INDIAN SCHOOL MUSCAT

FINAL TERM EXAMINATION

NOVEMBER 2018

SET A

CLASS XII

Marking Scheme – BIOLOGY [THEORY]

Q.NO.	Answers	Marks (with split up)
1.	Big bang theory OR Adaptive radiation	1
2.	Penicilin	1
3.	Bioreactors are required to produce large volumes (100 - 1000 litres) of recombinant proteins/desired protein / enzymes	1
4.	Small animals have larger surface area relative to their volume// loose heat very fast, due to small size, expend much energy to generate body heat through metabolism.	1
5.	Vertical distribution of different species occupying different levels is called stratification OR Each trophic level has a certain mass of living material at a particular time called as the standing crop.	1
6.	Male Partner: Vasectomy - a small part of the vas deferens is removed or tied up through a small incision in the scrotum. Female Partner: Tubectomy - a small part of the fallopian tube is removed or tied up through a small incision in the abdomen or through vagina OR Cu^{2+} ions, increases phagocytosis of sperms, suppresses sperm motility, reduces fertilizing capacity.	2
7.	From the dihybrid cross, law of independent assortment can be derived which states that, when two pairs of traits are combined in a hybrid, segregation of one pair of characters is independent of the other pair of characters. 1 + 1 mark	2
8.	Antitoxin / Antivenoms / Preformed antibodies = 1 - Whenever quick immune response is required we need to directly inject preformed antibodies / Antitoxins = ½ + ½	2
9.	• Predators act as conduits for energy transfer across trophic levels. • They keep prey population under control. • They help in maintaining species diversity in a community by reducing intensity of competition among competing prey species. • An efficient predator may cause extinction of prey species (Any two) = 1 + 1 OR A-confirmors B- Partial regulators	
10.	Rapid deforestation , massive burning of fossil fuel , have significantly increased the rate of release of carbon dioxide , polluting atmosphere , this greenhouse gas , contributes to global warming [for any two]	2
11.	Thorns of Acacia / Cactus are morphological means of defence against cows & goats - Plants produce & store chemicals that make herbivore sick when they are eaten inhibit feeding or digestion and disrupt its reproduction or even kill it- Calotropis produces highly poisonous cardiac glycosides so cows and goats can never browse on these plants / Chemical substances like nicotine / caffeine / defences / strychnine / opium are actually defences against grazers & browsers [for any two)	2

12. (a) Grazing food chain starts from producers while detritus food chain starts from organic matter = 1 — 2
(b) Grazing food chain is the major conduit of energy flow in an ecosystem = 1

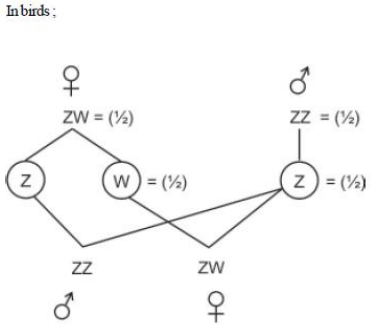
13. Decline in death rate/ maternal mortality rate/ infant mortality rate — 3

14. (a) Dominant. ½ a mark — 3
(b) Autosomal. ½ a mark
(c) Genotype of parents in generation I – Female – aa and Male – Aa. (½ + ½ mark each)
Genotype of third child in generation II - Aa.
Genotype of first grandchild in generation III - Aa.

OR

Dominance : one allele expresses itself in the hybrid heterozygous condition , other is suppressed
Co dominance : both the alleles of a gene express in a heterozygous hybrid containing two dominant alleles.
Incomplete dominance : Neither of the two alleles of a gene is completely dominant over the other in heterozygous condition , the hybrid is intermediate.

15. — 3



Birds : female heterogamety / female produces (Z) type and (W) type of gametes = ½
Humans : male heterogamety / male produces (X) type and (Y) type of gametes = ½

16. (a) VNTR - Variable Number of Tandem Repeat(s) = ½ — 3
- used as a probe (because of its high degree of polymorphism) = ½
(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) = 1 + 1

OR

RNA polymerase - I , transcribes rRNAs (28S -18S and 5.8S) = ½ × 2
RNA polymerase - II , transcribes precursor of mRNA / hnRNA / heterogeneous RNA = ½ × 2
RNA polymerase - III , transcribes tRNA / 5sr RNA / snRNA = ½ × 2

17. (i) In a closed flask containing NH3, CH4, H2 and Water Vapour to simulate primitive atmosphere — 3
(ii) Electric discharge to simulate on primitive earth
(iii) Formation of compounds like amino acids from simple molecules like NH_3, CH_4, H_2 1x 3

18. By screening germplasm for resistance sources , hybridisation of selected parents , selection and evaluation of the hybrids and testing and release of newvarieties // mutation breeding - it is possible to inducemutations artificially through use of chemicals or radiations (like gamma radiations) , and selecting and using the plants of desirable character as a source in breeding. // Selection amongst somaclonal variants /Genetic engineering - Any one explained = 2 — 3
(a) Himgiri= ½

(b) Pusa swarnim /Karan rai = ½

OR

Out breeding – Breeding of unrelated animals (which may be between individual of same breed or between individuals of different species) = 1
Out crossing – (a kind of out breeding) Mating of animals within the same breed but having no common ancestors on either side of their pedigree upto 4 – 6 generations = 1
Cross breeding – (another type of out breeding) Superior males of one breed are mated with superior females of another breed = 1

19. (a) If the boy is suffering from Typhoid, then, the he should have sustained high fever (39° to 40°C), weakness, stomach pain, constipation and headache. So It cannot be typhoid. 1 mark — 3
(b) If the boy is suffering from Viral Fever he will suffer from high fever, joint pain, weakness, and headache, So It cannot be Viral Fever. 1 mark
(c) If the boy is suffering from Malaria he should have high fever recurring with profuse sweating every three to four days associated with chills and headache. There is a possibility that he is suffering from Malaria because high fever associated with chills is possible with malaria. 1 mark

20. Breeding crops with higher level of vitamins and minerals , or higher protein and healthier fats = ½ × 2 — 3
Vitamin A enriched carrots / spinach / pumpkin
Vitamins C enriched bitter gourd / bathua / mustard / tomato
Iron and calcium enriched spinach / bathua
Protein enriched broad lablab / french & garden peas
Any two examples = 1 + 1

21. (a) Palindromic nucleotide sequence / Recognition sequence. — 3
(b) DNA fragments from two different molecules which have the same kind of sticky ends overhanging chains can be joined together (end to end) by DNA ligases.
(c) EcoRI 1 x 3

22. Denaturation , Two strands of DNA are separated by heating = ½ × 2 — 3
Annealing , Two sets of primers are attached / annealed to the separated DNA strands = ½ × 2
Extension , Taq polymerase catalyses the extension of primers using genomic DNA as template and nucleotides provided in the reaction = ½ × 2
(correctly labelled diagrams with polarity of strands to be accepted in lieu of explanation) // or diagrammatic explanation

23. (a) Masses of aerobic bacteria associated with fungal filaments — 3
(b) While growing they consume large amount of organic matter of the effluents reducing BOD
(c) When effluent goes to settling tank and flocs are allowed to sediment for activated sludge, they get digested by anaerobic bacteria 1+1+1

24. - Using Agrobacterium vector nematode specific genes introduced into host plant — 3
- Sense and antisense strands of mRNA are produced
- ds RNA is formed
- ds RNA initiates RNAi
- Prevents translation of mRNA / silencing of mRNA of parasite / nematode
- Parasite will not survive

25. (a) DNA being very long , requires high energy for opening along its entire length = 1 + 1 — 5
(b) DNA dependent DNA polymerase catalyse polymerisation only in one direction , i.e. 5' 3', = ½ + ½
Two strands of DNA are anti parallel and have opposite polarity = 1
(c) Site where replication originates = 1

OR

(a) Drosophila melanogaster = 1
They observed that two genes (located closely on a chromosome) did not segregate independently of each other (F2 ratio deviated significantly from 9 : 3 : 3 : 1) = ½
Tightly linked genes tend to show fewer (lesser) recombinant frequency of parental traits / show higher (more) frequency of parental type = ½
Loosely linked genes show higher percentage (more) of recombinant frequency of parental traits / lower frequency percentage of parental type = ½
Genes present on same chromosome are said to be linked and the recombinant frequency depends on their relative distance on the chromosome = ½
(b) He used the frequency of recombination between gene pairs on the same chromosome, as a measure of the distance between genes and mapped their position on the chromosome = 1 + 1

26. (a) Tissue culture / micro propagation = 1 5
Explants, grown in a test tube , under sterile condition , in special nutrient medium / culture medium ½ × 4 = 2
(b) Isolated single cells , digests cell walls , to obtain protoplast from two different varieties ,
fusion of protoplast. ½ × 4 = 2
OR
i) (a) Aspergillus niger - Citric Acid , natural preservative / flavouring agent = ½ + ½
(b) Trichoderma polysporum - Cyclosporin A , immunosuppressive agent = ½ + ½
(c) Monascus purpureus - Statin , blood cholesterol lowering agent = ½ + ½
ii) 'Roquefort cheese' are ripened by growing a specific fungi on them, which gives them a particular flavour.

27. (i) Regulate - Maintain constant internal temperature / osmotic concentration /homeostasis = ½
e.g. birds / mammals = ½
(ii) Conform - Do not maintain constant internal temperature / osmotic concentration / No homeostasis = ½
e.g. any one example of animal other than birds and mammals = ½
(iii) Migrate - Temporary movement of organisms from the stressful of habitats to hospitable areas and return when stressful period is over = ½
e.g. birds from Siberia / or any other correct example = ½
(iv) Suspend - Reducing / minimising the metabolic activities during unfavourable conditions = ½
e.g. Polar bear / amphibian / snails / fish / any other example of animals = ½
(b) Death rate = 0.1
8/80 , individuals per butterfly per week = ½ + ½

OR

Breakdown of complexorganicmatterbydecomposers.a)Process-i)fragmentation 2 ½
ii)leachingiii)catabolism.Humificationandmineralization–humificationleadsto accumulationofdarkcoloursubstancecalledhumus.Mineralisationresultinreleaseof +2 ½ inorgranic substances
a)climaticfactor– i)tempii)soilb)chemicalqualityofdetritus.Highertempandmoist condition – high rate of decomposition.Drysoil ,High temp–Lowrate