

Department of Zoology, University of Calcutta
M.Sc. 2nd Semester Examination, 2020

ZCT 213

(Aquatic Biology)

Answer any one question

1. a) Discuss the mechanism how a pressure gradient is maintained between the respiratory chambers and a continuous and unidirectional renewal of water is ensured during gill ventilation. What is the significance of ventilation volume in water as a respiratory medium?
- b) How do you envisage a perfect matching of ventilation volume and blood perfusion from the structure involved in gaseous exchange? What is the significance of the branchial vascular shunt pathway?

(4+1+4+1=10)

Or

Analyze the reasons /significance of the following:

- a) In active pelagic fishes, the secondary lamellae are extremely numerous and the distance between two lamellae over the primary filament decreases.
- b) Special to fish gill, the spatial organization of the water current and the blood current is arranged in a counterstreaming fashion.
- c) The gas exchanging surfaces of the secondary lamella are made up of a single epithelial cell layer on the distal margin of the lamellae, held apart by pillar cells.
- d) The width of the lacunar blood space is just large enough for a single red blood cell to pass through and the nuclei of epithelial cells are aligned with the pillar cells.
- e) Gill resistance to water flow becomes vital for maximum efficiency of gaseous exchange.

(2x5=10)

- 2.a. Schematically elucidate the conditions for successful coral recruitment to the benthos. Comment on the importance of thyroid hormones in larval recruitment of marine fishes.
- b. How will 'vas' gene null mutation affect gonad development in fish? Mention conditions for the occurrence of protandry in fish.

(3+2+3+2=10)