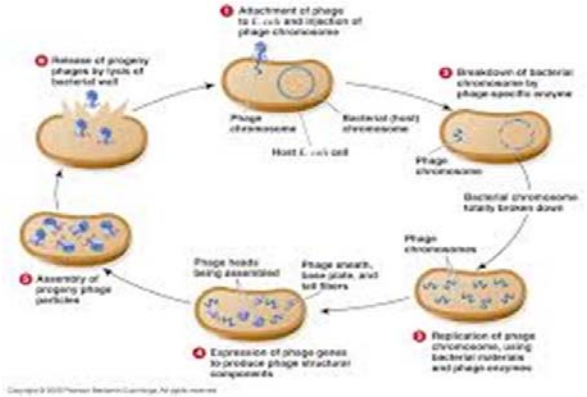
PAPER CODE: 20781

Q.No	Sub part	Description	Marks
Q1A	**i**	TRUE	1
	ii	FALSE	1
	iii	FALSE	1
	iv	FALSE	1
Q1B	**i**	4O Clock plant is *Mirabilis jalapa.* It shows incomplete dominance. Deviation from Mendelian inheritance	3 marks for explanation
	ii	Mendel proposed two laws-Law of segregation and law of independent assortment	01.5 mark for each law
	iii	Non-Mendelian inheritance in *Chlamydomonas.* Erythromycin resistance is inherited in a Non-Mendelian pattern	explanation for 02 marks+ 01 marks for Non-Mendelian inheritance
	iv	Dihybrid cross-Detailed explanation by taking an two traits as examples and showing the gamete formation. Also, mentioning Law of Independent Assortment of Mendel	Punett square 01 marks; 02 marks for genotypic and phenotypic ratios
	v	Example of arctic fox, fur color and quantitative traits like height.	03 marks for explanation
	vi	Rediscovery of Mendel's work by Hugo, Tshmark and de Vries	Three valid points for 03 Marks
Q1C	**i**	Definition-Maternal inheritance; Definition-Maternal effect; explanation of both with examples	Each Definition01 marks;02 marks each for explanation of both with examples=06 marks
	ii	a) Two different genes, each gene having two alleles (b) Red flower and long leaves is dominant (c) Genotype RrSs and phenotype is Red flowers and long leaves (d) RRSs, RRss, RrSs, Rrss	a) 01 mark (b) 01 mark (c) 02 mark (01 mark for genotype, 01 mark for phenotype) (d) 02 marks
	iii	Epistasis- Gene interaction that does not follow Mendelian inheritance; Also known as Emerson's Modified ratio of 9:7	01 mrk Definition; 01 Emerson ratio; 04 marks explanation

	iv	An elaborate note on Multiple alleles detailing about each blood group. Yes the baby can be their's if both parents had the genotype Iai, then the child can have genotype ii.	04 marks for blood group explanation;02 marks for problem
Q2A		a) -iv) b) -v) c) - i) d) - ii)	1 1 1 1
Q2B	**i**	Chromosome arranged in a dense clump,nucloid, not bound by membrane,, compacted by supercoiling of DNA helix to produce lopped domains	3
	ii	Growth factors trigger intracellular cell signalling system,proteins which function as growth factor binds with its receptor and reacts by triggering the events within the cell, if the cell is deprived of appropriate growth factors, it stops at G1 check point.	3
	iii	Conjugation in HFr- Crossing over of F factor with bacterial chromosome, integrated F factor is nicked and transfers to the recipient cell, transferred strand is copied	3
	iv	Heterochromatin-part of eukaryotic chromosome, dense, highly condensed, transcriptionally inactive, dark staining , two types-constitutive and facultative	3
	v	fails to stop cell division, cells proliferate and leads to cancer, cell division does not halt at G1 checkpoint	3

	vi	Lambda phage infecting E.coli	3



Q2C	**i**	Definition of CDK + activation of CDK + G1 CDK activates transcription factors for DNA synthesis, S phase CDK involved in DNA pre-reoplication complex formation, mitotic CDK induces chromosome conensation and nucelar envelope breakdown, assembly of mitotic spindle, arragement of chromosome at equitorial plate	6
	ii	Linear double stranded DNA + histone and non-histone proteins + bead on string morphology + nucleosomes + Solenoid structure + looped domains	6

	iii	HFr strain- discovered by William Hayes Luca Cavalli Sfroza, results from a rare crossover of F factor integration into bacterial chromosome.HFr is high frequency recombination, when F factor is integrated, it no longer replicates independently, it is replicated as a part of host chromosome + Cross between F+ and F- cell:genetic exchange only in one direction,i) Nicked strand of F factor ii) Nicked strand transfers to the recipient cell iii) transferred and remaining strand are copied iv) transfer and DNA synthesis completed, none of the bacterial chromosome is transferred, only F factor is, as a result both donor and recipient are F+ after conjugation.	6
	iv	any 3 relevant similarities and differences betweeen prokaryotic and eukaryotic genome	6
Q3A	**i**	FALSE	1
	ii	FALSE	1
	iii	TRUE	1
	iv	FALSE	1
Q3B	**i**	definition + antiport & symport-definition and one relevant point	1+2
	ii	explanation of globin + heme structure + diagram preferred	1+2
	iii	false + reason and explanation	1+2
	iv	Formation of HCO3^-1 ion from CO2, Movement of HCO3^-1 and Cl^-1 ions across hemoglobin membrane, Reaction	01 each
	v	Definition + function with any 2 example	1+2
	vi	Any 3 point of difference between phagocytosis and pinocytosis	3
Q3C	**i**	Labelled Dissociation curve graph + Effect on curve due to - CO2 concentration, pH, BPG concentration (Any two)	2+4

	ii	a) Fe^2+ converted to Fe^3+ by Ferroxidase b) Fe^3+ binds to apoferritin to form ferritin in GIT cells c) converted to Fe^2+ by Ferrreductase and moves to plasma d) converted to Fe^3+ by ferroxidase II e) binds to transferrin in plasma + taken to tissues	6
	iii	Phagocytosis + a) formation of pseudopodia b) engulfing of foreign particle c) phagosome formation d) fusion with lysosome to form phagolysosome + diagram	1+4+1
	iv	a) specific binding of molecule b) undergo conformation change c) rate of transfer corresponds to enzyme activity (Vmax) d) rate is maximum when carrier is saturated like enzymes e) inhibitors bind to specific sites on carriers like enzymes competitive and non competitive	6
Q4A	**i**	Definition + 1 relevant point	02 marks
	ii	Definition + 1 relevant point	02marks
	iii	Definition + 1 relevant point	02marks
	iv	Definition + 1 relevant point	02 marks
	v	Wild-type allele-The functional allele of a gene that predominatesin the population of an organismfound in the 'wild' is known as the wild-type allele	02 marks
	vi	Recessive trait-A trait that is expressed only in the homozygous state	02 marks
	vii	Reciprocal cross: A pair of crosses in which the genotypes of males and females are reversed	02 marks
Q4B	**i**	Definition + Types - Chylomicrons, HDL, LDL, VLDL composition	01+04
	ii	false + active transport and types with examples	1+ 4

iii	Transformation- Transfer of small extracellular DNA, unidirectional, resulting in phenotypic change,Bacterial transformation first observed by Griffith., Diagrammatic representation, after replication,on half of the progeny is transformants and one half is non-transformants.	5
iv	histones - basic protein, types, highly conserved sequences, crucial for DNA packing ii) non-histone proteins - acidic proteins, DNA replication , repair, transcription, recombinations	5
v	(a) Genotype of parents-RR and rr-F1 genotype Rr-Selfing of F1 would give RR, Rr and rr (b) Law of segregation-Two members of a gene pair segregate from each other during the formation of gametes	(a) Punett square-01 mark; Parental genotype-01 mark, F1 and F2 genotype-01 mark (b) Law-02 marks
vi	05 valid points for Mendel's success	01 mark for each point