Newton's Academy

BIOLOGY

Time: 3 Hrs. **Max. Marks: 70**

General Instructions:

*The question paper is divided into **four** sections.*

(1) ***Section A:** Q. No. **1** contains **Ten multiple choice** type of questions carrying **one** mark each.*

*(i) For each multiple choice type of question, it is mandatory to write the correct answer along with its alphabet, e.g., **(A) ……. / (B) ……. / (C) ……. / (D) ……. etc.** No mark/s shall be given if ONLY the correct answer or alphabet of the correct answer is written.*

*(ii) In case of **MCQ,** evaluation will be done for the **first attempt** only.*

*Q. No. **2** contains **Eight very short answer** type of questions carrying **one** mark each.*

(2) ***Section B:** Q. No. **3** to **14** are **short answer** type of questions carrying **two** marks each. (Attempt **any Eight**)*

(3) ***Section C:** Q. No. **15** to **26** are **short answer** type of questions carrying **three** marks each. (Attempt **any Eight**)*

(4) ***Section D:** Q. No. **27** to **31** are **long answer** type of questions carrying **four** marks each. (Attempt **any Three**)*

(5) *Begin the answer of each section on a new page.*

SECTION – A

Q.1. Select and write the correct answer for the following multiple choice type of questions: **[10]**

i. Histones are rich in _____.
(A) Lysine and Arginine (B) Leucine and Methionine
(C) Serine and Leucine (D) Phenyl alanine and Lysine

ii. How many mitotic divisions take place during the formation of a female gametophyte from a functional megaspore?
(A) One (B) Two
(C) Three (D) Four

iii. Which of the following is the only gaseous plant growth regulator?
(A) ABA (B) Cytokinin
(C) Ethylene (D) Gibberellin

iv. The pH of nutrient medium for plant tissue culture is in the range of _____.
(A) 2 to 4.2 (B) 5 to 5.8
(C) 7 to 7.5 (D) 8 to 9.5

v. Rivet Popper Hypothesis is an analogy to explain the significance of _____.
(A) Biodiversity (B) natality
(C) sex-ratio (D) age distribution ratio

vi. Which of the following group shows ZW-ZZ type of sex determination?
(A) Pigeon, Parrot, Sparrow (B) Parrot, Bat, Fowl
(C) Bat, Fowl, Crow (D) Sparrow, Fowl, Cat

vii. In Hamburger's phenomenon, _____.
(A) Cl^- diffuse into WBCs (B) Cl^- diffuse into RBCs
(C) Na^+ diffuse into RBCs (D) Na^+ diffuse into WBCs

viii. Calcium and Phosphate ions are balanced between blood and other tissues by _____.
(A) Thymosin and Parathormone (B) Calcitonin and Somatostatin
(C) Collip's hormone and Calcitonin (D) Calcitonin and Thymosin

ix. Identify the INCORRECT statement.
(A) In a flaccid cell, T.P. is zero (B) In a turgid cell, DPD is zero
(C) In a fully turgid cell, TP = OP (D) Water potential of pure water is negative

x. Which of the following is a hormone releasing contraceptive?
(A) Cu-T (B) Cu-7
(C) Multiload-375 (D) LNG-20

Q.2. Answer the following questions: **[8]**

i. Which disease is caused by HPV?

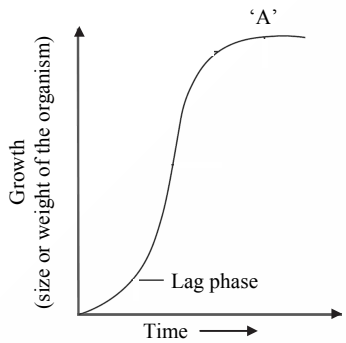
ii. Which device is used to clean both dust and gases from polluted air?

iii. Mention the name of sterile animal produced by intergeneric hybridisation.

iv. Give the name of first transgenic plant.

v. A child has low BMR, delayed puberty and mental retardation. Identify the disease.

vi. Identify 'A' in the given graph of population growth:



vii. Complete the following box with reference to symptoms of mineral deficiency:

Abscission	Pre-mature fall of flowers, fruits and leaves
	Appearance of green and non-green patches on leaves

viii. Give an example of plant having both kidney and dumb-bell shaped guard cells in stomata.

SECTION – B

Attempt any EIGHT of the following questions: **[16]**

Q.3. Define the terms:

a. Gross Primary Productivity

b. Net Primary Productivity

Q.4. Draw a neat diagram of thyroid gland and label thyroid follicle, follicular cells and blood capillaries.

Q.5. i. Give reason – ABA is also known as antitranspirant.

ii. Explain the role of chlorophyllase enzyme in banana.

Q.6. Complete the chart showing human proteins produced by rDNA technology to treat human diseases and re-write.

Disorders/diseases	Recombinant Proteins
?	Erythropoietin
Asthma	?
?	Tissue plasminogen activator
Emphysema	?

Q.7. i. Define – Imbibition

ii. Explain how imbibition helps root hairs in adsorption of water.

Q.8. Draw a neat diagram of the conducting system of human heart and label AV node, Bundle of His and Purkinje fibres.

Q.9. Distinguish between heterochromatin and euchromatin with reference to staining property and activity.

Q.10. Complete the following chart regarding energy flow in an Ecosystem and re-write:

?	Herbivores
Primary Producer	?
?	Man, Lion
Secondary consumer	?

Q.11. i. What is biofortification?
ii. Mention one example each of fortification with reference to –
a. Amino acid content b. Vitamin-C content

Q.12. Differentiate between X-chromosome and Y-chromosome with reference to –
i. length of non-homologous regions
ii. type as per position of centromere.

Q.13. Define the terms:
i. Genetic drift
ii. Homologous organs

Q.14. i. What is *ex-situ* conservation?
ii. Mention any two places where the *ex-situ* conservation is undertaken.

SECTION – C

Attempt any EIGHT of the following questions: **[24]**

Q.15. i. Define – Incomplete dominance.
ii. If a red flowered *Mirabilis jalapa* plant is crossed with a white flowered plant, what will be the phenotypic ratio in F2 generation? Show it by a chart.

Q.16. i. Differentiate between sympathetic and parasympathetic nervous system with reference to the following:
a. Pre and post ganglionic nerve fibres.
b. Effect on heart beat.
ii. Give reason – All spinal nerves are of mixed type.

Q.17. i. Draw a suitable diagram of replication of eukaryotic DNA and label any three parts.
ii. How many amino acids will be there in the polypeptide chain formed on the following mRNA?
5′GCCACAUGGAGAUGACGACAAAAUUUUACUAGAAAA3′

Q.18. Describe the steps in breathing.

Q.19. i. What is spermatogenesis?
ii. Draw a neat and labelled diagram of spermatogenesis.

Q.20. i. What is a connecting link?
ii. Which fossil animal is considered as the connecting link between reptiles and birds? Give any one character of each class found in it.

Q.21. Complete the following chart regarding population interaction and re-write:

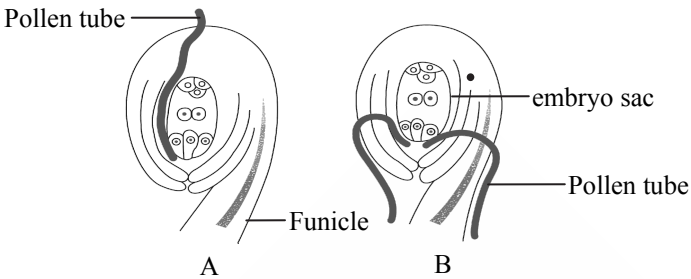
Sr. No.	Name of interaction	Interaction between
1	——?——	*Plasmodium* and Man
2	——?——	Leopard and Lion
3	——?——	Clown fish and Sea-anemone

Q.22. i. What is composition of bio-gas?
ii. Mention any four benefits of bio-gas.

Q.23. i. Give reason – Water acts as thermal buffer.
ii. Draw a neat and proportionate diagram of root hair and label mitochondria, nucleus and vacuole.

Q.24. Explain three main functions of free antibodies produced by B-lymphocytes.

Q.25. i. Following are the diagrams of entry of pollen tube into ovule. Identify the type A and B.



ii. Give any four points of significance of double fertilization.

Q.26. i. Name the hormone which is responsible for apical dominance.
ii. A farmer wants to remove broad-leaved weeds from the jowar plantation in his field. Suggest any plant hormone to remove such weeds.
iii. Mention any two applications of cytokinin.

SECTION – D

Attempt any THREE of the following questions: **[12]**

Q.27. i. What is blood pressure?
ii. Give the name of the instrument which is used to measure the blood pressure.
iii. Differentiate between an artery and a vein with reference to lumen and thickness of wall.

Q.28. i. Describe any three adaptations in anemophilous flowers.
Mention any one example of the anemophilous flower.
ii. Describe any three adaptations in hydrophilous flowers.
Mention any one example of the hydrophilous flower.

Q.29. i. What is polymerase chain reaction (PCR)?
ii. Describe three steps involved in mechanism of PCR.

Q.30. i. Give any four significances of fertilization in human.
ii. Mention the names of any two organs each derived from ectoderm and mesoderm.

Q.31. i. Give any two functions of cerebellum.
ii. Write the names of any four motor cranial nerves with their appropriate serial number.
iii. Which hormones stimulate liver for glycogenesis and glucogenolysis?