

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 the correct alternatives and write the answers:

[10]

- i. If members of two populations have difference in the structure of reproductive organs, then this type of isolation is called _____.

(A) ethological	(B) seasonal
(C) mechanical	(D) habitat
- ii. The primary precursor of Indole-3-Acetic acid is _____.

(A) Tryptophan	(B) Phenyl alanine
(C) Mevalonic acid	(D) Methionine
- iii. If only one DNA molecule is subjected to PCR and the time required for each cycle is three minutes, then after five cycles, how many DNA molecules are obtained?

(A) 10	(B) 15
(C) 32	(D) 64
- iv. The specific gravity of CSF is _____.

(A) 1.005	(B) 1.02
(C) 1.502	(D) 1.81
- v. Cardiac output of a person is 5400 ml and heart rate 72 per min. What will be his stroke volume?

(A) 65 ml	(B) 74 ml
(C) 75 ml	(D) 78 ml
- vi. Detritus food chain starts from _____.

(A) producers	(B) dead organic matter
(C) parasite	(D) photosynthesis
- vii. Plants absorb _____ water.

(A) gravitational	(B) capillary
(C) combined	(D) hygroscopic
- viii. The organisms having tolerance for wide range of salinity are called _____.

(A) stenothermal	(B) euryhaline
(C) stenohaline	(D) eurythermal

- ix. Hisardale is a new breed of sheep developed by crossing _____.
- (A) Bikaneri ram and Marino ewe (B) Bikaneri ram and Bikaneri ewe
(C) Marino ram and Bikaneri ewe (D) Marino ewe and Marino ram
- x. Perforins are secreted by _____.
- (A) Helper T-cells (B) Cytotoxic T-cells
(C) Suppressor T-cells (D) Memory T-cells

Q.2. Answer the following questions:

[8]

- i. Mention the chromosome number having the mutated gene for β -Thalassemia.
- ii. Which organ produces calcitriol?
- iii. If the megaspore mother cell has 26 chromosomes, what will be the total number of chromosomes in endosperm of the same plant?
- iv. Define the term – Facilitated diffusion.
- v. Give reason – Energy pyramid is always upright.
- vi. What will be the base sequence on the template strand of DNA, which codes for methionine?
- vii. Deficiency of which element causes Brown heart disease in plants?
- viii. Where are the cells of Rauber situated in the blastocyst of human embryo?

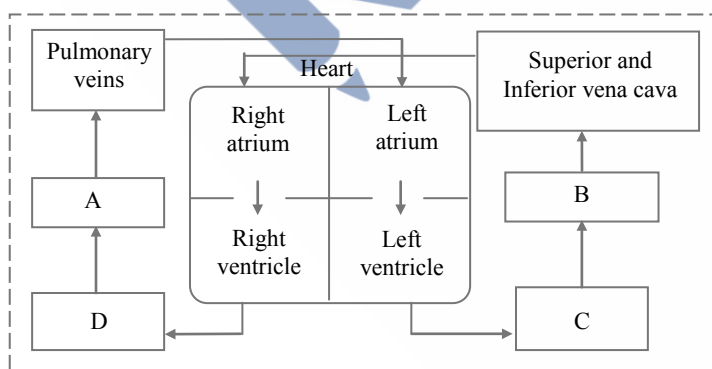
SECTION – B

Attempt any EIGHT of the following questions:

[16]

- Q.3.** i. Give one example each of:
- a. Autosomal dominant traits
 - b. Autosomal recessive traits
- ii. If a carrier woman marries a colorblind man, what will be the phenotype of their progeny? Show in the form of a chart.
- Q.4.** Sketch the appropriate diagrams showing following chromosomal aberrations:
- i. deletion
 - ii. inversion

- Q.5.** Observe the following diagram of double circulation and identify A, B, C and D:



- Q.6.** i. Select the names of fresh-water fishes from the given list:
Sardinella, Rastrelliger, Cirrhina, Harpadon, Labeo
- ii. Write the economic importance of Lac (Any Two).
- Q.7.** i. Define the term – Ecological succession.
ii. What is the reason of eutrophication?
- Q.8.** i. Mention any two ill-effects of UV-rays on human beings.
ii. Give significance of Ecosan.

- Q.9.** What are oral vaccines?
Enlist the benefits of oral vaccines.
- Q.10.** What is vernalization?
Give the advantages of vernalization.
- Q.11.** Enlist the causes of biodiversity losses.
- Q.12.** Give role of hormones Relaxin and Inhibin.
- Q.13.** Sketch and label the diagram of a stoma showing kidney – shaped guard cells.
- Q.14.** Explain in brief the process of southern blotting and hybridization in DNA fingerprinting.

SECTION – C

Attempt any EIGHT of the following questions:

[24]

- Q.15.** i. Define – Palaeontology.
ii. Give any four points of significance of palaeontology.
- Q.16.** i. What is pollination?
ii. Differentiate between Anaemophily and Entomophily with reference to :
a. pollinating agent
b. stigma
c. nectar
d. fragrance
- Q.17.** i. Differentiate between hypotonic and hypertonic solutions.
ii. Mention the effect of exo-osmosis and endo-osmosis on shape of the cell.
iii. Give one difference between symplast and apoplast pathway.
- Q.18.** i. Mention the control measures to prevent ascariasis.
ii. With appropriate terms, complete the following chart and rewrite it.

Sr. No.	Name of disease	Name of pathogen
a.	—?—	<i>Entamoeba histolytica</i>
b.	Typhoid	—?—
c.	—?—	<i>Wuchereria bancrofti</i>
d.	—?—	<i>Plasmodium species</i>

- Q.19.** i. Define – Adaptation.
ii. Explain any two adaptations in *Opuntia* and Seal.
- Q.20.** Match the disease resistant varieties given in Column-I with the crops in Column-II and rewrite:

	Column-I		Column-II
i.	Himgiri	a.	Chilli
ii.	Pusa shubhra	b.	Wheat
iii.	Pusa sadabahar	c.	Cauliflower
		d.	Cotton

- Q.21.** i. Explain the qualitative and quantitative aspects of growth phenomenon.
ii. Explain the phase of cell maturation.
- Q.22.** i. What is co-dominance?
ii. If a red colored female cattle is crossed with a white male cattle, what will be the appearance of progeny in F2 generation? Show the genotypes with the help of a chart.
- Q.23.** i. Give any two involuntary vital functions of medulla oblongata.
ii. Mention two functions of spinal cord.
- Q.24.** i. Define –Transcription.
ii. Write anticodons for the following triplet codons:
AUG, GAG, CUA, CCU

- Q.25.** i. Mention the position of the following in human heart:
a. Eustachian valve
b. Bicuspid valve
- ii. Differentiate between open and closed circulation with reference to:
a. blood pressure
b. exchange of material
- Q.26.** Draw a neat and proportionate diagram of *Graafian follicle* and label oocyte and antrum. Explain its structure in brief.

SECTION – D

Attempt any **THREE** of the following questions:

[12]

- Q.27.** i. What is placenta?
ii. Give reason – Placenta is considered as a temporary endocrine gland.
iii. Give significance of hCG.
- Q.28.** Describe in brief the structural and hormonal changes during ovarian cycle.
- Q.29.** i. Name the formed elements which are useful in blood coagulation. Give its normal number per cubic millimeter (mm^3) in human blood.
ii. Comment on the shape and secretion of the above mentioned formed elements.
iii. Explain in brief the mechanism of blood coagulation.
- Q.30.** i. Give full form of the cloning vectors BAC and YAC.
ii. Write the appropriate palindrome for Eco RI and indicate by an arrow its recognition sequence.
iii. Give any four uses of gene therapy.
- Q.31.** Explain any four contrivances to prevent self pollination in plants with an appropriate example of each type.