(3 Hours) **(100 Marks)**

Instructions to the candidates:
Please check that you have received the correct question paper.
i) All questions are compulsory. Choice is internal
ii) Figures to the right indicate full marks.
iii) Draw structures/diagrams/flowcharts wherever necessary.

Q.1 (A) State True or False: **(04)**
(i) Mendel's laws were readily accepted.
(ii) A recessive trait can be expressed in only heterozygous condition.
(iii)The number of characters studied in garden pea by Mendel for his second law was one.
(iv) A 2 x 2 punnet square is applicable to a dihybrid cross.

Q.1 (B) Attempt the following: (Any three) **(09)**
(i) Gregor Mendel was successful in drawing conclusions from his experiments, whereas other scientists during that time were not. What were the reasons for his success?
(ii) Both Mark and Max are brothers and both are tasters for PTC. If their mother is a taster, but their father is not, what are the genotypes of all Mark, Max and their parents? (Tasters are dominant to non-tasters).
(iii)With the aid of a suitable example, explain the significance of lethal genes.
(iv)Differentiate between test cross and back cross.
(v) Briefly explain the contribution of Hardy Weinberg.
(vi) What makes the pea plant the plant of choice in genetics?

Q.1 (C) Attempt the following: (Any two) **(12)**
(i) State Mendel's second Law. As per Mendel's second law, in the crossing between individuals concerning two pairs of non-linked alleles, AABB x aaBB, what are the genotypic and phenotypic ratios in F1 and F2? The traits denoted are A - tall plant, a- short plant; B - coloured flowers b- White flowers.
(ii) Compare and contrast: Mendelian and Non-Mendelian inheritance.
(iii)Elaborate on the contribution of Hershey & Chase to the field of genetics.
(iv) With the help of example, explain co-dominance in human genetics.

Q2. A) State True or False: **(04)**
i) Plasma albumin performs the functions of maintaining osmotic pressure and is involved in transport of molecules.
ii) A mature blood cell that lacks a nucleus is a lymphocyte.
iii) Due to deficiency of ADH, the kidneys produce concentrated urine
iv) Haemophilia is a blood disorder in which blood clots.

Q2. B) Answer the following: (Any three) **(09)**
(i) What are bile salts?
(ii) Enlist any **two** mechanisms that contribute to haemostasis.
(iii) Which non-nitrogenous substances are normally present in urine?
(iv) Elaborate on the route of lymph flow through a lymph node.
(v) State Starling's hypothesis of fluid exchange.
(vi) Describe the functions of blood.

Q2. C) Answer the following: (Any two) **(12)**

(i) Describe how the renal tubule and collecting ducts produce dilute urine and concentrated urine.
(ii) Write a note on: Composition and function of lymph
(iii) Diagrammatically represent the mechanism of blood clotting and the factors involved in it.
(iv) Justify: Gall bladder bile is concentrated than hepatic bile.

Q3. A) State True or False: **(04)**

(i) O_2 moves from the alveoli to the blood by active transport
(ii) Alveolar partial pressure does not fluctuate to any extent between inspiration and expiration.
(iii) Carbonic anhydrase is found only in the plasma.
(iv) Calcium is transported coupled to lipids in the body.

Q.3 (b) Answer the following: (Any three) **(09)**

(i) Briefly explain the different types of membrane proteins.
(ii) Discuss in brief coupled transport and its types.
(iii) In brief explain the role of ferritin.
(iv) Differentiate between simple and facilitated diffusion.
(v) Briefly explain the mechanism of action of valinomycin and gramicidin.
(vi) Justify: 'Albumin is an important plasma protein'.

Q.3 (c) Attempt the following: (Any two) **(12)**

(i) Discuss factors affecting oxy-haemoglobin dissociation curve.
(ii) Compare and contrast: Exocytosis and Endocytosis.
(iii) Write an elaborative note on Lipoproteins.
(iv) State True or False, giving detailed reasons/examples: "Molecules/Ions cannot be transported to an area that has its high concentration".

Q.4 (a) Define and explain: (Any five) **(10)**

(i) Bombay blood group (ii) Transferrin (iii) Phenotype (iv) Aquaporins
(v) Serum (vi) Secondary active transport (vii) Chloride shift

Q.4 (b) Write elaborate notes on: (Any three) **(15)**

(i) Epistasis
(ii) Incomplete dominance
(iii) Composition of blood
(iv) Role of xylem and phloem in plants.
(v) ICF and ECF
(vi) Glucose transporters