

2023

M.Sc.

4th Semester Examination

ZOOLOGY

PAPER : ZOO-402.1 & 402.2

Full Marks : 40

Time : 2 hours

The figures in the right hand margin indicate marks.

*Candidates are required to give their answers
in their own words as far as practicable.*

Illustrate the answers wherever necessary.

SECTION—I

(ZOO-402.1)

(DEVELOPMENTAL BIOLOGY)

1. Answer any **two** questions from the following :
2×2=4

(a) What happens if PiT -2 protein is injected
into the right side of the *Xenopus* embryo?

2

(2)

- (b) What abnormalities will you find if antibodies against Dieckkopf is injected in *Xenopus* embryo? 2
- (c) Mention the enzymes which harden the vitelline envelope in sea urchin egg. 2
- (d) How can bindin protein be localized in the sea urchin acrosomal process? 2

2. Answer **any two** questions from the following :

4×2=8

- (a) Explain the role of retinoic acid and its responsive genes to change proximo-distal positional value in regenerating limb in amphibia. 4
- (b) Explain the role of a pair of signal gradients produced by the head organizer for head regeneration in hydra with a simple model. 4
- (c) State the role of calcium as the initiator of the cortical granule reaction in sea urchin and mammals. 4
- (d) Illustrate the role of a gradient of a posteriorizing molecule to specify the neural tube in *Xenopus*. 4

3. Answer **any one** question from the following :

8×1=8

- (a) Explain the antagonistic relationship between BMPS (Bone Morphogenetic Proteins) and the organizer with a model studied by you. 8
- (b) Describe the IP₃ responsive pathway for sea urchin egg activation. 8

(3)
SECTION—II

(ZOO-402.2)

(NEUROENDOCRINOLOGY)

4. Answer *any two* questions from the following :
2×2=4

(a) Name the supporting cells of the Central Nervous System. 2

(b) Comment on neuroendocrine structures of an insect. 2

(c) Distinguish between electrical and chemical synapses. 2

(d) Which areas of the brain are responsible for speech and comprehension? Point out their location. 1+1=2

5. Answer *any two* questions from the following :
4×2=8

(a) Explain the role of Ca^{++} (calcium ion) in synaptic transmission. 4

(b) Briefly state the guidance and axonal growth during the development in vertebrates. 4

(4)

(c) What are the main causes of Alzheimer's disease? How to avoid Alzheimer? 3+1=4

(d) Comment on :

(i) Suprachiasmatic nucleus (SCN)

(ii) Neural innervations of neuroendocrine immune system

6. Answer *any one* question from the following :

8×1=8

(a) 'Hypothalamic-Pituitary-Gonadal (HPG) axis' control the vertebrate reproductive function. Explain your answer with a suitable diagram.

(b) Describe the neurotransmitter release mechanism following a stimulation received by the presynaptic neuron with relevant diagram(s).

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