

Let us Practice

Exercise I

1. A strain of motile Gram positive bacterium, when treated with lysozyme, lost its pathogenicity. The virulence of the bacterium is most likely due to (2nd INBO)

- (a) flagellum (b) cell membrane
(c) cell wall (d) pili

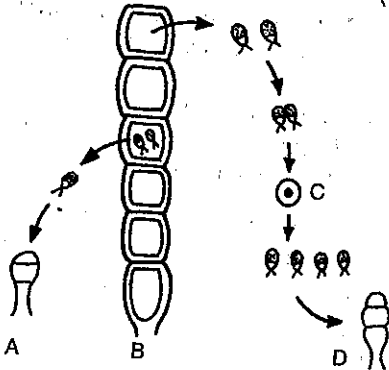
2. Which statement is true only for organisms belonging to the kingdom-Fungi?

- (a) They are multicellular and photosynthetic
(b) They have cell walls and reproduce by seeds
(c) They have filamentous growth and cell walls made of chitin
(d) They have roots and starch is the main storage molecule
(e) They have numerous cellular organelles, but only one nucleus per cell

3. The characteristics of phylum-Rotifera, Nematoda and Platyhelminthes are (4th NSEB)

- (a) bilateral symmetry, pseudocoelomate, complete or sac-like digestive tract
(b) bilateral symmetry, acoelomate, greatly reduced digestive tract
(c) bilateral symmetry, coelomate/acoelomate, complete digestive tract
(d) radial symmetry, pseudocoelomate, no digestive tract

4. Life cycle of *Ulothrix* is shown in the diagram. The correct ploidy levels at the four stages A, B, C and D are: (4th NSEB)



- (a) A-n B-n C-2n D-n
(b) A-n B-n C-2n D-2n
(c) A-2n B-n C-2n D-n
(d) A-n B-n C-n D-n

5. Which of the following is not found in the phylum-Chordata?

- (a) Bilateral symmetry
(b) An external skeleton
(c) A dorsal hollow nerve chord
(d) Gill slits at some stage during development

6. Which of the following is not in the phylum-Mollusca (molluscs)?

- (a) Clam (b) Oyster (c) Shrimp (d) Snail
(e) Squid

7. Which of the following is true about the photosynthetic Protista?

- (a) Dinophyta often have cell wall made up of armour plates
(b) Bacillariophyta are commonly found as phytoplankton
(c) All of them have chlorophyll
(d) All of the above

8. Which of the following is true of alternation of generation?

- (a) The sporophyte undergoes syngamy to produce spores
(b) The sporophyte undergoes meiosis to produce spores
(c) The gametophyte undergoes syngamy to produce spores
(d) The gametophyte undergoes meiosis to produce gametes

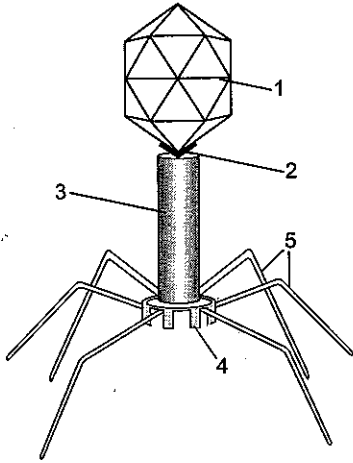
9. Air bladder is

- (a) a respiratory organ in birds
(b) excretory organ in mammals
(c) a cnidarian
(d) a hydrostatic organ in bony fishes

10. The principle pigment imparting distinctive brown or olive brown colouration to the thallus of Phaeophyta is

- (a) siphonoxanthin (b) fucoxanthin
(c) necoxanthin (d) flavoxanthin

11. Mark the correct labelling in the T₄ bacteriophage from top to bottom.



- (a) Collar, head, tail, endplate, tail fibre
(b) Head, collar, tail, endplate, tail fibre
(c) Head, endplate, tail, collar, tail fibre
(d) Head, collar, tail, endplate, tail fibre

12. The top five crops, as on date, in terms of annual world production in millions of metric tonnes belong to the families.

- (a) Gramineae and Solanaceae
(b) Gramineae and Cruciferae
(c) Gramineae and Leguminosae
(d) Leguminosae and Cucurbitaceae

13. One of the following is not a feature of amphibians (1st NSEB)

- (a) habitat-damp places ✗
(b) egg-laying in water ✗
(c) scaly skin
(d) larvae respire by gills

14. The numbered items corresponding with those marked with letters are

Column I	Column II
A. Green algae	1. Floridean starch
B. Brown algae	2. Frustules
C. Red algae	3. Prokaryotic
D. Golden brown or green algae	4. Mannitol
	5. Gemma
	6. Starch

(3rd NSEB)

Codes :

	A	B	C	D		A	B	C	D
(a)	6	4	2	5 ✗	(b)	6	3	2	4 ✗
(c)	5	4	1	2	(d)	6	4	1	2

15. Match the following structures of a sponge with their respective functions and mark your answer from the codes given below.

Column I	Column II
A. Amoebocyte	1. Control of water entry
B. Epidermal cells	2. Movement of water and filtering of food
C. Collar cells	3. Skeletal support element
D. Spicules	4. Transport of food to non feeding cells

Codes :

	A	B	C	D		A	B	C	D
(a)	1	3	4	2	(b)	3	2	1	4
(c)	4	1	2	3	(d)	2	4	3	1

16. Monotremes are unique mammals because they

- (a) possess hair
(b) give birth to live young
(c) secrete milk in a pouch
(d) lay eggs
(e) possess a bill

17. Which of the following is present in the respiratory system of insects, fish and mammals?

- (a) Blood containing oxyhaemoglobin
(b) Alveoli
(c) Spiracles
(d) A thin moist surface

18. Which of the following correctly ranks the following structures in terms of size, from smallest to largest? Virus particle (VP), algal cell (AC), water molecule (WM), chloroplast (CH), phospholipid molecule (PM).

- (a) WM-PM-VP-CH-AC
(b) VP-WM-CH-PM-AC
(c) WM-VP-PM-AC-CH
(d) PM-WM-VP-CH-AC

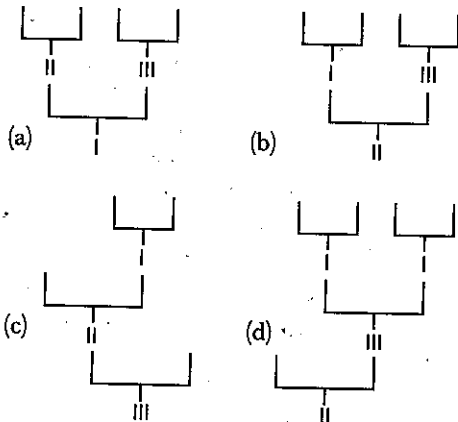
19. The gymnosperms differ from the ferns in that

- (a) sexual fusion does not occur in water
(b) they have vascular tissue
(c) they have a larger gametophyte
(d) they produce gymnosperms

20. Some criteria for classifying animals are (4th NSEB)

- I. Presence or absence of coelom.
- II. Presence or absence of true tissue organization.
- III. Presence of 2 or 3 tissue layers.

The correct way of classification using the above criteria is



21. Pick out the correct answer by using the codes given below. Mycorrhizal association is obligatory for growth in

- I. Formation of apothecia in lichens.
 - II. Growth of gametophytes in some species of *Lycopodium*.
 - III. Growth of coralloid roots of *Cycas*.
 - IV. Germination of the seeds of Orchidaceae.
- (a) I and III
 - (b) II and IV
 - (c) II and III
 - (d) III and II

22. Whirling whips are protists which possess two flagella that beat

- (a) slightly towards one side so as to cause rotation of the organism while moving forward
- (b) forward, backward and sideways depending upon the requirement
- (c) at right angles to each other due to being present in different grooves
- (d) along with numerous cilia

23. Pick up the properly matched

- (a) Arthropoda - Arachnida - Lobster
- (b) Arthropoda - Myriapoda - Scorpion
- (c) Mollusca - Cephalopoda - Octopus
- (d) Mollusca - Gastropoda - Squid

24. Which of the following groups contain organisms that are most closely related?

- (a) *Rhizobium*, *E. coli* and *Salmonella*
- (b) *Mangifera indica*, lizard and *Mucor*
- (c) *Amoeba*, yeast and fern
- (d) Jelly fish, cat fish and whale

25. Match the following and mark the correct answer from the codes given below.

Column I (Divisions of Algae)	Column II (Reserve Food Materials)
A. Cyanophyta	1. Chrysolaminarin
B. Chlorophyta	2. Amylopectin
C. Phaeophyta	3. Floridean starch
D. Rhodophyta	4. Starch
	5. Laminarin

Codes :

- | | | | | |
|-----|---|---|---|---|
| | A | B | C | D |
| (a) | 2 | 4 | 5 | 3 |
| (b) | 2 | 5 | 1 | 3 |
| (c) | 2 | 3 | 5 | 1 |
| (d) | 1 | 4 | 3 | 5 |

26. Following are given some statements about bryophytes. Mark the incorrect statement. (2nd NSEB)

- (a) Gametophyte is dominant generation in all bryophytes
- (b) Sporophyte is always haploid
- (c) Sporophyte is dependent on gametophyte for nutrition
- (d) Water and minerals are absorbed by the whole plant

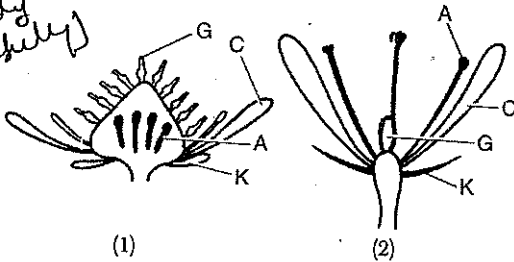
27. Placement of gymnosperms between dicotyledons and monocotyledons is one of the drawbacks in the system of classification of

- (a) Rendle
- (b) Bentham and Hooker
- (c) Engler and Prantl
- (d) Linnaeus

28. Which statement is false?

- (a) Bacteria are necessary for decomposition
- (b) Bacteria can cause diseases of plants
- (c) Bacteria are part of your 'personal' microflora
- (d) Bacteria are necessary for biological nitrogen fixation
- (e) Bacteria are necessary for photosynthesis

29. Two flower structures are shown in the figure. Mark the correct interpretation. (2nd NSEB)



- (a) 1 is primitive and 2 is advanced
 (b) 1 is advanced and 2 is primitive
 (c) Both are advanced flower structures
 (d) Both are primitive flower structures

30. Which of the following is not an Indian carp? (3rd NSEB)

- (a) *Catla catla* (b) *Labeo rohita*
 (c) *Cirrhinus mrigala* (d) *Cyprinus carpio*

31. Which of the following animals has both endoskeleton as well exoskeleton? (3rd NSEB)

- (a) Cockroach (b) Sponge ✗
 (c) Snake (d) Frog ✗

32. Which of the following are true for *Peripatus*? (3rd NSEB)

- I. It is a connecting link between Annelida and Arthropoda.
 II. It is a connecting link between Arthropoda and Mollusca
 III. It is a living fossil.
 IV. It is endemic to South America.
 (a) I, II and III (b) I and III
 (c) II and III (d) III and IV

33. Agnatha or Cyclostomata are characterized by

- (a) absence of jaws and presence of suctorial mouth
 (b) presence of suctorial mouth, absence of jaws, presence of single nostril and unpaired fins
 (c) absence of mouth, presence of single nostril
 (d) round mouth with triradiate lips

34. An archegonium of *Riccia* has

- (a) 4 neck canal cells, 1 venter canal cell and 1 oosphere
 (b) 4 neck canal cells, 2 venter canal cells and 1 oosphere
 (c) 4 neck canal cells, 1 venter canal cell and 2 oospheres
 (d) 6 neck canal cells, 2 venter canal cells and 1 oosphere

35. A plant from Liliaceae whose underground stem yields a chemical mutagen, which produces polyploids by hindering the spindle formation. Which is the plant?

- (a) *Solanum tuberosum*
 (b) *Nicotiana tabacum*
 (c) *Parthenium hysterophorus*
 (d) *Colchicum autumnale*

36. Which important aspect of the classification of all organisms is attributed to Carl Linnaeus?

- (a) The use of Latin
 (b) The use of branching diagrams (trees) to depict relationships among groups
 (c) The use of two-part names (binomials)
 (d) The use of standardized common names
 (e) The use of keys for identification

37. It is generally agreed that prokaryotes constituted the first life on earth. It is also generally accepted that the early eukaryotes were

- (a) photosynthetic
 (b) chemosynthetic
 (c) heterotrophs
 (d) multicellular
 (e) unicellular

38. Which statement is false?

- Bacteria are involved in
 (a) animal diseases
 (b) decomposing dead organic matter
 (c) nitrogen processing in the soil
 (d) food digestion in animals
 (e) alcohol production in beer

39. The endosperm of an angiosperm differ from that of a gymnosperm in that it

- (a) is triploid
 (b) only lasts a few days
 (c) does not form until fertilization take place
 (d) Both (a) and (c)

40. Which of the following animals is not a mammal?

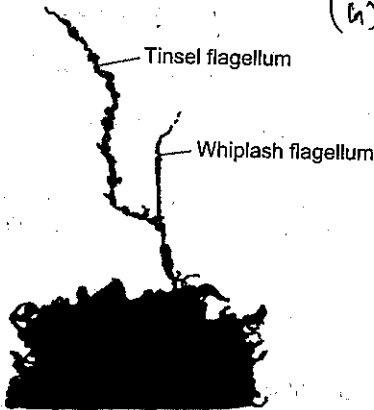
- (a) Bird (b) Kangaroo
 (c) Dog (d) Human
 (e) *Echidna*

41. Both algae and fungi are not independently capable of initiating seral change on bare rocks but lichens can do so because they

- (a) adapt suitably to xeric conditions
 (b) are a combination of algae and fungi

Biosystematics

- (c) can secrete acids causing weathering of rocks
(d) do not require much moisture for growth
42. Two different animals are classified into the same family. This means they would be classified in
- the same phylum, but different class
 - the same class, but different species
 - a different kingdom and a different phylum
 - a different class and a different order
 - the same genus, but different phylum
43. What group(s) of organisms are characterized by the structures shown in the diagram? (h)



- Rhodophyta
- Chlorophyta
- Heterokonts
- All of these

44. Which of the following descriptions does not apply to Phaeophyta?

- Dominant photosynthetic pigment is fucoxanthin
- Stores carbohydrates as mannitol
- Nearly all are freshwater
- Body is filamentous or thalloid

45. Which of the following use their own metabolic energy to maintain a near constant body temperature?

- | | |
|--------------|----------------|
| I. Fish | II. Birds |
| II. Reptiles | IV. Amphibians |
| V. Mammals | |

- I, II, III, IV and V
- II, III, IV and V
- II, III and V
- II and V
- V only

46. A major difference between insect and vertebrate populations is that

- the insect populations are based on a family unit, whereas the vertebrate society is not
- there is more recognition of individuals in vertebrate rather than insect populations
- only insects display altruistic behaviour to benefit the society
- communication is absent in insect populations

47. Which of the following statements about reproduction in *Paramecium* are true?

I. Conjugation is a process of sexual reproduction.

II. Macronuclei always divide mitotically.

III. Conjugation is a process of only genetic recombination.

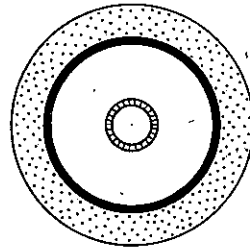
IV. During the process of conjugation, each *Paramecium* gives and receives equal amount of DNA. (4th NSEB)

- I, III and IV
- II and IV
- III and IV
- Both (a) and (c)

48. The Phaeophyta, Rhodophyta and Chlorophyta are distinguished by the following feature.

- Their degree of multicellularity
- Their accessory (light-harvesting) pigments
- Nuclei
- All of the above

49. The figure represents the internal body plan of (4th NSEB)



- Platyhelminthes
- Nematoda
- Annelida
- Echinodermata

50. A volcano rises from the floor of the ocean. The resulting island gradually becomes populated with living organisms. The most likely order of colonization is

- blue-green algae, grass, trees, birds and snakes
- birds, snakes, trees, blue-green algae and grass

- (c) snakes, birds, trees, blue-green algae and grass
 (d) trees, grass, birds, snakes and blue-green algae
51. The living organisms in the domain Archaea that live near volcanic vents in the ocean floor are example of
 (a) chemoautotrophs (b) chemoheterotrophs
 (c) photoautotrophs (d) photoheterotrophs
 (e) geotrophs
52. Two different animals are classified into the same family. This means that they would be classified in
 (a) the same phylum but different class
 (b) the same class but different species
 (c) a different kingdom and different phylum
 (d) a different class and different order
 (e) the same genus but different phylum
53. The *Anopheles* and *Culex* differ from each other by which one of the following character?
 (a) In *Culex*, respiratory siphon is absent, whereas in *Anopheles* respiratory siphon is present
 (b) *Culex* lies horizontal to the surface of water, whereas *Anopheles* makes an angle with water
 (c) *Culex* makes an angle with water surface and *Anopheles* lies horizontally, i.e., parallel to water surface
 (d) None of the above
54. Which of the following groups of animals are all invertebrates?
 (a) Earthworm, insect and crab
 (b) Cow, fish and frog
 (c) Shark, snake and bird
 (d) Insect, fish and frog
 (e) Snail, fish and bacterium
55. Animals of the same phylum are grouped. Mark the incorrect group. (4th NSEB)
 (a) Spider, insects, shrimp
 (b) Fish, mammal, reptile
 (c) Snail, squid, slug
 (d) Earthworm, millipede, leech
56. One common feature of tracheae of cockroach and trachea of rabbit is that both
 (a) have ciliated inner lining
 (b) are paired and branched
 (c) have cartilaginous rings
 (d) have non-collapsible wall
57. Larva of *Anopheles* is a
 (a) surface feeder with long, conical respiratory siphon
 (b) surface feeder with undeveloped respiratory siphon
 (c) bottom feeder with undeveloped respiratory siphon
 (d) bottom feeder with long, conical respiratory siphon
58. Which one of the following statements is correct?
 (a) The body of sponges consists of epithelial tissues only
 (b) All the four types of tissues are seen in the body of sponge
 (c) Only epithelial and connective tissues are present
 (d) Structurally organized tissues are absent in the body of sponge
59. Which of the following taxonomic categories contains organisms least similar to one another?
 (a) Class (b) Family
 (c) Genus (d) Species
60. Pick out the correct statement from among the following
 (a) All chloroplasts have pyrenoids associated with them
 (b) Chloroplasts of all algae have pyrenoids associated with them
 (c) Chloroplasts of green algae only have pyrenoids associated with them
 (d) Chloroplasts of all green algae and some embryophytes have pyrenoids associated with them
61. The gliding bacteria that aggregate to form spore releasing fruiting bodies under harsh conditions are
 (a) myxobacteria (b) actinomycetes
 (c) mycoplasma (d) chlamydiae
62. Which of the following is considered as Guinea pig of Microbiology and weed of laboratory? (3rd NSEB)
 (a) *Escherichia coli*
 (b) *Aspergillus niger*
 (c) *Neurospora crassa*
 (d) *Pseudomonas denitrificans*
63. Naming of cultivars is determined by
 (a) international code of nomenclature of cultivated plants
 (b) international code of botanical nomenclature

Biosystematics

- (c) international association of breeders and genetists
(d) international code of nomenclature for microbes
64. Mark out the odd pair. (1st NSEB)
(a) *Trypanosoma* and blood cells
(b) *Mycobacterium leprae* and bone cells
(c) *Entamoeba* and intestinal cells
(d) *E. coli* and urinary tract
65. Kangaroo is a
(a) eutherian (b) prototherian
(c) bird (d) metatherian
66. Which of the following is not an insect?
(a) Ant (b) Mosquito (c) Spider (d) Locusts
67. Binomial system of nomenclature means that every organism has
(a) one scientific and one popular name
(b) a name given by two scientists
(c) one scientific name consisting of generic and specific epithet
(d) a number in an international catalogue by which an organism is identified
68. Adult tapeworms feed by
(a) wafting food particles into their mouths along ciliated tracts
(b) secreting enzymes and absorbing the food they digest
(c) absorbing food from their surroundings
(d) taking in food through muscular proboscis
69. In the life cycle of a fern, the meiosis occurs during the
(a) formation of spores
(b) formation of gametes
(c) germination of a spore
(d) development of a zygote
70. Incomplete siphonogamy in *Cycas* is due to the presence of (3rd NSEB)
(a) nucellus between pollen chamber and archegonial chamber
(b) ciliated male gametes
(c) several archegonia
(d) All of the above
71. *Euplectella* is a symbol of union till death because
(a) its basal root tuft and upper part symbolize the two sexes
(b) a young shrimp pair gets entrapped in the sponge
(c) it symbolizes the goddess of marriage
(d) it contains a sieve plate in the osculum region
72. Which of the following pairs are correctly matched?
I. Parrot - Psittaciformes
II. Salamander - Caudate
III. Rabbit - Rodentia
IV. Tortoise - Chelonia
(a) I, II and III (b) I, III and IV
(c) I, II and IV (d) II, III and IV
73. All fungi
(a) are parasitic
(b) are capable of carrying out photosynthesis
(c) are heterotrophic
(d) live on dead organic matter
(e) are pathogens
74. Highly modified maxillae and saliva with an anticoagulant is characteristic of (1st NSEB)
(a) butterfly (b) housefly
(c) mosquito (d) caterpillar
75. Only one of the following features of the phylum of the Chordata also is present in adult tunicate (Urochordata) which is that
(a) possession of a chord
(b) possession of visceral slits
(c) possession of tail
(d) possession of a dorsal tubular nervous system
76. Which one of the following pairs is correctly matched?
(a) Portuguese man of war - *Velella*
(b) Sea fan - *Porpittia*
(c) Sea pen - *Physalia*
(d) Red coral - *Corallium*
77. Organisms grouped under kingdom-Protista can be described as (2nd NSEB)
(a) chemosynthetic prokaryotes
(b) unicellular eukaryotes
(c) multicellular heterotrophs
(d) unicellular autotrophs
78. The largest and the most foul smelling flower in the plant kingdom is
(a) *Rafflesia* (b) *Sequoia*
(c) *Victoria* (d) *Amorphophallus*
79. The scientist/s who first demonstrated that a virus was made up of a nucleic acid and protein was/were

- (a) W M Stanley
 (b) Dr. N W Pirie and Dr. F C Bawden
 (c) Dr. Salvador Luria and Dr. Max Delbruck
 (d) Dr. Jonas Edward Salk

80. Genera Plantarum was written by

- (a) Linnaeus
 (b) Bentham and Hooker
 (c) John Ray
 (d) Engler and Prantl

81. Interstitial fluid closely resembles

- (a) sea water (b) lake water
 (c) pond water (d) rain water

82. Animal species whose adults nurture their young a great deal probably

- (a) have a great deal to time of spare
 (b) live in the tropics
 (c) have few young
 (d) are antisocial and live on their own

83. In *Riccia*, water and food is transported by (2nd NSEB)

- (a) xylem
 (b) phloem
 (c) cell to cell
 (d) Both (a) and (b)

84. Following are given some trends

- I. Gradual increase in size.
 II. Gradual shift from marine to freshwater habitat.
 III. Gradual differentiation from cell or tissues or organs.
 IV. Gradual increase in chromosomal number.
 Trends observed among kingdom animals are (2nd NSEB)

- (a) I, II and III
 (b) I and III
 (c) I, II and IV
 (d) All of these

85. Which of the following cannot be the criteria for grouping of plants/animals together? (2nd NSEB)

- (a) Similar reproductive physiology
 (b) Similar behavioural/mating pattern
 (c) Anatomical similarity ×
 (d) Genetic similarity ×

86. The diploid parenchymatous mass of cells which constitutes the body of the young ovule of *Pinus* is called

- (a) endosperm
 (b) perisperm
 (c) nucellus
 (d) nucellar beak

87. The zoological name of peacock is (2nd NSEB)

- (a) *Corvus splendens*
 (b) *Passer domesticus*
 (c) *Pavo cristatus*
 (d) *Pycnonotus cafer*

88. Regeneration was first discovered in

- (a) *Planaria* (b) *Hydra*
 (c) sponges (d) salamander

89. The floral formula for family—Caesalpinaceae is (3rd NSEB)

- (a) $\% \underset{\text{♀}}{\overset{\text{♂}}{\text{K}}}_5 \text{C}_5 \text{A}_{10} \underline{\text{G}}_1$
 (b) $\oplus \underset{\text{♀}}{\overset{\text{♂}}{\text{K}}}(4-5) \text{C}(4-5) \text{A}_a \underline{\text{G}}_1$
 (c) $\oplus \underset{\text{♀}}{\overset{\text{♂}}{\text{K}}}_{(5)} \text{C}_5 \text{A}_a \underline{\text{G}}_{(5)}$
 (d) $\oplus \underset{\text{♀}}{\overset{\text{♂}}{\text{K}}}_5 \text{C}_5 \text{A}_a \underline{\text{G}}_a$

90. Which of the following features do all bacteria possess?

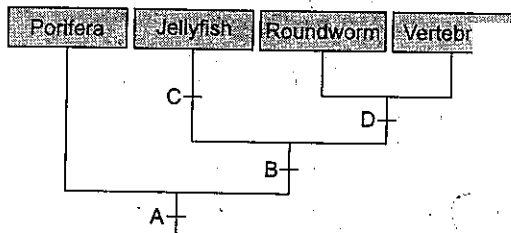
- (a) A capsule
 (b) A flagellum
 (c) DNA
 (d) All of these

Exercise II

1. In an experiment, common Tobacco Mosaic Virus (TMV) and its mutant strain 'HR' were used. Hybrid particles with 'HR' nucleic acid and 'TMV' protein coat were prepared. These hybrids were mixed with antibodies against 'HR' strains. If this mixture is applied to plant materials, it will result in (INBO)

- (a) loss of infectivity of virus particles due to inactivation of nucleic acids
- (b) loss of infectivity due to inactivation of protein coat
- (c) intact infectivity because only coat is neutralized
- (d) unchanged infectivity because neither nucleic acid nor protein coat is neutralized

2. Evolutionary relationships of some animal phyla are shown below. Mark the correct options. For the numbers (2nd INBO)



- (a) A-Cellular organization B-Multicellularity C-Radial symmetry D-Protostome
- (b) A-Multicellularity B-Cell differentiation C-Radial symmetry D-Acoelomate
- (c) A-Cell differentiation B-Asymmetry C-Radial symmetry D-Protostome
- (d) A-Multicellularity B-Cell differentiation C-Radial symmetry D-Bilateral symmetry

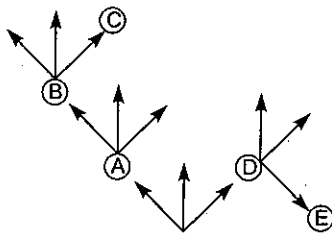
3. Some characteristics of animals are given below.

- I. Notochord is present in the embryonic as well as adult form.
- II. Animals have closed or open circulatory system.
- III. Animals show bilateral symmetry.
- IV. Animals are always triploblastic and coelomate.

The characteristics that apply to chordates are (2nd INBO)

- (a) I, II, III and IV
- (b) I, II and III
- (c) II, III and IV
- (d) only III and IV

4. In the given cladogram, C is rodentia, then (2nd NSEB)



- (a) A-Chordata B-Mammalia
- (b) A-Mammalia B-Carnivora
- (c) A-Chordata B-Amphibia
- (d) A-Mammalia B-Amphibia

5. In herbivorous mammals, the cellulose of plant cell wall

- digested by enzymes produced by symbiotic microorganisms
- (b) is digested by cellulase, which is secreted by the lining of the rumen
- (c) is hydrolyzed to simple molecules by large quantities of saliva
- (d) cannot be digested and, therefore, forms the bulk of the faeces
- (e) cannot be digested, but the cell walls are broken down by the mechanical action of the teeth, so that the cell contents are released, and become available

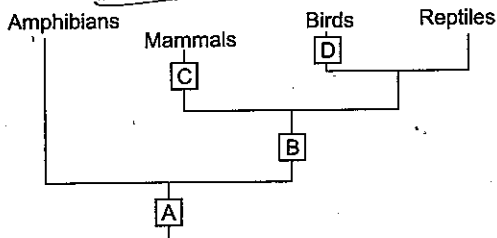
6. The increase in complexity of the vertebrate circulatory system is represented by which of the following combinations?

- (a) Toad-Rabbit-Alligator-Shark
- (b) Shark-Frog-Alligator-Rabbit
- (c) Shark-Crocodile-Rabbit-Frog
- (d) Alligator-Dog-Shark-Toad

7. Red algae differ from the green algae and brown algae in having

- (a) no chlorophyll-a
- (b) no differentiated cells
- (c) no phycoerythrin within their cells
- (d) no flagellated stages in their life cycles

8. Animal classification is depicted below. Mark the correct option. (2nd NSEB)



- (a) A-Limbs
B-Egg with amnion membrane
C-Milk, hair
D-Feathers
- (b) A-Egg with amnion membrane
B-Milk, hair
C-Limbs
D-Feathers
- (c) A-Swim bladder
B-Limbs
C-Milk, hair
D-Feathers
- (d) A-Milk, hair
B-Limbs
C-Egg with amnion membrane
D-Feathers

9. Match column I with column II and select the correct answer by using the codes given below.

Column I (Animal)	Column II (Type of Coelom)
A. Echinodermata	1. Coelom absent
B. Arthropoda	2. Haemocoel
C. Nematyhelminthes	3. Enterocoelous coelom
D. Annelida	4. Pseudocoelom
	5. True coelom

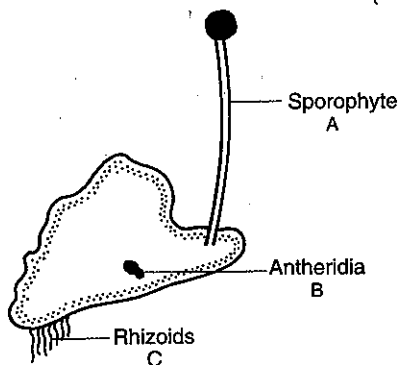
Codes :

- | | | | | | | | |
|-------|---|---|---|-------|---|---|---|
| A | B | C | D | A | B | C | D |
| (a) 2 | 1 | 5 | 4 | (b) 3 | 2 | 4 | 5 |
| (c) 2 | 5 | 4 | 3 | (d) 2 | 1 | 3 | 4 |

10. Which of the following features of plants and animals is best matched in terms of function?

Plant Feature	Animal Feature
(a) Stomata	- Skin
(b) Phloem	- Urine tract \times
(c) Root hair	- Villi of the intestine
(d) Auxin	- Tendon \times

11. Given is a picture of bryophyte. The correct ploidy levels of the indicated structures are (2nd INBO)

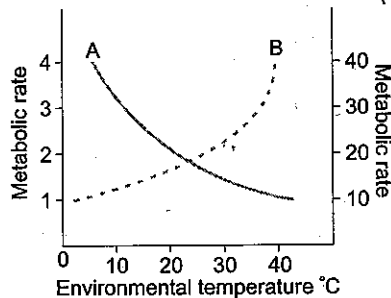


- (a) A- $2n$ B- n C- n
- (b) A- n B- n C- n \times
- (c) A- $2n$ B- $2n$ C- $2n$
- (d) A- $2n$ B- n C- $2n$

12. Which arrangement of the organisms represents a rank ordering (based on size/importance) from dominant gametophyte on the left to dominant sporophyte on the right?

- (a) *Oedogonium* (Chlorophyta), *Polytrichum* (moss), fern, corn
- (b) *Polytrichum*, *Oedogonium*, fern, corn
- (c) *Oedogonium*, *Polytrichum*, corn, fern
- (d) Corn, *Oedogonium*, *Polytrichum*, fern

13. Curves A and B in the following graph represent (4th NSEB)



- (a) A-Cat B-Lizard
- (b) A-Elephant B-Mouse
- (c) A-Bird B-Mouse
- (d) A-Fish B-Frog

14. Match the names of branches of science listed under column I with the field of study given under column II. Choose the choice which gives the correct combination of the alphabet.

Column I (Branch of Science)	Column II (Field of Study)
A. Mycology	1. Study of birds
B. Ornithology	2. Study of worms
C. Herpetology	3. Study of fishes
D. Ichthyology	4. Study of fungi
	5. Study of snakes

Codes :

- | | | | | | | | |
|-------|---|---|---|-------|---|---|---|
| A | B | C | D | A | B | C | D |
| (a) 2 | 4 | 3 | 5 | (b) 1 | 4 | 3 | 5 |
| (c) 4 | 1 | 5 | 3 | (d) 4 | 5 | 1 | 3 |

15. Bryophytes resemble algae on the following basis

- differentiation of the plant body into root, stem and heterotrophic mode of nutrition
- thallus-like plant body, lack of vascular tissue; absence of root; and autotrophic mode of nutrition
- thallus-like plant body, presence of roots; and heterotrophic mode of nutrition
- filamentous body; presence of vascular tissue; and autotrophic mode of nutrition

16. Which one of the following statements is incorrect? (INBO)

- Alternation of generation occurs only in plants and certain group of algae
- All sexually reproducing organisms alternate haploid and diploid conditions
- The haploid stage of gametes restores the diploid stage
- Variations on different ancestral cycles of alternation of generation has led to the diversity among plant life

17. Filament of an alga *Cladophora* was kept on a slide with an even distribution of oxygen sensitive bacteria in a thin film of water. It was illuminated with a micro spectrum of light for 30 minutes in absence of oxygen. It will cause (3rd NSEB)

- no change in distribution of bacteria
- aggregation of bacteria in the region receiving red range of the spectrum
- aggregation of bacteria near the regions receiving 650 nm and 450 nm rays
- aggregation of bacteria in the region receiving blue range of spectrum

16. You open your refrigerator to make a sandwich and find that the tomato that you put there 3 weeks ago has turned into a soggy, mushy mess. Your mother tells you that the tomato must have been infected with a bacterium. Which of the following procedures would be the best way to prove this?

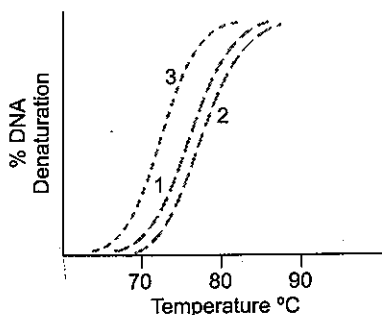
- Take a bit of the mushy tomato and analyze it for DNA
- Examine the tomato tissue under the electron microscope and look for small cells with a cell wall, a plasma membrane, and no endoplasmic reticulum
- Put a piece of the mushy tomato (using aseptic techniques) on a culture medium and look for fluffy colonies of microorganisms
- See, if the mushy tomato takes up more oxygen than a healthy tomato
- Examine the tomato tissue under a light microscope and look for small polyhedral particles

19. The technique of DNA-DNA hybridization provides a way of comparing the total genome of the species.

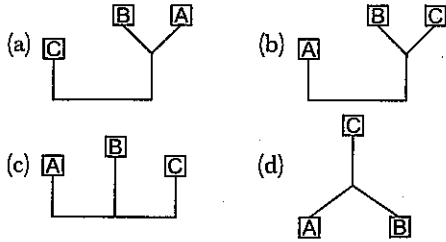
Following procedure was used to assess the evolutionary relationship of species A, B and C:

- The total DNA was extracted from the cells of each species and purified.
- Each of the three samples was denatured by heating.
- The resulting single strands were then mixed as follows:
 Test tube 1 : Strands from sp. A
 Test tube 2 : Strands from sp. A and B
 Test tube 3 : Strands from sp. A and C
- All the samples were cooled
- DNA melting curve for all the three samples was studied.

The result is shown in the graph:



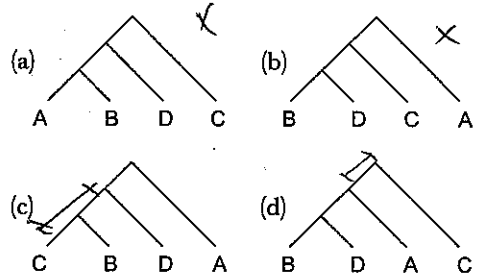
Select the cladogram that matches with the data obtained. Put a tick mark (✓) in the appropriate box in the answer sheet



a.	
b.	
c.	
d.	

Comparison of Species	Number of Amino Acid Substitution
A and B	19
B and C	26
A and C	27
D and C	27
A and D	20
D and B	1

20. Following table shows data on amino acid substitution in the α chain of haemoglobin in four different mammalian species A, B, C and D. On the basis of the data shown in the table. Choose the most appropriate evolutionary tree from those given below.



B & C → (A+D)

Answers

Exercise I

- | | | | | | | | | | |
|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 1. (c) | 2. (c) | 3. (a) | 4. (a) | 5. (b) | 6. (c) | 7. (d) | 8. (b) | 9. (d) | 10. (b) |
| 11. (d) | 12. (c) | 13. (c) | 10. (d) | 15. (c) | 16. (d) | 17. (d) | 18. (b) | 19. (a) | 20. (d) |
| 21. (b) | 22. (c) | 23. (c) | 24. (a) | 25. (a) | 26. (b) | 27. (b) | 28. (e) | 29. (a) | 30. (d) |
| 31. (c) | 32. (b) | 33. (b) | 34. (a) | 35. (d) | 36. (c) | 37. (e) | 38. (e) | 39. (d) | 40. (a) |
| 41. (d) | 42. (b) | 43. (c) | 44. (c) | 45. (d) | 46. (b) | 47. (d) | 48. (b) | 49. (b) | 50. (a) |
| 51. (a) | 52. (b) | 53. (b) | 54. (a) | 55. (d) | 56. (d) | 57. (b) | 58. (d) | 59. (a) | 60. (d) |
| 61. (a) | 62. (b) | 63. (b) | 64. (b) | 65. (d) | 66. (c) | 67. (c) | 68. (c) | 69. (a) | 70. (b) |
| 71. (b) | 72. (c) | 73. (c) | 74. (c) | 75. (b) | 76. (d) | 77. (b) | 78. (a) | 79. (b) | 80. (b) |
| 81. (a) | 82. (c) | 83. (c) | 84. (b) | 85. (c) | 86. (c) | 87. (c) | 88. (b) | 89. (a) | 90. (c) |

Exercise II

- | | | | | | | | | | |
|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 1. (d) | 2. (d) | 3. (d) | 4. (a) | 5. (a) | 6. (b) | 7. (d) | 8. (a) | 9. (b) | 10. (c) |
| 11. (a) | 12. (b) | 13. (a) | 14. (c) | 15. (b) | 16. (a) | 17. (c) | 18. (b) | 19. (a) | 20. (d) |