

**BZYCT-133**

**ASSIGNMENT BOOKLET**

**Bachelor's Degree Programme**

**(BSCM)  
(COMPARATIVE ANATOMY AND DEVELOPMENTAL BIOLOGY  
OF VERTEBRATES)**

**Valid from 1<sup>st</sup> January, 2024 to 31<sup>st</sup> December, 2025**



**School of Sciences  
Indira Gandhi National Open University  
Maidan Garhi  
New Delhi-110068  
(2024-2025)**

Dear Student,

Please read the section on assignments in the Programme Guide for Core Courses that we sent you after your enrolment. A weightage of 30 per cent, as you are aware, has been earmarked for continuous evaluation, **which would consist of one tutor-marked assignment** for this course. The assignment is in this booklet, and it consists of three parts, Part A, B and C. The total marks of all the parts are 100, of which 35% are needed to pass it.

### Instructions for Formatting Your Assignments

Before attempting the assignment please read the following instructions carefully:

- 1) On top of the first page of your answer sheet, please write the details exactly in the following format:

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**ROLL NO.:** .....

**NAME:** .....

**ADDRESS:** .....

.....

.....

**COURSE CODE:** .....

**COURSE TITLE:** .....

**ASSIGNMENT NO.:** .....

**STUDY CENTRE:** ..... **DATE:** .....

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**PLEASE FOLLOW THE ABOVE FORMAT STRICTLY TO FACILITATE EVALUATION AND TO AVOID DELAY.**

- 2) Use only foolscap size writing paper (but not of very thin variety) for writing your answers.
- 3) Leave 4 cm margin on the left, top and bottom of your answer sheet.
- 4) Your answers should be precise.
- 5) Complete each of Part A, Part B and Part C of this assignment separately, and **submit them together.**
- 6) The assignment answer sheets are to be submitted to your Study Centre as per the schedule made by the study centre. **Answer sheets received after the due date shall not be accepted.**

**We strongly suggest that you retain a copy of your answer sheets.**

- 7) This assignment is **valid from 1<sup>st</sup> January, 2024 to 31<sup>st</sup> December, 2025.** If you have failed in this assignment or fail to submit it by 31<sup>st</sup> December, 2025, then you need to get the assignment for the year 2026, and submit it as per the instructions given in the Programme Guide.
- 8) **You cannot fill the exam form for this course** till you have submitted this assignment.

We wish you good luck.

**ASSIGNMENT**  
**COMPARATIVE ANATOMY AND DEVELOPMENTAL BIOLOGY**  
**OF VERTEBRATES**

Course Code: BZYCT-133  
Assignment Code: BZYCT-133/TMA/2024-25  
Maximum Marks: 100

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**Note: Attempt all questions. The marks for each question are indicated against it.**

1. a) Write *two* important differences between scales of reptiles and fishes. (5)  
b) Explain keratinization in terrestrial vertebrates. (5)
2. a) Mention the two types of endoskeletal structures found in vertebrates. (4)  
What is the difference between their ground matrix?  
b) Fill in the blanks in the following sentences by selecting an appropriate word from those given in the parenthesis after each sentence: (6)
  - i) The skeleton of the head is known as ..... (vertebral column, pelvic girdle, skull).
  - ii) Cranium encloses and protects the ..... (eye, heart, brain).
  - iii) The brain within the cranium is in contact with the spinal cord through ..... an aperture found at the hind end of the cranium (fenestra ovalis, foramen magnum, external nares).
  - iv) The vertebra with concavity in front and convexity behind is called ..... type (amphicoelous, procoelous, opisthocoelous).
  - v) The bone humerus of the upper arm articulates with the pectoral girdle at ..... cavity (glenoid, acetabulum, zygapophysis).
  - vi) Radio-ulna, a composite bone is found in ..... (rabbit, bat, frog).
3. a) Describe the structure of the respiratory system of cartilaginous fishes and state how it differs from that of bony fishes. (5)  
b) Briefly discuss the mechanism of pulmonary respiration in frog. How is it different from reptilian mechanism of respiration? (5)
4. a) Write short note on the general structure of heart wall. (5)  
b) Name different stages in the evolution of heart. (5)
5. Draw a well labeled diagram of the internal structures of ovary and describe the structures present in it. (10)
6. List at least three stages in gene expression that can be regulated to result in differentiated cell types? Explain any *one* of them with the help of an example. (10)
7. Mark the following statements as 'True' or 'False': (10)
  - i) During development cells move by extending their cell processes in all directions without any polarity.

- ii) The cytoskeleton of the cell is actively involved in cell movement and cell shape change.
  - iii) Cadherin on one cell binds strongly to similar cadherins molecules on other cells.
  - iv) Integrins are cell adhesion molecules that attach cells to other cells at the apical region.
  - v) Permissive interaction involves gene expression in the induced cell.
  - vi) Morphogens are paracrine signalling molecules.
  - vii) In apoptosis the cell organelles are delivered to lysosomes and the cell contents are spilled out.
  - viii) Cell death by necrosis indicates that cell has undergone a toxic reaction.
  - ix) Optic cup is induced to form the retinal layers by reciprocal induction from the lens.
  - x) Pattern formation is the result of morphogenesis.
8. a) Briefly describe the spermiogenesis process. (5)
- b) What are the major differences in the development and differentiation of an egg and a sperm? (5)
9. Describe the process of neurulation in chick. (10)
10. a) How is the placenta formed? What are its functions? (5)
- b) Draw a flow chart to show how the three germinal layers are derived from the zygote. (5)