) fixes the atmospheric nitrogen for the alga
(d) release oxygen for the alga

Ans. ***(a)***

Lichen is a symbiotic association between a fungus and an algae. The fungal partner of lichen helps in the absorption of water and mineral to algal partner. It also provides protection and anchorage to algal partner of lichen. In exchange of this, the fungal partner absorbs prepared food material from algal partner. This food material is prepared by the algal partner of lichen through the process of photosynthesis.

90 Lichens are well known combination of an alga and a fungus where fungus has **[CBSE AIPMT 2004]**

(a) a saprophytic relationship with the alga
(b) an epiphytic relationship with the alga
(c) a parasitic relationship with the alga
(d) a symbiotic relationship with the alga

Ans. ***(d)***

Lichen is a symbiotic association between a fungus and an alga. The fungal part is called mycobiont while the algal part is called **phycobiont**. The fungi absorb mineral and water to algae and the algae synthesise food by photosynthesis.

91 During the formation of bread it becomes porous due to the release of CO_2 by the action of **[CBSE AIPMT 2002]**

(a) yeast (b) bacteria
(c) virus (d) protozoans

Ans. ***(a)***

Strains of *Saccharomyces cerevisiae* are extensively used for leavening of bread. During fermentation, the yeasts produce alcohol and CO_2 which leaves the bread porous.

92 Which fungal disease spreads by seed and flowers? **[CBSE AIPMT 2002]**

(a) Loose smut of wheat
(b) Corn stunt
(c) Covered smut of barley
(d) Soft rot of potato

Ans. ***(a)***

Fungal disease, loose smut of wheat spreads by seed and flowers. The causal organism of this disease is *Ustilago* fungus. It is an internal parasite. It has a dikaryotic mycelium which remains within the intercellular spaces of the host tissue.

This fungus infects the ovary of the host flower as a result of which the masses of teliospores or brand spores are formed in place of grains. Teliospores are not surrounded by any wall hence, called loose **smut**.

93 Plant decomposers are **[CBSE AIPMT 2001]**

(a) Monera and Fungi
(b) Fungi and Plants
(c) Protista and Animalia
(d) Animalia and Monera

Ans. ***(a)***

Decomposers are living components chiefly the bacteria and fungi that breakdown the complex compounds of dead protoplasm of producers and consumers absorb some products and release others.

94 Adhesive pad of fungi penetrates the host with the help of **[CBSE AIPMT 2001]**

(a) mechanical pressure and enzymes
(b) hooks and suckers
(c) softening by enzymes
(d) only by mechanical pressure

Ans. ***(a)***

Cell wall degrading enzymes (cellulolytic, pectolytic) as well as mechanical pressure of adhesive pad (appressorium) help the fungus in penetrating the host.

95 In fungi stored food material is **[CBSE AIPMT 2000]**

(a) glycogen (b) starch
(c) sucrose (d) glucose

Ans. ***(a)***

Glycogen, also known as 'animal starch', is the chief storage polysaccharide of animal cells and most of the fungi (though food is also stored as oil globules in some fungi).

Starch is a complex water insoluble polysaccharide carbohydrate chiefly found in green plants as their principal energy (food) source.

Glucose is the most widely distributed hexose sugar. It is an aldohexose reducing sugar. It is found in blood muscles and brain and works as energy fuel.

Sucrose is a non-reducing disaccharide consists of one glucose and one fructose molecules. It is one of the abundant transport sugar in plants.

96 Black rust of wheat is caused by **[CBSE AIPMT 2000]**

(a) *Puccinia* (b) *Mucor*
(c) *Aspergillus* (d) *Rhizopus*

Ans. ***(a)***

Black rust of wheat is caused by *Puccinia graminis tritici*. This is the potential cause of enormous economic loss in all wheat growing regions of the world. *Puccinia graminis tritici* usually passes its life cycle on two different hosts, wheat and barbery.

97 Which of the following is the use of lichens in case of pollution? **[CBSE AIPMT 1999]**

(a) Lichens are not related with pollution
(b) They act as bioindicators of pollution
(c) They treat the polluted water
(d) They promote pollution

Ans. ***(b)***

Growth of lichens on trees is inhibited by air pollution. Hence, atmospheric pollution causes decrease in their populations. So, lichens are biological indicators of pollution.

98 Columella is a specialised structure found in the sporangium of **[CBSE AIPMT 1999]**

(a) *Ulothrix* (b) *Rhizopus*
(c) *Spirogyra* *(d) None of these*

Ans. ***(b)***

In *Rhizopus*, the central non-sporiferous region of sporangium is called columella.

99 *Puccinia* forms **[CBSE AIPMT 1998]**

(a) uredia and aecia on wheat leaves
(b) uredia and telia on wheat leaves
(c) uredia and aecia on barbery leaves
(d) uredia and pycnia on barbery leaves

Ans. ***(b)***

Puccinia graminis tritici (fungus) causes black rust of wheat. It forms Urediospores (uredia) and teleutospores (telia) on wheat leaves.

100 Most of the lichens consist of **[CBSE AIPMT 1997]**

(a) blue-green algae and Basidomycetes
(b) blue-green algae and Ascomycetes
(c) red algae and Ascomycetes
(d) brown algae and Phycomycetes

Ans. ***(b)***

Lichens consist of the fungal component mycobiont, mainly Ascomycotina (only a few Basidiomycotina and Deuteromycotina) and the algal component, phycobiont which are mostly blue-green algae (*Nostoc, Scytonema*) or green algae (*Trebouxia, Trentophila*, etc.)

101 Which one of the following is not true about lichens? **[CBSE AIPMT 1996]**

(a) Their body is composed of both algal and fungal cells
(b) Some form food for reindeers in Arctic regions
(c) Some species can be used as pollution indicators
(d) These grow very fast at the rate of about 2 cm per year

Ans. ***(d)***

Statement (d) is incorrect because lichens show very slow growth. Their size and slow rate of growth suggest that some lichens in the Arctic are 4000 years ago.

102 Which of the following is not correctly matched? **[CBSE AIPMT 1995]**

(a) Root knot disease — *Meloidogyne javanica*
(b) Smut of bajra — *Tolysporium penicillariae*
(c) Covered smut of barley — *Ustilago nuda*
(d) Late blight of potato — *Phytophthora infestans*

Ans. ***(c)***

Option 'c' is mismatched because the smuts in which sori are covered by the membranous covering or peridium are called covered smuts. These are caused by *Ustilago hordei*, in which the sorus or smut ball is covered by a peridium of host cells. *Ustilago nuda* is responsible for causing loose smut of barley.

103 The chemical compounds produced by the host plants to protect themselves against fungal infection is **[CBSE AIPMT 1995]**

(a) phytotoxin (b) pathogen
(c) phytoalexins (d) hormone

Ans. ***(c)***

Phytoalexins are chemical substances produced by plants in response to fungal infection and are toxic to fungi.

104 White rust disease is caused by **[CBSE AIPMT 1995]**

(a) *Claviceps*
(b) *Alternaria*
(c) *Phytophthora*
(d) *Albugo candida*

Ans. ***(d)***

Albugo candida (Oomycetes) is an obligate parasite commonly found parastising a wide range of crucifers. It causes a disease called white rust or blister rust of crucifers resulting in economically significant losses in the yield of turnip, rape and mustard.

105 *Ustilago* caused plant diseases are called smuts because **[CBSE AIPMT 1994]**

(a) they parasitise cereals
(b) *Mycelium* is black
(c) they develop sooty masses of spores
(d) affected parts become completely black

Ans. ***(c)***

The genus *Ustilago* (L. *ustus* = burnt) includes the group of fungi producing black, sooty powder mass of spores on the host plant parts imparting them a 'burnt' appearance, hence, the name, the black dusty masses of spores produced by these fungi resemble soot or smut, so these are also known as smut fungi.

106 Mycorrhiza represents **[CBSE AIPMT 1994, 96, 2003]**

(a) antagonism (b) endemism
(c) symbiosis (d) parasitism

Ans. ***(c)***

Mycorrhiza (*mykes* = mushroom + *rhiza* = root) represents a symbiotic association of fungi with the roots of higher plant. Mycorrhiza meaning fungus root is an infected root system arising from the rootlets of a seed plant.

In ectomycorrhiza, the ultimate absorbing rootlets of the root system are completely surrounded by a distinct mantle or sheath of fungal tissue. In endomycorrhiza, there is no such sheath. Most of the fungus is within the root and may be intracellular as well as intercellular.

107 Absorptive heterotrophic nutrition is exhibited by **[CBSE AIPMT 1990]**

(a) algae (b) fungi
(c) bryophytes (d) pteridophytes

Ans. ***(b)***

Fungi are heterotrophic, e.g. these require an organic source of carbon, also require some source of nitrogen, inorganic ions (K^+, Mg^+), trace elements (Fe, Zn, Cu) and growth factors like vitamins. Fungi may act as saprobes and parasites. They obtain nutrition from host by means of special structures called haustoria and exhibit absorptive or holophytic type of nutrition.

108 Lichens indicate SO_2 pollution because they **[CBSE AIPMT 1989, 92]**

(a) show association between algae and fungi
(b) grow faster than others
(c) are sensitive to SO_2
(d) flourish in SO_2 rich environment

Ans. ***(c)***

Lichens, the composite organisms consist of a specific fungus living in symbiotic association with one or sometimes, two species of algae. Lichens are world-wide in distribution. These are pioneer colonisers of barren rocks and mountains. Being extremely sensitive to SO_2, the lichens especially epiphytic lichens serve as bioindicators air pollution.

TOPIC 4
Virus and Viroids

109 Which of the following statements about inclusion bodies is incorrect? **[NEET (Sep.) 2020]**

(a) These are involved in ingestion of food particles
(b) They lie free in the cytoplasm
(c) These represent reserve material in cytoplasm
(d) They are not bound by any membrane

Ans. ***(a)***

Option (b), (c) and (d) are correct whereas option (a) is incorrect because Inclusion bodies are nuclear or cytoplasmic aggregates of proteins. They represent sites of viral multiplication in a bacterium or a eukaryotic cell and usually consist of viral capsid proteins. These are not involved in ingestion of food particles.

110 Which of the following statements is incorrect? **[NEET (National) 2019]**

(a) Viruses are obligate parasites
(b) Infective constituent in viruses is the protein coat
(c) Prions consist of abnormally folded proteins
(d) Viroids lack a protein coat

Ans. ***(b)***

The statement "infective constituent in viruses is protein coat" is incorrect. The correct information about the statement is as follows. Viruses infect their host organisms through their genetic material, i.e either DNA or RNA and not protein. They take over the biosynthetic machinery of the host cell and produce chemicals required for their own multiplication. Rest statements are correct.

111 Viroids differ from viruses in having **[NEET 2017]**

(a) DNA molecules with protein coat
(b) DNA molecules without protein coat
(c) RNA molecules with protein coat
(d) RNA molecules without protein coat

Ans. ***(d)***

Viroids differ from viruses in having RNA molecules without protein coat. Viruses on the other hand posses DNA or RNA with a protein coat as their genetic material.

Viruses can infect a wide range of organisms including plants, animals or bacteria, while viroids infect only plants.

112 Which of the following statements is wrong for viroids? **[NEET 2016 Phase I]**

(a) They are smaller than viruses
(b) They cause infections
(c) Their RNA is of high molecular weight
(d) They lack a protein coat

Ans. ***(c)***

Viroids are infectious, non-protein-coding, highly structured with small circular RNA's, which have the ability to replicate autonomously. These contain RNA of low molecular weight and induce diseases in higher plants.

113 Select wrong statement. **[CBSE AIPMT 2015]**

(a) The viroids were discovered by DJ Ivanowski
(b) WM Stanley showed that viruses could be crystallised
(c) The term '*Contagium vivum fluidum*' was coined by MW Beijerinek
(d) Mosaic disease in tobacco and AIDS in human being are caused by viruses

Ans. ***(a)***

All statements are correct except the statement (a), which can be corrected as

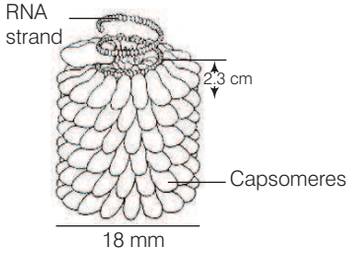
Viroids were discovered by TO Diener in 1971 as a new infectious agent that was smaller than virus.

114 Which of the following shows coiled RNA strand and capsomeres? **[CBSE AIPMT 2014]**

(a) Polio virus
(b) Tobacco mosaic virus
(c) Measles virus
(d) Retrovirus

Ans. ***(b)***

In TMV RNA is single stranded (ss) helically coiled structure containing about 2130 capsomeres, which is a basic subunit of capsid (an outer covering of protein that protects the genetic material of a virus).



There are about 16 capsomeres present in each helical turn.

115 Which statement is wrong for viruses? **[CBSE AIPMT 2012]**

(a) All are parasites
(b) All of them have helical symmetry
(c) They have ability to synthesise nucleic acids and proteins
(d) Antibiotics have no effect on them

Ans. ***(b)***

The nucleocapsids of viruses are constructed in highly symmetric ways. Two types of symmetry are recognised in viruses, which correspond to the two primary shapes, rod and spherical. Rod-shaped viruses have helical symmetry and spherical viruses have icosahedral symmetry.

116 Virus envelope is known as **[CBSE AIPMT 2010]**

(a) capsid
(b) virion
(c) nucleoprotein
(d) core

Ans. ***(a)***

Structurally viruses are very diverse varying widely in size, shape and chemical composition. The nucleic acid of virus is always located within the virion particle and surrounded by a protein shell called capsid.

The protein coat is composed of a number of individual protein molecules called structural subunits. The complete complex of nucleic acid and proteins, packaged in the virion is called the virus nucleocapsid.

117 TO Diener discovered a **[CBSE AIPMT 2009]**

(a) free infectious RNA
(b) free infectious DNA
(c) infectious protein
(d) bacteriophage

Ans. ***(a)***

Viroids are small, circular, single stranded free infectious RNA molecules that are the smallest known pathogens. The extracellular form of the viroid is naked RNA, i.e. there is no protein capsid of any kind.

These RNA molecule contains no protein encoding genes and therefore, the viroid is totally dependent on host for its replication. No viroid diseases of animals are known and the precise mechanisms by which viroids cause plant diseases remain unclear.

118 Viruses that infect bacteria, multiply and cause their lysis are called **[CBSE AIPMT 2004]**

(a) lysozymes (b) lytic
(c) lipolytic (d) lysogenic

Ans. ***(b)***

When bacteriophage infects a bacterium, it entirely depends on the host for its multiplication. It utilises the host machinery for replication and produce a large number of progeny (phage particles). The bacterium cell undergoes lysis and dies to liberate a large number of these phage particles which are ready to start another cycle by infecting new bacterial cell. This cycle is known as lytic cycle.

119 Which of the following statements is not true for retroviruses? **[CBSE AIPMT 2004]**

(a) DNA is not present at any stage in the life cycle of retroviruses
(b) Retroviruses carry gene for RNA dependent DNA polymerase
(c) The genetic material in mature retroviruses is RNA
(d) Retroviruses are causative agents for certain kinds of cancer in man

Ans. ***(a)***

Retroviruses are so, named because they contain enzyme reverse transcriptase or **RNA dependent DNA polymerase.** The genetic material of these viruses is RNA, e.g. Rous Sarcoma Virus.

120 Viruses are no more 'alive' than isolated chromosomes because **[CBSE AIPMT 2003]**

(a) both require the environment of a cell to replicate
(b) they require both RNA and DNA
(c) they both need food molecules
(d) they both require oxygen for respiration

Ans. ***(a)***

Viruses are non-cellular obligate parasite. In the free state they are just like the particles. They do not have their own metabolic machinery and use host's machinery for multiplication.

121 Which one of the following statements about viruses is correct? **[CBSE AIPMT 2003]**

(a) Nucleic acid of viruses is known as capsid
(b) Viruses possess their own metabolic system
(c) All viruses contain both RNA and DNA
(d) Viruses are obligate parasites

Ans. ***(d)***

Viruses are **non-cellular, obligate parasites.** They have DNA or RNA as genetic material (never both). Genetic material of virus is covered in protein coat, known as **capsid.** Viruses do not contain their own metabolic system instead they occupy host's metabolic system after entrance in them.

122 Tobacco mosaic virus is a tubular filament of size **[CBSE AIPMT 2003]**

(a) 700 × 30 nm
(b) 300 × 10 nm
(c) 300 × 5 nm
(d) 300 × 18 nm

Ans. ***(d)***

TMV is elongated rod-like, 3000Å (300 nm) long and 180Å (18 nm) in diameter.

123 Interferons are synthesised in response to **[CBSE AIPMT 2001]**

(a) Mycoplasma (b) bacteria
(c) viruses (d) fungi

Ans. ***(c)***

Cells infected by virus produce interferon which is an antiviral protein. It spreads to neighbouring cells and makes them resistant to virus infections by inhibiting viral growth.

124 Cauliflower mosaic virus contains **[CBSE AIPMT 2001]**

(a) *ss*RNA
(b) *ds*RNA
(c) *ds*DNA
(d) *ss*DNA

Ans. ***(c)***

Caulimovirus (Cauliflower Mosaic Virus) contains double stranded (*ds*) DNA.

Influenza virus contains single stranded RNA (*ss*RNA).

Parvovirus contains single stranded DNA (*ss*DNA).

125 Which one of the following statements about viruses is correct? **[CBSE AIPMT 1997]**

(a) Viruses possess their own metabolic system
(b) Viruses contain either DNA or RNA
(c) Viruses are facultative parasites
(d) Viruses are readily killed by antibiotics

Ans. ***(b)***

Viruses contain only one type of nucleic acid DNA or RNA. These are obligate parasites; do not possess metabolic machinery and are not readily killed by antibiotics.

126 Influenza virus has **[CBSE AIPMT 1996]**

(a) DNA
(b) RNA
(c) Both (a) and (b)
(d) Only proteins and no nucleic acids

Ans. ***(b)***

Influenza virus is single (–) stranded RNA virus, which cannot serve directly as *m*RNA but rather as templates for *m*RNA synthesis *via* a viral transcriptase. Influenza virus (orthomyxo virus) infects the respiratory tract and cause influenza.

127 Tobacco Mosaic Virus (TMV) genes are **[CBSE AIPMT 1994]**

(a) double stranded RNA
(b) single stranded RNA
(c) polyribonucleotides
(d) proteinaceous

Ans. ***(b)***

Tobacco Mosaic Virus (TMV) is elongated, rod shaped, most thoroughly studied plant virus, with 95% protein and 5% RNA by weight. RNA is genomic, i.e. genetic material which is single stranded, linear, helically coiled, 5mμ in length with 6500 nucleotides long.