Biological Classification

Standard difficulty · 20 questions · 40 marks · Time: 36 minutes

Name: _____ Date: _____ Score: ____ / 40

Show your working for Sections B and C. Answers are on the last page — try every question first!

Section A — Choose the correct answer — 8 × 1 = 8 marks

1. The five-kingdom classification was proposed by:
(a) Aristotle **(b)** Robert Hooke
(c) Carolus Linnaeus **(d)** R. H. Whittaker

2. Amoeba is one of the:
(a) amoeboid protozoans **(b)** Phycomycetes
(c) sporozoans **(d)** ciliated protozoans

3. Cholera is caused by:
(a) a viroid **(b)** a protozoan **(c)** a bacterium **(d)** a prion

4. Which kingdom contains organisms that have a cell wall made of chitin?
(a) Plantae **(b)** Fungi **(c)** Animalia **(d)** Protista

5. In Basidiomycetes, the sexual spores are:
(a) basidiospores, on basidia **(b)** not known
(c) zygospores **(d)** ascospores, in sacs (asci)

6. A bacterium divides by binary fission every 15 minutes. Starting with 5 cells, how many cells are there after 3 hours? (Assume all keep dividing.)
(a) 40,960 **(b)** 120 **(c)** 60 **(d)** 20,480

7. Mycoplasma are:
(a) archaebacteria that live in hot springs
(b) free RNA without a protein coat
(c) the smallest living cells, bacteria with no cell wall
(d) viruses that infect bacteria

8. Assertion (A): A single bacterium dividing every 60 minutes gives 64 cells after 360 minutes.
Reason (R): In binary fission the number of cells increases by one each generation.
(a) Both A and R are true, and R is the correct explanation of A.
(b) Both A and R are true, but R is not the correct explanation of A.
(c) A is true, but R is false.
(d) A is false, but R is true.

Section B — Short answer — 8 × 2 = 16 marks

9. Give two drawbacks of the two-kingdom classification.

10. To which kingdom and group does Mucor belong?

11. Name the cause of potato spindle tuber disease, and say what kind of organism or agent it is.

12. A bacterium divides every 30 minutes. How many bacteria come from one after 90 minutes?

13. To which class of fungi does Colletotrichum belong? Name the sexual spores of that class.

14. Euglena is placed in kingdom Protista. Give its cell type, cell wall and nuclear membrane.

15. Name these: nucleic acid inside a protein coat, living only inside a host cell.

16. Name two diseases caused by protozoans, giving the cause of each.

Section C — Word problems — 4 × 4 = 16 marks

17. Compare the five kingdoms of Whittaker by cell type, cell wall, nuclear membrane, body organisation and mode of nutrition.

18. A bacterium divides by binary fission every 20 minutes. (a) How many bacteria come from one in 100 minutes? (b) How long does it take one bacterium to give 8,192? (c) Why does a bacterial population grow so fast?

19. Compare kingdoms Protista and Monera for cell type, cell wall, nuclear membrane, body organisation and mode of nutrition, and give one example of each.

20. Classify into kingdom and group, giving one feature of each group: Agaricus, Ustilago, Albugo, Puccinia.

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Answer key

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Q	Answer	Working
1	**(d) R. H. Whittaker**	1969
2	**(a) amoeboid protozoans**	kingdom Protista
3	**(c) a bacterium**	Vibrio cholerae (a bacterium)
4	**(b) Fungi**	—
5	**(a) basidiospores, on basidia**	—
6	**(d) 20,480**	12 divisions: 5 × 2^12
7	**(c) the smallest living cells, bacteria with no cell wall**	—
8	**(c) A is true, but R is false.**	A is true: 6 divisions: 2^6 = 64. R is false.
9	**It did not separate prokaryotes from eukaryotes, unicellular from multicellular organisms, or photosynthetic from non-photosynthetic organisms; fungi were wrongly placed with plants.**	—
10	**Kingdom Fungi; Phycomycetes**	—
11	**A viroid**	—
12	**8**	3 divisions: 2^3
13	**Deuteromycetes (fungi imperfecti); not known**	—
14	**cell type: eukaryotic; cell wall: present in some; nuclear membrane: present**	—
15	**Viruses**	—
16	**amoebic dysentery: Entamoeba; sleeping sickness: Trypanosoma**	—

Q	Answer	Working
17	**Monera: prokaryotic, cell wall non-cellulosic (polysaccharide + amino acid), no nuclear membrane, cellular, autotrophic or heterotrophic. Protista: eukaryotic, cell wall present in some, nuclear membrane present, cellular, autotrophic or heterotrophic. Fungi: eukaryotic, wall of chitin, multicellular/loose tissue, heterotrophic (saprophytic or parasitic). Plantae: eukaryotic, cellulose wall, tissue/organ level, autotrophic. Animalia: eukaryotic, no cell wall, tissue/organ/organ system level, heterotrophic (holozoic).**	—
18	**(a) 32 (5 divisions); (b) 260 minutes (13 divisions); (c) every cell divides into two, so the number doubles each generation (exponential growth)**	2^n after n divisions
19	**cell type: eukaryotic / prokaryotic; cell wall: present in some / non-cellulosic (polysaccharide and amino acid); nuclear membrane: present / absent; body organisation: cellular / cellular; mode of nutrition: autotrophic (photosynthetic) and heterotrophic / autotrophic (chemosynthetic and photosynthetic) and heterotrophic. Examples: Euglena, Nostoc.**	—
20	**Agaricus: Fungi, Basidiomycetes; Ustilago: Fungi, Basidiomycetes; Albugo: Fungi, Phycomycetes; Puccinia: Fungi, Basidiomycetes**	cyanobacteria photosynthesise; protozoans are heterotrophic protists; fungal classes differ in mycelium and spores

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