



**NAVVRACHANA  
UNIVERSITY**

*a UBC recognized University*

**School:** School of Science  
**Program/s:** M.Sc. Life Science  
**Year:** 2<sup>nd</sup> **Semester:** 3<sup>rd</sup>  
**Examination:** End Semester Examination  
**Examination year:** December 2022

**Course Code:** LS211 **Course Name:** Taxonomy, Systematics and Phylogeny  
**Date:** 08/12/2022  
**Time:** 11:30 am to 01:30 pm

**Total Marks:** 40  
**Total Pages:** 3

**Instructions**

- Write each answer on a new page.
- Draw a neat and labelled diagram as when necessary

Q. No.	Details	Marks	COs'	BTL <sup>n</sup>
Q.1	<p><b>Choose the correct option:</b></p> <p>1. Study of diversity of organisms and evolutionary relationship amongst them on the basis of all possible characters is called as            A) Taxonomy B) Systematics C) Alpha-taxonomy D) Phylogeny</p> <p>2. This is used to know the phylogeny            A) mRNA B) rRNA C) DNA D) none of these</p> <p>3. Pick the incorrect statement concerning the terminologies of phylogenetics            A) branches are the lines in the tree            B) tips of the branches have long lost sequences or species            C) node indicate inferred ancestor of extant taxa            D) connecting point joining two adjacent branches is a node</p> <p>4. This is not a vestigial organ in man            A) coccyx B) nails C) third molar D) homologous</p> <p>5. This is incorrect about the merits of molecular data for Phylogenetics study            A) sampling bias is involved            B) with the help of molecular data more robust and clear-cut phylogenetic tree can be constructed            C) much easier to obtain in comparison to fossil records            D) more in number compared to fossil records</p> <p>6. Organizing taxonomic information in logical classification is called _____            A) Systematics B) Phenetic C) Phylogenetic D) Dendogram</p> <p>7. Name the philosopher who first classified organisms?            A) Whittaker B) Carl woose C) Linnaeus D) Aristotle</p> <p>8. Which of these is an example of homoplasy?            A) Presence and absence of hair B) Wings of birds and bats            C) Forelimbs of humans D) Leg of a dog and flipper of a dolphin</p>	10	CO1, CO2,	BT1, BT2, BT3

9) Based on the cladogram given below, species 2 is mostly related to which species?

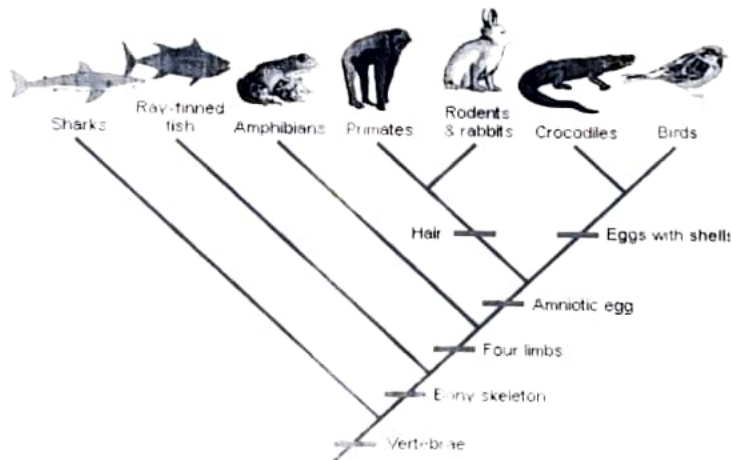
- 1    2    3    4    5
- A) 1  
 B) 3  
 C) 4  
 D) 1 or 3

10. Arrange in the correct order.

- 1) Class
  - 2) Kingdom
  - 3) Phylum
  - 4) Order
  - 5) Genus
  - 6) Family
  - 7) Species
- A) 2, 3, 1, 6, 4, 7, 5                      B) 2, 7, 3, 4, 5, 6, 1  
 C) 2, 1, 3, 4, 5, 6, 7                      D) 2, 3, 1, 4, 6, 5, 7

Q.2 Using the given cladogram answer the question below:

5



CO1,  
 CO2,  
 BT1,  
 BT2,  
 BT3

- a) What separates rabbits/primate from the crocodiles on this cladogram?
- b) Which organism is most related to the rodents and rabbits on this cladogram?
- c) What 5 traits do the bird and its closest relative share?
- d) Which organism will have DNA most similar to the bird? Why?
- e) Which organism's DNA will differ the most from the bird? Why?

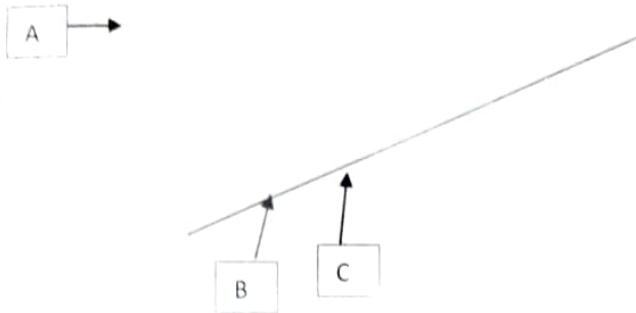
Q.3 Answer the following question in brief: (Any 5)

15

1. Define the following.
- a) Taxonomy    b) Systematics    c) Paraphyletic group
  - d) Monophyletic group    e) Homology    f) Analogy

CO1,    BT1,  
 CO2,    BT2,  
           BT3

2. Label the following cladogram and write note on cladogram.



3. Brief about the evidences from comparative anatomy in the evolution.
4. What are vestigial organs? Give examples.
5. Write a note on type of selection along with the examples.
6. Explain the modern synthetic theory of evolution.

**Q.4 Answer in detail: (Any 2)**

**10**

1. Draw a cladogram from the given matrix and mark the monophyletic, polyphyletic and paraphyletic groups.

Character/taxa	Sponge	Jelly fish	Flatworms	Earthworms	Snail	Fruit fly	Starfish
Cells with flagella	1	1	1	1	1	1	1
Symmetry	0	1	1	1	1	1	1
Bilateral Symmetry	0	0	1	1	1	1	1
Mesoderm	0	0	0	1	1	1	1
Mouth development first	0	0	0	1	1	1	0
Anus development first	0	0	0	0	0	0	1
Metameric segmentation	0	0	0	1	0	1	0
Calcified Shell	0	0	0	0	1	0	0
Chitinous exoskeleton	0	0	0	0	0	1	0
Water vascular system	0	0	0	0	0	0	1

CO1, BT1,  
CO2, BT2,  
CO3 BT3

2. Write a note on Darwinism and Darwin-wallace theory of natural selection.
3. Give a detail account on molecular markers used in phylogenetic studies.

\*\*\*\*\*End of question paper\*\*\*\*\*