



'সমানো মন্ত্র: সমিতি: সমানী'

**UNIVERSITY OF NORTH BENGAL**

B.Sc. Honours Part-II Examination, 2022

**ZOOLOGY**

**PAPER-V**

**GENETICS, BASIC CONCEPTS OF IMMUNOLOGY, ANIMAL PHYSIOLOGY,  
ENDOCRINOLOGY AND REPRODUCTIVE BIOLOGY**

**NEW SYLLABUS (SYLLABUS-2015)**

Time Allotted: 4 Hours

Full Marks: 90

*The figures in the margin indicate full marks.*

**GROUP-A**

**GENETICS**

1. Answer any **four** questions as directed: 1×4 = 4
- (a) In a genetic test, 9:7 ratio in F<sub>2</sub> generation represents:
- (i) epistasis (ii) codominance  
(iii) incomplete dominance (iv) complete dominance  
(Choose the correct answer)
- (b) Individuals in which one part of the body shows male characters, while other part shows female characters are called \_\_\_\_\_. (Fill in the blank)
- (c) The inhibition of crossover by another one is known as coincidence. (Write True/False)
- (d) Albinistic offspring can be produced by two non-albinistic parents. (Write True/False)
- (e) Down syndrome occurs due to:
- (i) deletion (ii) non-disjunction  
(iii) non-recombination (iv) position effect  
(Choose the correct answer)
- (f) The number of linkage groups in human male is:
- (i) 22 (ii) 23 (iii) 24 (iv) 46  
(Choose the correct answer)
- (g) Hypomorphs are genes which have the same effect as the standard genes. (Write True/False)
2. Answer any **two** questions: 3×2 = 6
- (a) "Complementation is possible in between cistrons but never possible within cistron" — Explain.

- (b) Describe Stern's experiment to prove the cytological basis of crossing over.
- (c) Mention the clinical features of Klinefelter syndrome.
- (d) Prove that in male *Drosophila* sp., there is absence of crossing over.

3. Answer any **one** question: 10×1 = 10
- (a) What do you mean by extra-chromosomal inheritance? Write its features. Describe the role of mitochondria in extra-chromosomal inheritance. 2+3+5
  - (b) Explain, in detail, sex determination in humans. Add a note on role of SRY gene. 6+4

### GROUP-B

#### BASIC CONCEPTS OF IMMUNOLOGY

4. Answer any **four** questions: 1×4 = 4
- (a) The only Ig that crosses the placenta is \_\_\_\_\_. (Fill in the blank)
  - (b) The classical and alternative pathway of complement activation meet at the complement component:
    - (i) C2                      (ii) C3                      (iii) C4                      (iv) C5

(Choose the correct answer)
  - (c) All antigens are immunogens but all immunogens are not antigens. (Write True/False)
  - (d) Which of the following is an autoimmune disease?
    - (i) Type I DM                      (ii) Type II DM
    - (iii) Haemophilia A                      (iv) Sickle cell anaemia

(Choose the correct answer)
  - (e) Macrophages are derived from:
    - (i) Basophils                      (ii) Monocytes
    - (iii) Neutrophils                      (iv) Eosinophils

(Choose the correct answer)
  - (f) B cell maturation takes place in \_\_\_\_\_ or \_\_\_\_\_. (Fill in the blanks)
  - (g) The secondary immune response is generated due to:
    - (i) Naive cell                      (ii) Memory cell                      (iii) NK cell                      (iv) Effector cell

(Choose the correct answer)

5. Answer any **two** questions: 3×2 = 6
- (a) Discuss the immune response to plasmodium.
  - (b) Explain cross-reactivity in an Ag-Ab reaction.
  - (c) Differentiate between active and passive immunity.
  - (d) Draw and describe the structure of IgE.

6. Answer any **one** question: 10×1 = 10
- (a) What is immunity? Describe the cells responsible for immune system of our body. Briefly mention the functions of memory B cells. 2+6+2
  - (b) What is inflammation? Comment on the extravasation of neutrophils during inflammation. Describe cell adhesion molecule. 2+6+2

**GROUP-C**

**ANIMAL PHYSIOLOGY**

7. Answer any **four** questions: 1×4 = 4
- (a) Porphyrin of Hb is degraded into \_\_\_\_\_ which is excreted by liver.  
(Fill in the blank)
  - (b) In homeotherms, thermoregulatory control is located in the \_\_\_\_\_.  
(Fill in the blank)
  - (c) Hypothalamus controls the secretion of anterior pituitary gland by transporting hormone through the \_\_\_\_\_ portal blood vessel. (Fill in the blank)
  - (d) The process of squeezing of leucocytes out of capillaries is called \_\_\_\_\_.  
(Fill in the blank)
  - (e) Membrane depolarization is due to \_\_\_\_\_ influx. (Fill in the blank)
  - (f) The precursor of platelets called \_\_\_\_\_. (Fill in the blank)
  - (g) T-wave in the ECG is caused by:
    - (i) atrial depolarization
    - (ii) ventricular depolarization
    - (iii) ventricular repolarization
    - (iv) none of these(Choose the correct answer)
8. Answer any **two** questions: 3×2 = 6
- (a) Describe the role of cAMP in hormone action.
  - (b) Write the differences between cortical and juxtamedullary nephrons.
  - (c) What is cardiac cycle? Elucidate the steps.
  - (d) Write on the features of ECG.
9. Answer any **one** question: 10×1 = 10
- (a) What is carrying capacity of blood? Discuss about the chloride shift and reverse chloride shift. Write a note on Haldane's effect. 2+(3+2)+3
  - (b) Describe the process of nerve impulse propagation through the axon. Differentiate impulse propagation through myelinated and non-myelinated nerve fibres. 6+4

**GROUP-D**

**ENDOCRINOLOGY AND REPRODUCTIVE BIOLOGY**

10. Answer any **eight** questions: 1×8 = 8
- (a) Paracrine hormones act locally. (Write True/False)
  - (b) Cortisol is secreted from \_\_\_\_\_. (Fill in the blank)
  - (c) The somatic 'nurse' cells of the testes are called \_\_\_\_\_. (Fill in the blank)
  - (d) JH is responsible for moulting in insects. (Write True/False)
  - (e) ADH has its greater influence on the kidney at medulla. (Write True/False)
  - (f) Chronic excretion of large amount of urine of low specific gravity is indicative of diabetes intermittents. (Write True/False)

- (g) Thymosin hormone is released from \_\_\_\_\_. (Fill in the blank)
- (h) Graves disease is also known as \_\_\_\_\_. (Fill in the blank)
- (i) \_\_\_\_\_ causes contraction of uterus during labour. (Fill in the blank)
- (j) Which hormone is secreted in the urine of pregnant woman?
- (i) Beta-hCG (ii) Oxytocin
- (iii) Growth hormone (iv) Somatostatin
- (Choose the correct answer)
- (k) Melatonin is secreted from \_\_\_\_\_. (Fill in the blank)
- (l) Renin is secreted from liver. (Write True/False)

11. Answer any **four** questions:

3×4 = 12

- (a) State the characteristic features of hypothyroidism.
- (b) Classify hormones according to chemical nature.
- (c) Discuss the effects of androgens in males.
- (d) Discuss the hormonal regulation of insect moulting.
- (e) State the feedback mechanism of hormone action.
- (f) Write briefly on the synthesis of T<sub>3</sub> and T<sub>4</sub>.
- (g) Describe hormonal regulation of spermatogenesis.

12. Answer any **one** question:

10×1 = 10

- (a) Describe the various types of cells found in the anterior lobe of pituitary gland. What is the difference in the cellular architecture of the anterior and posterior lobe of the pituitary gland? State the causes of gigantism and acromegaly. 6+2+2
- (b) What is oogenesis? Briefly describe the process of formation of ovum. What is fertilization? 2+6+2

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