

INDIAN SCHOOL MUSCAT

FINAL EXAMINATION

NOVEMBER 2019

SET A

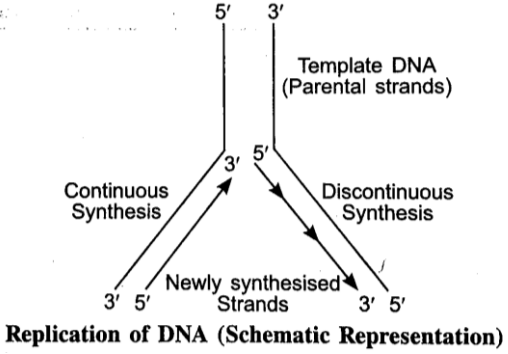
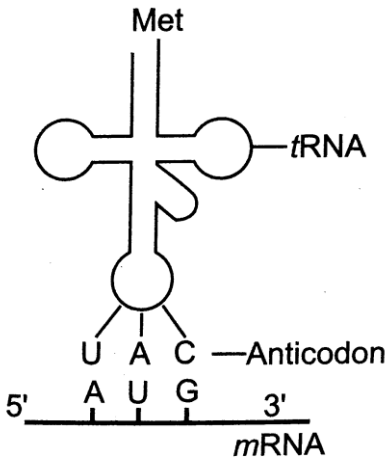
CLASS XII

Marking Scheme – SUBJECT [THEORY]

Q.NO.	Answers	Marks (with split up)
1.	a) d) 1:2:1 OR c) by mutation of gene coding for Phenyl alanine hydroxylase	1
2.	a) O ₂	1
3.	c) Genetic Engineering Approval Committee OR d) used to treat emphysema	1
4.		
5.	c) The physical position and functional role of a species within the community	
6.	Parent genotypes: I ^A i and I ^B i Working	1 1
7.	Stop codon- does not code for any amino acids/ terminates the synthesis of pp chain. Unambiguous codon- codes for one amino acid only. Degenerate codon- codes for some amino acids by more than one codon. Universal codon- genetic code same for all organisms	½ ½ ½ ½
8.	Louis Pasteur explained that in pre sterilised flask , life did not come from killed yeast. Another flask open to air , living organisms arose from killed yeast.	1 1
9.	Pneumonia – infection site- alveoli (lungs) / common cold nasal and respiratory tract, Pneumonia- bacterial / common cold- Rhino viruses	½ + ½ ½ + ½
10.	Eco RI Slightly away from the middle of the palindrome site, between two same bases on the opposite strands Leave the sticky ends, which forms hydrogen bonds with opposite complementary cut counterpart.	½ ½ 1
11.	RNA interfering/silencing method/ nematode specific genes in the host plant will produce ds RNA / this dsRNA will silence the specific RNA of the nematode.	1 ½ + ½
12.	- To detect HIV in suspected patients - To detect mutated genes in cancer patient - For DNA amplification	4 X ½

	- To detect any other genetic disorders	
13.	Accidental leakage and safe disposal High level- lethal Low level- causing mutation- genetic disorders OR i) Inflammation of cornea. Due to UV-B radiation ii) As they produce greenhouse effect	2 $\frac{1}{2}$ $\frac{1}{2}$ 1+1 $\frac{1}{2}$
14.	a) Earthworm- breaks down detritus into smaller particles / called fragmentation. Bacteria and Fungi- their enzymes degrade detritus into simple inorganic substances/ called catabolism. b) Producers of terrestrial ecosystem- herbaceous and woody plants; Aquatic ecosystem- phytoplanktons/algae/ higher plants (any one)	1 1 $\frac{1}{2}$ $\frac{1}{2}$
15.	It is important as a mean of energy transfer from producer to organisms at high trophic level. One example. - To control prey population / to avoid ecosystem instability- ex. prickly pear and moth - To maintain species diversity – <i>Pisaster</i> removal costs non existence of 10 invertebrates.	1 1 1
16.	Z gene in a plasmid will produce beta-galactosidase. /A bacterial colony with z gene (non- recombinant) will produce this enzyme which will produce blue colour, interaction with chromogenic substrate. / A bacterial colony lack of z gene(recombinant) will not produce this enzyme and the colony will remain white / helps in elimination of recombinants from non-recombinants in a colony. Chitinase- to break down fungus cell wall. Lysozyme- to breakdown bacterial cell wall.	4 x $\frac{1}{2}$ $\frac{1}{2} + \frac{1}{2}$
17.	Due to deletion of ADA gene/ immune system/ marrow cells lymphocytes are cultured in vitro/ ADA gene cDNA is introduced into lymphocytes by retrovirus/	$\frac{1}{2} + \frac{1}{2}$ 1 $\frac{1}{2} + \frac{1}{2}$
18.	Vitamin A enriched carrots, spinach, pumpkin; Vitamin C enriched bitter gourd, bathua, mustard, tomato; Iron and calcium enriched spinach and bathua; Protein enriched beans – broad, lablab, French and garden peas. (For any three) OR Poultry is the class of domesticated fowl (birds) used for food or for their eggs. selection of disease free and suitable breeds/ proper and safe farm conditions/ proper feed and water/ hygiene and health care.	1 m each 1 4 x $\frac{1}{2}$
19.	(a) activates their immune system and helps in destroying the tumor. (b) (i) Salivary gland- Mosquito (ii) blood- human	$\frac{1}{2} + \frac{1}{2}$ $\frac{1}{2}$ each
20.	Definition Wings of butterfly and birds/ tubers of sweet potato and potato	2 1

21.	(a) VNTR - Variable Number of Tandem Repeat(s) - used as a probe (because of its high degree of polymorphism) (b) Forensic science / criminal investigation (any point related to forensic science) / determine population and genetic diversities / paternity testing / maternity testing / study of evolutionary biology (Any two)	$\frac{1}{2}$ $\frac{1}{2}$ 1+1										
22.	(i) Allelic frequencies in the gene pool of a population remains unchanged for generations; (ii) Hardy-Weinberg equilibrium (iii) Any two factors- mutation/Natural selection : gene flow/genetic drift/migration (iv) Mutation : changes alleles/ Natural selection : brings about greater reproduction of certain/alleles gene flow. migration genetic drift : alleles move out of gene pool	6 X $\frac{1}{2}$										
23.	(a) Fermented palm sap (b) Produced by yeast, <i>Monascus purpureus</i> / blood -cholesterol lowering agent/ acts by competitively inhibiting the enzyme responsible for synthesis of cholesterol.	1 1 $\frac{1}{2} + \frac{1}{2}$										
24.	(a) When area increases, no. of species will also increase but only to certain extent. (b) Alexander Humbolt (c) 1.15	1 1 1										
25.	<p>(a) Parents : Tall, yellow (TtYy) × Tall, green (Ttyy)</p> <p>Gametes : TY, Ty, tY, ty Ty, ty</p> <p>Progeny :</p> <table><tr><td>Ty</td><td>TTYy Tall, yellow</td><td>Ttyy Tall, green</td><td>TtYy Tall, yellow</td><td>Ttyy Tall, green</td></tr><tr><td>ty</td><td>TtYy Tall, yellow</td><td>Ttyy Tall, green</td><td>ttYy Dwarf, yellow</td><td>ttyy Dwarf, green</td></tr></table> <p>(i) Tall and green $\frac{3}{8}$ (ii) Dwarf and green $\frac{1}{8}$.</p> <p>(b) (i) A male grasshopper produces two types of gametes with reference to sex chromosomes, i.e 50% of them with one X-chromosome and 50% of them with no X-chromosome. (ii) A male Drosophila produces 50% of gametes with one X-chromosome and 50% of them with one Y-Chromosome. Since they produce two types of gametes with reference to sex chromosomes, they are called male heterogamety. (d) Human: Colour blindness/ Haemophilia Drosophila: Eye-colour/ Body colour.</p> <p style="text-align: center;">OR</p>	Ty	TTYy Tall, yellow	Ttyy Tall, green	TtYy Tall, yellow	Ttyy Tall, green	ty	TtYy Tall, yellow	Ttyy Tall, green	ttYy Dwarf, yellow	ttyy Dwarf, green	$\frac{1}{2}$ $\frac{1}{2}$ 1 $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ Correct
Ty	TTYy Tall, yellow	Ttyy Tall, green	TtYy Tall, yellow	Ttyy Tall, green								
ty	TtYy Tall, yellow	Ttyy Tall, green	ttYy Dwarf, yellow	ttyy Dwarf, green								

	 <p>(C)</p> 	labelling 1 ½ Polarity ½ 1 2
26.	<p>(a) correct diagrams</p> <p>i) a- exponential growth curve b- logistic growth curve.</p> <p>ii) Logistic growth curve(b) is considered more realistic, because the resources are finite and become limiting sooner or later.</p> <p>iii) K stands for carrying capacity, the maximum number of individuals of a population, that the given environment can sustain.</p> <p>iv) N- symbolizes population density, the number of individuals in a given population per unit area.</p> <p>OR</p> <p>(a) For any two activities</p> <p>(b) Any two differences</p> <p>(c) Constituent of biomembranes/ components of nucleic acids/ needed for</p>	2 1 1 ½ ½ 2 2 For any two 1

	making bones/ teeth/ shell etc.,/ constituent of cellular energy currency.	
27.	<p>Bio wastes are collected and a slurry of dungs is fed/ a floating cover having gas outlet is placed over slurry which keeps on rising as the gas is produced in the tank/the spent slurry is removed through another outlet/ and may be used as fertilizer./</p> <p>a. Sludge loader b. gas holder c. dung and water. d. digester</p> <p>mixture of gases- methane, hydrogen sulphide and carbon di oxide.</p> <p>OR</p> <p>a) Effluent sent to aeration tank/ aerobes(flocs) digest organic wastes/ decrease in BOD/ sent to settling tanks/ deposits flocs(activated sludge)/ then sent to anaerobic digester/ anaerobes digest bacteria and fungi/ release into river</p> <p>b) Microbes which will enrich the soil with nutrients/ Rhizobium/ cyanobacterium/ mycorrhiza</p>	<p>4 x ½</p> <p>4 x ½</p> <p>1 6 x ½</p> <p>1+1</p>

SET B

Q.NO.	Answers	Marks (with split up)
7.	(a) to diagnose typhoid disease (b) Hepatitis-B	1 1
8.	carries cry gene producing Cry protein/ activates protein under alkaline pH in insect gut/ crystal proteins bind to midgut epithelial cells causing swelling and lysis//caused the death of the insect	4 x ½
10.	Fitness- reproductive fitness;/ those who are better fit in an environment, leave more progeny than others / These, therefore, will survive more and hence are selected by nature	1 ½ + ½
11.	Test cross To determine the unknown genotype of a character	1 1
15.	<p>(i) Migration – migratory birds from Siberial come to Bhartatpur Sanctuary.</p> <p>(ii) Suspension</p> <ul style="list-style-type: none"> - When the organisms are not able to migrate, they reduce their metabolic activity and avoid stress by escaping in time. ½ - E.g., (a) Snails undergo aestivation during summer ½ - (b) Frogs undergo hibernation during winter ½ - (c) Zooplanktons enter diapause. ½ 	1 ½ ½ ½ ½

19.	<p>Ringworm is caused by <i>Microsporum</i>, <i>Trichophyton</i> and <i>Epidermophyton</i></p> <ul style="list-style-type: none"> - Skin, nails and scalp are affected. - Symptoms- Dry,scaly lesions on both body parts like skin, scalp and nails - The lesions are accompanied by intense itching <p>Transmission- contact with infected persons articles/ from soil, by direct contact</p>	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ 1
21.	<p>Expresssing Sequence Tags (ESTs)- sequencing only expressive genes.</p> <p>Sequence Annotation- both introns and exons are sequenced and then allot function of each gene.</p> <p>Steps: isolation and fragmentation of DNA/cloning with suitable vector for amplification/ sequence the fragments with automated sequencer which work based on Sanger principle/ generate overlapping sequences and align it and sequencing it using computers.</p>	$\frac{1}{2}$ $\frac{1}{2}$ 4X $\frac{1}{2}$
25.	<p>(a) • Infection - Radioactive phosphorus / phosphorus labelled bacteriophages were allowed to infect E.coli - growing in a culture medium,simultaneously radioactive sulphur / Sulphur labelled bacteriophage was allowed to infect E.coli growing in another culture medium</p> <ul style="list-style-type: none"> • Blending- As infection proceeds- the viral coats are removed from the bacteria by agitating in a blender • Centrifugation - virus particles were seperated from bacteria by spinning them in a centrifuge <p>(b) Conclusion - DNA is the genetic material = 1</p> <p>Interpretation - sulphur labelled viral protein did not enter the bacteria during infection , whereas phosphorus labelled viral DNA entered into the bacteria to cause infection</p> <p>OR</p> <p>Skin colour is controlled by three genes; A,B,C dominant genes and a,b,c the recessive genes ;</p> <p>the effect of each type of allele is addictive ; more the dominant allele, darker the skin colour;</p> <p>more the recessive allele lighter the skin colour ; when three dominant alleles and three recessive alleles</p> <p>are present in an individual the skin colour is intermediate</p> <ul style="list-style-type: none"> - Polygenic inheritance - Human Height /or any other correct example 	1+1 $\frac{1}{2}$ $\frac{1}{2}$ 1 $\frac{1}{2} + \frac{1}{2}$ 6 X $\frac{1}{2}$ 1 1

SET -C

Q.NO.	Answers	Marks (with split up)
1	c) Removed during maturation of pro-insulin to insulin	1
6	Lysozyme added to remove the cell wall , Ribonuclease added to remove RNAs , Proteases added to remove proteins , chilled ethanol added to precipitate DNA	$\frac{1}{2} \times 4$
8	When a stop codon UAG / UGA / UAA, presents itself on the mRNA, it has no corresponding tRNA / does not code for any amino acid , release factor binds to the stop codon and translation ends. OR Codes for Methionine , and is an initiation codon The sequence of bases from which it is transcribed is T AC Its anticodon is UAC	$\frac{1}{2} \times 4$ $\frac{1}{2} + \frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$
14.	Definition Factors - No. of species inhabiting in place - Environmental factors - Availability of nutrients (for any two)	2 1
16.	Gel Electrophoresis DNA fragments on the agarose gel are negatively charged molecules and they move towards the anode (The fragments separate according to their size) The separated DNA fragments can be visualised after staining with ethidium bromide followed by exposure to UV radiation Separated fragments are extracted from the gel by elution	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$
26	(a) Lichens on a bare rock , acids to dissolve rock , soil formation - bryophyte to hold the soil , retention of water - grass , scrubs and trees (b) Effluents from the industry, minerals stimulate algal growth, depletion of oxygen content , death of other aquatic life , lake is spoilt fully / dead lake /	$\frac{1}{2} \times 5 =$ $2\frac{1}{2}$ $\frac{1}{2} \times 5 =$ $2\frac{1}{2}$

	Eutrophication	
27.	<p>(a) definition and any two symptoms</p> <p>(b) smoking effect/ chewing effect</p> <p>(c) sense of euphoria/increased energy</p> <p style="text-align: center;">OR</p> <p>(i)wheat – hairy leaves- resistance to cereal leaf beetle.</p> <p>(ii) Maize- Hight aspartic acid and low nitrogen and sugar contents</p> <p>(iii) Wheat- Solid stem- resistance to stem borer</p> <p>(iv) cotton- smooth leaves and nectarless condition- resistance of bollworm</p> <p>(v) cotton- Hairly leaves- Resistance to saw fly. (any three)</p> <p>Disadvantage</p> <p>-use only those genes that are present in such species that can be hybridized.</p> <p>-changes occur in all those traits for which the parents used for hybridization differ from each other.</p>	<p>1+1</p> <p>1+1</p> <p>$\frac{1}{2} + \frac{1}{2}$</p> <p>3</p> <p>2</p>