



SIR ARTHUR LEWIS COMMUNITY COLLEGE  
ACADEMIC YEAR (2024/2025) – SEMESTER TWO  
END OF SEMESTER EXAMINATION

*COURSE CODE* : BIO117  
*COURSE TITLE* : Organismal Biology  
*LECTURER(S)* : Donaldene Thompson  
*DATE* : May 2, 2025  
*TIME* : 1 p.m.  
*DURATION* : 2 Hours  
*STUDENT ID #* : \_\_\_\_\_

GENERAL INFORMATION AND INSTRUCTIONS

- Students must sign **IN** and **OUT** on the examination class list.
- Write your ID number on the question paper.
- **This paper consists of two (2) sections.**
- Section A – 66 multiple choice questions
- Section B – THREE (3) structured questions, answer ALL questions in the spaces provided.
- ANSWER ALL QUESTIONS IN EACH SECTION
- Specific instructions are given at the beginning of each section.

| Question            | Student's Mark | Moderated Mark |
|---------------------|----------------|----------------|
| Section A<br>1 - 66 |                |                |
| Section B           |                |                |
| 1                   |                |                |
| 2                   |                |                |
| 3                   |                |                |
| Total               |                |                |

**DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO**

## SECTION A

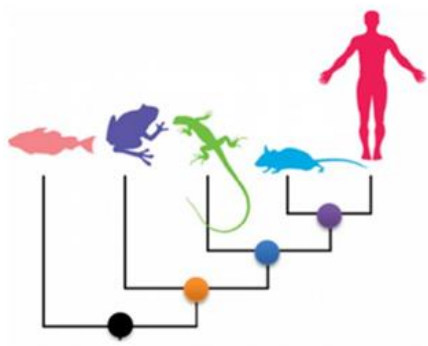
Multiple Choice questions (1 mark each)

***INSTRUCTIONS: Read the questions carefully and CIRCLE the letter alongside the correct option.***

1. One of the first scientists to propose that species change over time was
  - A. Charles Darwin.
  - B. Charles Lyell.
  - C. Jean Baptiste Lamarck.
  - D. Alfred Russel Wallace.
2. What are two main components of natural selection?
  - A. vestigial structures and camouflage
  - B. artificial selection and selective breeding
  - C. variation and inheritance
  - D. mimicry and artificial selection
3. These vertebrate forelimbs are examples of \_\_\_\_.



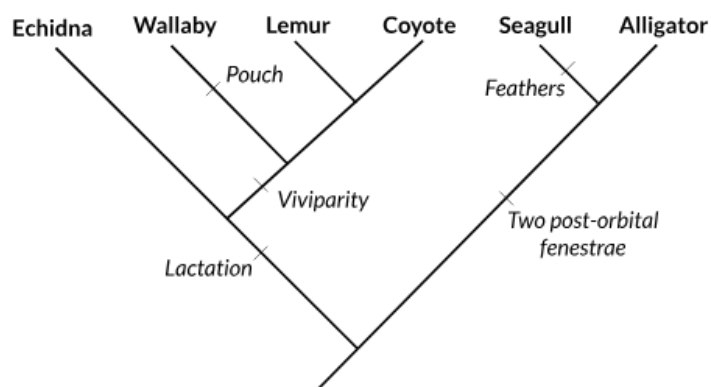
- A. homologous structures
  - B. vestigial structures
  - C. ancestral development
  - D. dysfunctional evolution
4. Which of these is an example of a vestigial structure?
  - A. kangaroo's pouch
  - B. leg attachment site on snake pelvis
  - C. elephant's trunk
  - D. light weight bones of bird skeleton
5. Two species sharing the same \_\_\_\_\_ will be the most closely related
  - A. phylum
  - B. order
  - C. Class
  - D. family



6. In the picture above, which species is most closely related to fish?

- A. Humans and lizard are equally related to fish
- B. lizard
- C. human
- D. frog

7. The following cladogram shows the evolutionary relationships among several animals. Selected derived characters are labeled on the cladogram.



Based on the cladogram, which of the following derived characters is shared by wallabies and lemurs but is not present in echidnas?

- A. Viviparity
- B. Feathers
- C. Lactation
- D. Pouch

8. Dichotomous Key

- A. The recognizable remains or body impressions of an organism that lived in the past
- B. A tool that uses pairs of descriptive statements to identify an organism
- C. The science of identifying, classifying, and naming living things
- D. Grouping objects based on what they have in common

9. The organism shown in the diagram below was found in Mr. Goldstein's backyard last night. Use the classification key above to identify the organism

According to the key below, which animal has wings covered by an exoskeleton and a round body?

|    |                                                        |              |
|----|--------------------------------------------------------|--------------|
| 1a | The animal has wings covered by an exoskeleton         | Go to step 2 |
| 1b | The animal has wings not covered by an exoskeleton     | Go to step 3 |
| 2a | The animal's body has a round shape                    | Ladybug      |
| 2b | The animal's body has a elongated shape                | Grasshopper  |
| 3a | The animal's wings point out from the side of the body | Dragonfly    |
| 3b | The animal's wings point to the posterior of the body  | Housefly     |

- A. Ladybug  
B. Grasshopper  
C. Dragonfly  
D. housefly
10. Which of the following consist of prokaryotic cells?  
A. bacteria and fungi  
B. archaea and fungi  
C. protists and animals  
D. bacteria and archaea
11. Prokaryotes stain Gram-positive or Gram-negative because of differences in the cell \_\_\_\_\_.  
A. wall  
B. cytoplasm  
C. nucleus  
D. chromosome
12. What group listed below DOES NOT have true cell walls?  
A. algae  
B. Gram-positive bacteria  
C. fungi  
D. protozoans
13. Which of the following characteristic DOES NOT occur in prokaryotic cells?  
A. cellular organization  
B. thylakoid membranes within chloroplasts  
C. oxygenic photosynthesis  
D. anaerobic respiration
14. Which of the following is the best collective name for all bacteria with spherical shape?  
A. Cocci,  
B. Bacilli.  
C. Spirochetes,  
D. Streptococci
15. Phagocytosis is not a characteristic of which groups?  
A. protozoans  
B. algae  
C. fungi  
D. Archaea / Bacteria

16. Viruses are better characterized as.
- A. Decomposes
  - B. producers
  - C. carnivores
  - D. parasites
17. To which of the following groups does HIV belong?
- A. Plasmids
  - B. retroviruses
  - C. DNA viruses
  - D. Bacteriophages
18. What is the main mode of transmission of diseases such as cholera and typhoid fever?
- A. Sexual intercourse,
  - B. Blood-to-blood contact,
  - C. vector transmission,
  - D. Food or water contamination
19. What is the main difference between how viruses and bacteria reproduce?
- A. Viruses must infect a living cell. Bacteria can reproduce without being in a cell.
  - B. Viruses need proteins. Bacteria do not.
  - C. Viruses must grow dramatically in size. Bacteria become smaller.
  - D. Viruses infect people. Bacteria do not
20. Apart from the fact that they are all eukaryotes (and therefore found within the Eukarya domain), there is no single trait that is common to all protist species. Which of the following is true of MOST protists?
- A. They can cause disease
  - B. They reproduce sexually
  - C. They prefer to live in water-rich environments
  - D. They can photosynthesize
21. Which of the following is/was not caused by protists?
- A. Malaria
  - B. The Irish potato famine
  - C. Red tides
  - D. Acquired Immunodeficiency Syndrome (AIDS)
22. Which of the following are true of fungus-like protists?
- i. They reproduce with spores.
  - ii. They have mouth-like structures for ingestion.
  - iii. The cell walls are made of chitin.
  - iv. They absorb nutrients from dead organic matter.
- A. i and ii
  - B. i and iii
  - C. i and iv
  - D. all of the above
23. Which of the following best describes the algae known as diatoms?
- A. Cells have intricate shells of silicon dioxide with two halves
  - B. Cells are encased in rigid walls composed of cellulose coated with silicon
  - C. Cells have flagella and a light-detecting eye spot
  - D. Cells contain carotenoid pigments as well as chlorophyll A and B
24. The \_\_\_\_\_ is the vegetative body of algae.
- A. mycelium
  - B. plasmodium
  - C. pseudo plasmodium
  - D. thallus

25. Which group(s) of fungi **DO NOT generally** produce sexual reproductive structures and are also sometimes known as imperfect fungi?
- A. Ascomycota
  - B. Oomycetes
  - C. Zygomycota
  - D. Deuteromycete
26. Water molds belong to which division?
- A. Ascomycota
  - B. Basidiomycota
  - C. Chytridiomycota
  - D. Oomycote
27. Which of the following **does not** represent a human disease caused by fungi?
- A. Ringworm
  - B. Cryptococcosis
  - C. Malaria
  - D. Jock itch
28. The most significant reason why fungi are not in the kingdom Plantae is that fungi
- A. are chemoorganotrophic heterotrophs
  - B. have unicellular and multi-cellular forms
  - C. are prokaryotes
  - D. are eukaryotes
29. Mycorrhizae are mutualistic associations between fungi and
- A. bacteria
  - B. protozoa
  - C. unicellular green algae
  - D. vascular plants
30. Which of the following is correct?
- A. All members of heterotrophic organisms are also members of fungi, but not all members of fungi are members of heterotrophic organisms
  - B. All members of fungi are also members of heterotrophic organisms, but not all members of heterotrophic organisms are members of fungi
  - C. All members of heterotrophic organisms are members of fungi and all members of fungi are members of heterotrophic organisms.
  - D. none of the above
31. Which of the following structures would not be associated with fungi?
- A. Mitochondria
  - B. Cell walls
  - C. Chloroplasts
  - D. Spores
32. A mycelium describes
- A. saclike structure where fungal spores are produced
  - B. single fungal strand made up of a long chain of cells
  - C. interwoven mass of numerous hyphae
  - D. none of the above
33. Land plants share a common ancestor with
- A. cyanobacteria
  - B. red algae
  - C. brown algae
  - D. green algae

34. Which of these is **NOT** a similarity between land plants and charophytes?
- A. Sperm shape
  - B. Protein in the cell walls
  - C. DNA sequences
  - D. Embryo development
35. Benefits to living on land include all but
- A. brighter sunlight unfiltered by water
  - B. no structural support
  - C. more carbon dioxide
  - D. mineral nutrients in the soil
36. Bryophytes are different from other land plants because the
- A. have gametophytes as their dominant generation
  - B. have no vascular system
  - C. are seedless
  - D. have both A and B
37. In the bryophytes which generation grows on top of the other?
- A. Gametophyte on top of sporophyte
  - B. Sporophyte on top of gametophyte
  - C. Zygote on top of gamete
  - D. Gamete on top of zygote
38. What seedless plant is a renewable source of energy?
- A. club moss
  - B. horsetail
  - C. sphagnum moss
  - D. fern
39. The main reason that ferns and their allies grow taller than bryophytes is that they
- A. eat more Wheaties
  - B. develop seeds
  - C. Develop vascular systems
  - D. live in wetter places
40. What is a sporophyll?
- A. A plant that produces spores
  - B. A leaf that produces spores
  - C. A site where spores grow into new plants
  - D. The plant that develops from a spore
41. What is one advantage of having seeds instead of spores?
- A. Seeds are bigger than spores.
  - B. Plants can produce more seeds than spores.
  - C. Seeds can store nutrients for the plant embryo.
  - D. Seeds germinate faster.
42. Which of the following is true about gymnosperms?
- A. They all bear cones.
  - B. They all produce flowers.
  - C. They do not produce fruits.
  - D. They are all extinct.
43. Which of the following traits is NOT unique to seed plants?
- A. Heterospory
  - B. Ovules
  - C. Pollen
  - D. Alternation of generations

44. What is the main benefit of attracting animal pollinators?
- A. Pollinators protect the plant from being eaten.
  - B. Sperm do not have to wait long to reach the egg.
  - C. Animals are better at delivering pollen than the wind is.
  - D. Plants can make more pollen.
45. The diploid generation of plants is called the \_\_\_\_.
- A. sporophyte
  - B. spore
  - C. gametophyte
  - D. gamete
46. All the following are true of plant evolution EXCEPT:
- A. Decrease in the size of gametophyte
  - B. From seedless to seed producing
  - C. Increase in the size of sporophyte
  - D. From vascular to nonvascular tissue
47. The \_\_\_\_ of angiosperms protect and aid in the dispersal of seeds.
- A. flowers
  - B. cones
  - C. fruits
  - D. peduncle
48. All the following are characteristics of animals, **EXCEPT**:
- A. Absence of cell walls
  - B. Heterotrophic
  - C. Muscle and nerve tissue
  - D. Manufacturing own food
49. A sponge does not have a mouth. Instead, they get their nutrients through:
- A. Pores
  - B. Flagella
  - C. Cell walls
  - D. Gamete
50. Which is not from the phylum Cnidaria:
- A. Hydra
  - B. Jellyfish
  - C. Coral
  - D. Sponges
51. Characteristics of flatworms include all, **EXCEPT**:
- A. Bilateral symmetry
  - B. Three germ layers (triploblastic)
  - C. Internal skeletons
  - D. Cephalization
52. Cephalopods have some qualities that make them different from other mollusks. Which one of these is **NOT** one?
- A. Open circulatory system
  - B. Ability to camouflage themselves
  - C. Tentacles with suckers
  - D. Ink sac to distract predators
53. The segments of an annelid body are called:
- A. Metamorphosis
  - B. Metabolites
  - C. Metameres
  - D. Metacarpals

54. Arthropods have an exoskeleton made of:  
A. Chiton  
B. Carapace  
C. Crustacea  
D. Chitin
55. The first animals on land were the arthropods. What group was the first vertebrae?  
A. Reptiles  
B. Amphibians  
C. Insects  
D. Crustaceans
56. Reptile adaptations to land include all **EXCEPT**:  
A. Watertight skin  
B. Amniotic egg  
C. Claws  
D. Backbone
57. Which features of reptiles did birds **NOT** retain?  
A. Teeth  
B. Amniotic egg  
C. Feathers  
D. Scales
58. All subclasses of mammals have the following, **EXCEPT**  
A. Mammary glands  
B. Fur or hair  
C. Teeth  
D. Placenta
59. Which of these things **DOES NOT** belong to the primate family:  
A. Lemur  
B. Raccoon  
C. Orangutan  
D. Chimpanzee
60. The study of population ecology focuses on the \_\_\_\_\_.  
A. number of individuals of one species in an area and how and why that number changes over time  
B. processes driving interactions within and among different species within an area  
C. adaptations that enable individuals to live in specific habitats  
D. Plants and animals living in an enclosed area
61. An ecologist hiking up a mountain may notice different biomes along the way due to changes in all of the following **EXCEPT** \_\_\_\_\_.  
A. elevation  
B. rainfall  
C. latitude  
D. temperature

Critical Thinking Questions # 62 -66. (2 marks each):

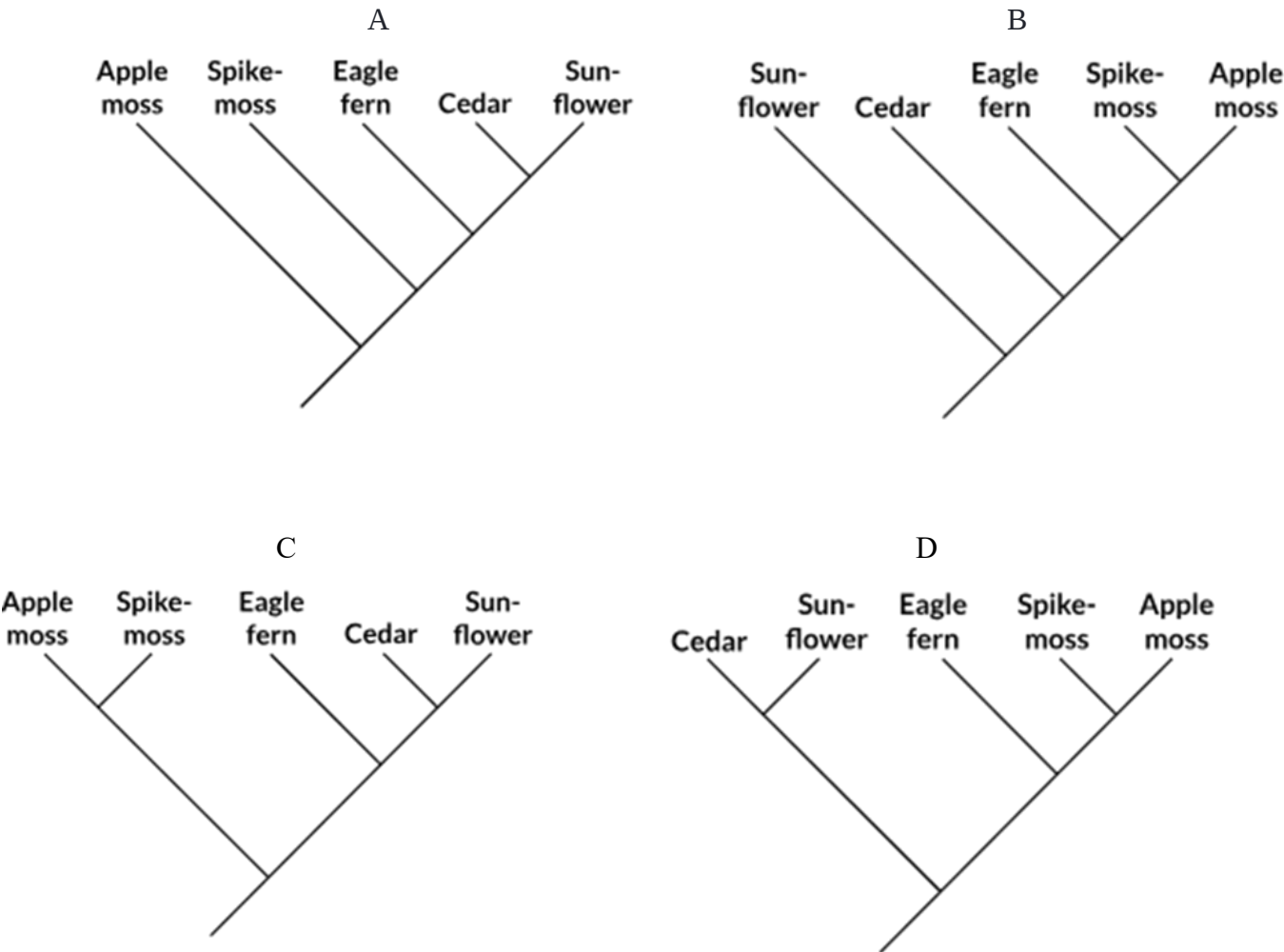
***INSTRUCTIONS: Read the questions carefully and CIRCLE the letter alongside the correct option***

62. A volcano erupted on an island. The ash released from the volcano changed the acidity (pH) of the soil from the level it had been for hundreds of years. This significant change resulted in new environmental pressures on species in the soil. Which of the following is a likely outcome of these pressures?
- A. Some species will disappear from the soil because they do not have individuals with traits that allow them to survive in more acidic soil.
  - B. Only some species will generate the needed mutations to adapt to the change in pH; other species will become extinct.
  - C. Most species gain additional genetically based traits, and this increase in complexity allows them to live in the more acidic soil.
  - D. Individuals in each species will evolve the traits necessary to survive under these new conditions.
63. Why do some adaptive traits, such as thicker fur or flowers of different colors, evolve over time within a population of organisms?
- A. Organisms with these traits survived longer and had more offspring than other organisms in the population, so their traits were passed on to more offspring.
  - B. Such traits are necessary to ensure the survival of the species.
  - C. These traits evolved randomly and just happened to persist over time.
  - D. These traits evolve in response to environmental challenges, ensuring that the population will survive any changes in its habitat.
64. An organism, such as an elephant, that invests in long-term care of its offspring faces risks to its survival as a result of this investment. Explain those risks.
- A. Organisms that invest in long-term parental care have many offspring. Having many offspring means there is greater risk of rapid increase in population.
  - B. Organisms that invest in long-term parental care have few offspring. Having a limited number of offspring means there is greater risk to the survival of the species when a single offspring dies.
  - C. Organisms that invest in long-term parental care have many offspring. Having many offspring means there is greater risk to the survival of the species when a single offspring dies.
  - D. Organisms that invest in long-term parental care have few offspring. Having a limited number of offspring means there is greater risk of rapid increase in population

65. The following table shows a set of derived characters for several species of land and plants.

| Species    | Derived characters (+ indicates the character is present) |       |         |              |         |             |
|------------|-----------------------------------------------------------|-------|---------|--------------|---------|-------------|
|            | Vascular tissue                                           | Seeds | Carpels | Woody tissue | Stamens | Mega-phylls |
| Eagle fern | +                                                         |       |         |              |         | +           |
| Apple moss |                                                           |       |         |              |         |             |
| Sunflower  | +                                                         | +     | +       | +            | +       | +           |
| Cedar      | +                                                         | +     |         | +            |         | +           |
| Spikemoss  | +                                                         |       |         |              |         |             |

Based on the information in the table, which of the following cladograms best represents the evolutionary relationships among the species?



66. The Convention on International Trade in Endangered Species (CITES) passed a resolution to protect rhinoceroses in the wild. Rhinoceroses have been hunted to the brink of extinction because their horns, which are made of simple keratin, are considered an aphrodisiac and a powerful drug in some cultures. Why does the protection of rhinoceroses require an international agreement?
- The rhinoceroses are hunted in their native countries, but the trade crosses borders.
  - The use of rhinoceros' horns as an aphrodisiac has showed various negative effects internationally.
  - The hunters from different countries travel to the native country to hunt for rhinoceroses.
  - Their demand is greater in foreign countries as compared to their native countries.

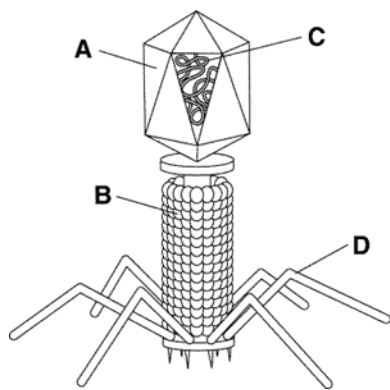
## **SECTION B**

*INSTRUCTIONS: Answer All questions in the spaces provided.*

### **Question 1**

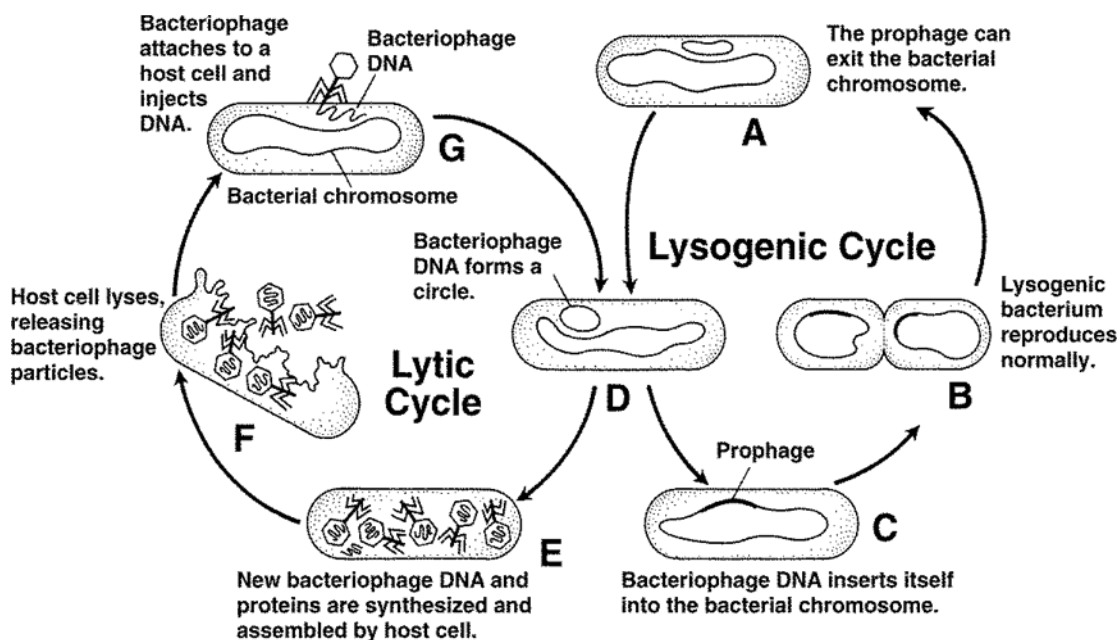
**(11 marks)**

(a) Figure 1



- Identify Figure 1. \_\_\_\_\_ (1)
  - What type of organism Figure 1 infects? \_\_\_\_\_ (1)
  - Label parts A – D on Figure 1 (5)
- (b). Study the diagram below (Figure 2) carefully and answer the questions in spaces provided.

Figure 2

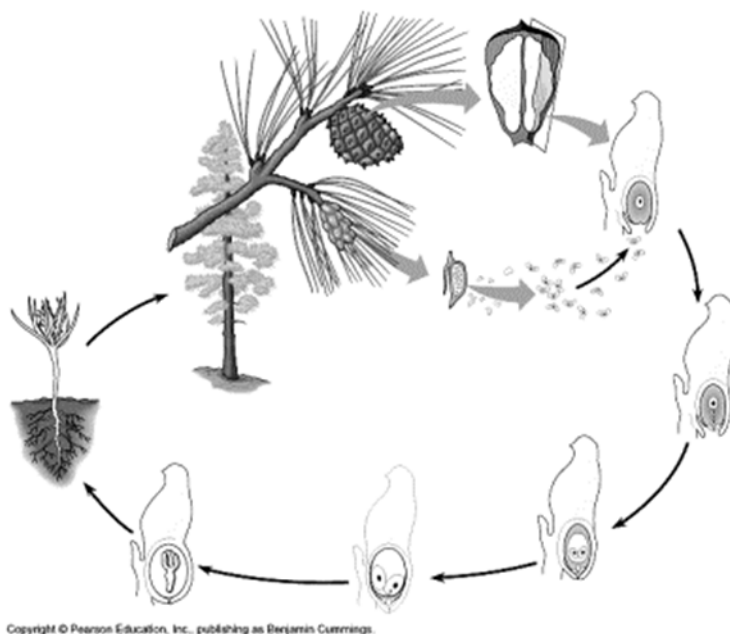


1. Which letter indicates the host cell being lysed? \_\_\_\_\_ (1)
2. Which letter above represents the stage at which a host cell begins producing new bacteriophages? \_\_\_\_\_ (1)
3. Which letter indicates the stage at which the bacteriophage injects its DNA into the host cell? \_\_\_\_\_ (1)
4. Looking at the above diagram which viral life cycle (lysogenic or lytic) is actively using and then lysing (body cells to make more viruses)? \_\_\_\_\_ (1)

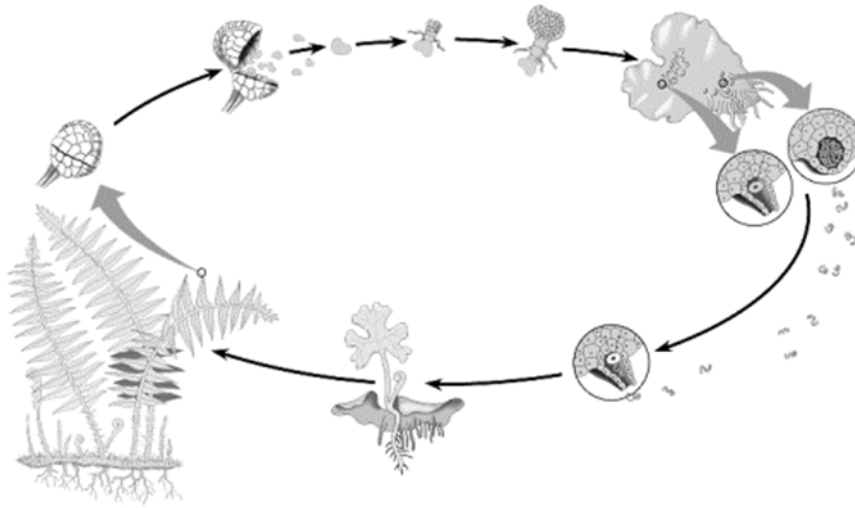
## **Question 2**

**(25 marks)**

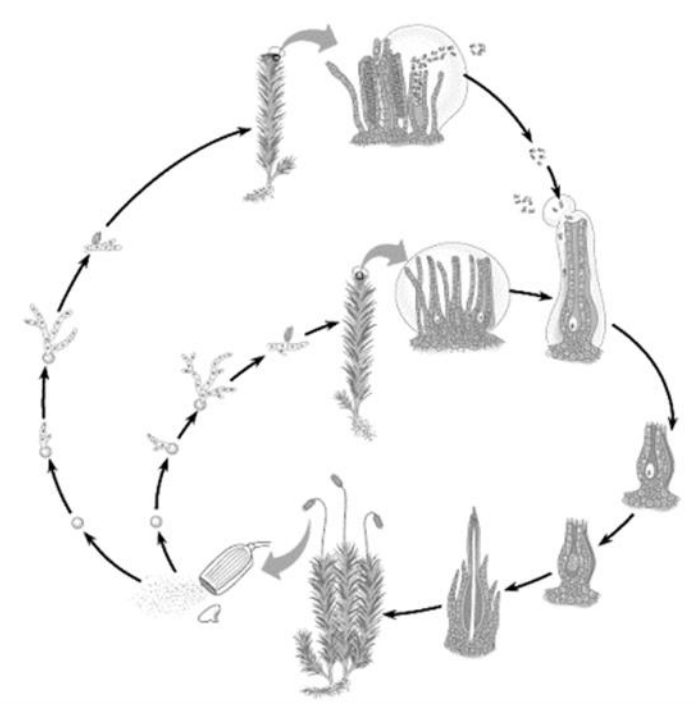
- (a) Figures 3,4 and 5 below represent the life cycles of major groups of the Kingdom Plantae.
- (i). Identify the plant groups each life cycle represents in spaces provided below Figures 3, 4, and 5 (3)
  - (ii). **Clearly** label following structures on the three life cycles below: **Sporophyte generation** and **Gametophyte generation**. (6)
  - (iii). On **each** life cycle **clearly** label ONE location where the process of **meiosis** occurs and ONE location where **mitosis** occurs. (6)



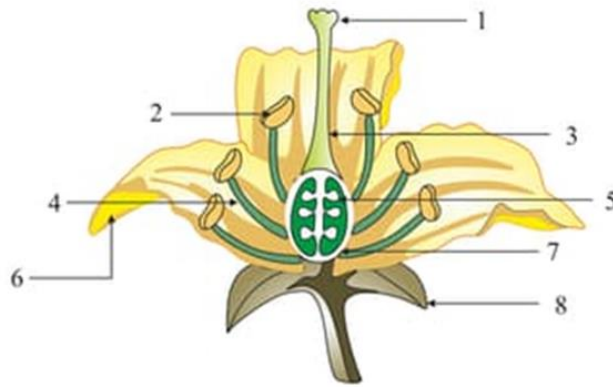
**Figure 3 – Life cycle of \_\_\_\_\_**



**Figure 4 – Life cycle of** \_\_\_\_\_



**Figure 5 - Life cycle of** \_\_\_\_\_



- (b) Study Figure 6 above and label the organs 1 – 8 of the complete flowers. (9)
- (c) Circle the female parts (1)

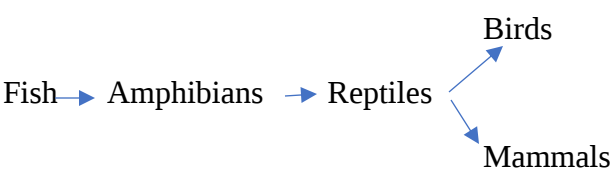
Figure 6

### Question 3

(15 marks)

1. List 2 phyla of animals that undergo molting: \_\_\_\_\_  
 \_\_\_\_\_ (2)
2. List 2 adaptations that make reptiles well adapted for life on land:  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_ (2)
3. List 2 classes of vertebrates that lay non-shelled eggs:  
 \_\_\_\_\_  
 \_\_\_\_\_ (2)
4. What 3 characteristics do all chordates have in common?  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_ (3)
5. . List a reason why most amphibians are “chained” to the water:  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_ (2)

6. Classification of organisms is intended to reflect their evolution as well as their relatedness. One theory of evolutionary development of vertebrates can be shown as



What were the adaptations that improved the ability of each of the following groups to survive on land?

- (a) Amphibians \_\_\_\_\_
- (b) Reptiles \_\_\_\_\_
- (c) Birds \_\_\_\_\_
- (d) Mammals \_\_\_\_\_

(4)

**END OF EXAMINATION**