INDIAN SCHOOL MUSCAT

HALF YEARLY EXAMINATION

SEPTEMBER 2019

SET A

CLASS XII

Marking Scheme – BIOLOGY [THEORY]

Q.NO.	Answers	Marks (with split up)
1.	**Sperms have enzymes in their acrosome. Support this statement by giving suitable reason.** To digest the outer wall of egg during fertilization	1
2.	**Nutrients are required by plants. Whereas presence of large amount of nutrients in water can create environmental disturbances. Evaluate this statement.** Algal bloom	1
3.	**Identify the vegetative propagule of Eichornia.** Offset **OR** **List the steps involved in artificial hybridization.** Emasculation and Bagging	1 ½ + ½
4.	**In Artificial Insemination, sperm may be collected from a donor. Suggest a solution in ART if a female is not able to produce a gamete.** GIFT	1
5.	**Give the technical term for the type of pollination which ensures genetic recombination.** Xenogamy **OR** **Identify the cells present in the seminiferous tubules that provide nutrition to the sperms.** Sertoli cells	
	SECTION B	
6	**Who proposed the 'Chromosomal theory of inheritance'? List any two ways in which the genes and chromosomes show similarity in their behavior.** Walter Sutton and Theodre Boveri Both occur in pairs, Both segregate at the time of gamete formation	½ + ½ ½ + ½
7	**Infer the characteristics of a stable community. (any two points)** Less year to year variation in biomass production. Resistant to occasional environmental disturbances	1 + 1
8	**What would happen if bactereophage grown in radioactive sulphur or**	1 + 1

	radioactive phosphorus are allowed to infect the bacteria? **grown in radioactive sulphur will make the bacteria non radio active.** **radioactive phosphorus make the bacteria radio active.**	
9	**a) How many eggs do you think were released by the ovary of a female dog which gave birth to 6 puppies?** **6** **b) How many eggs had been released if a mother gave birth to identical or monozygotic twins?** **1**	**1 + 1**
10	**Many fresh water animals cannot survive in marine environment. Explain by giving two reasons.** High salt concentration outside/ hypertonic surroundings Loss of water from the body/ exosmosis from animal body/ suffere osmotic problems **OR** **a) Exponential growth is not realistic. Give reason.** Resources are never unlimited. **b) What does 'r' indicate in a population equation.** Intrinsic rate of natural increase	**1 + 1**
11	<table><tr><td>**p**</td><td>**i**</td><td>**P**</td><td>**O**</td><td>**z**</td><td>**y**</td><td>**a**</td></tr></table> **(a) Identify the region where the repressor protein will attach normally.** Operator site **(b) Under which condition repressor is unable to attach at this site?** In the presence of inducer lactose, which bind to the repressor (½ + ½)	**1 + 1**
12	**Draw a labeled diagram of a mature ovule of an angiosperm.** correct diagram with 4 labellings **OR** **Draw a labeled diagram of sectional view of a seminiferous tubule. (Enlarged)**	**½ x 4**
	SECTION C	
13	**Explain convergent and divergent evolution with help of one example of each.** Convergent: Different structures evolving in the same direction in different organisms (1) eg; Wings of butterfly and of birds/ eye of octopus and of mammals/ the flippers of penguins and dolphins/ sweet potato and potato. Any one ½ Divergent : Same structure evolving in different directions in different organisms (1)	**1 ½ +1 ½**

	eg; forelimbs of whales , bats, cheetah and humans/ vertebrate hearts or brains/ thorns of Bougainvilleae and tendrils of Cucurbita Any one ½ **OR** **What do the forelimbs of whales, bats and cheetah with respect to evolution signify? Provide one such example in plants. Define adaptive radiation.** Homologous organs/ divergent evolution (1) thorns of Bougainvilleae and tendrils of Cucurbita (1) Process of evolution of different species in a given geographical area starting from a point and literally radiating to other geography (habitat) (1)	**1+1+1**
14	**a) Arrange the following terms in the correct developmental sequence.** **Pollen grain, sporogenous tissue, microspore tetrad, pollen mother cell, male gametes.** sporogenous tissue, pollen mother cell, microspore tetrad, pollen grains,male gametes **b) How many male gametes will be produced in a single angiosperm pollengrain?** **2**	**½ x 4 + 1**
15	**List any three parasitic adaptations in plants.** Haustoria in Cuscuta, Loss of chlorophyll, Loss of leaves **OR** **List any three adaptations in parasites to live within the host.** Loss of unnecessary sense organs strong clinging organs reduced digestive system high reproductive capacity (any three)	**1x3**
16	**A flower of Brinjal plant following the process of sexual reproduction produces 360 viable seeds.** **Answer the following questions giving reasons.** **a) How many ovules are minimally involved?** 360, each ovule becomes seed after fertilization. **b) How many megaspore mother cells are involved?** 360, each MMC forms four megaspores out of which only one remains functional **c) How many male gametes are involved in the above case?** 720, each pollen carries two male gametes	**1 x 3**
17	**a) If there were 3o fowls in a poultry farm, 10 more fowls were**	**1 x 3**

	brought in and 5 of them died. If 8 new chicks were hatched during the time period under consideration and 6 fowls were removed, find out the resultant number of fowls. **Nt = 30** **I = 10** **D = 5** **B = 8** **E = 6** **Nt+1 = Nt + (B+I) – (D+E) (1)** **= 30 + (8+10) – (5+6)** **= 30 + 18 – 11** **= 37 (1)** **b) If a new habitat is just being colonized, out of the four factors affecting population growth which factor contributes the most?** **Immigration (1)**	
18	**In a mixed population, those that can better adapt, survive and increase in population size, no variant is completely wiped out. Illustrate this statement with the help of an example.** **Industrial melanism explanation**	**3**
19	**What would happen if biodiversity loss happens in an area?** a) Decline in plant production b) Lowered resistance to environmental perturbations c) Increased variability in certain ecosystem processes such as plant productivity, water use and pest and disease cycles. **OR** **In a food chain consisting of grass, frog, hawk, snakes, grasshopper and insects, where will be the concentration of harmful chemicals be maximum? What is the effect of DDT magnification on bird population and why?** hawk being the highest trophic level. (1) Bird population decline/ DDT interferes with calcium metabolism/ thinning of egg shell/ premature breaking (½ x 4=2)	**1x3**
20	**Explain endosperm formation during the post fertilization events.** **PEcell divides to form triploid endosperm tissue/ PEN undergoes free nuclear division/ wall formation/** **OR** **Explain the placenta formation in human beings.** After implantation chorionic villi form/interdigitate with the uterine tissue/connected to the embryo through an umbilical cord	**1 x 3**
21	**State the rule that depicts the adaptation of animals to live in a particular habit.** Allen's rule: mammals in colder climatic conditions have shorter limbs	**1 x 3**

<table>
<tr><td></td><td>and ears (1)
Draw and discuss the expanding and declining age pyramids.
Diagram with proper explanation 1 mark each</td><td></td></tr>
<tr><td>22</td><td>A colourblind man marries a woman with normal vision, whose father was colour blind. Workout a cross to show the genotype of the new couple and their prospective sons.
Cross with proper conclusion and answer ½ x 6</td><td>3</td></tr>
<tr><td>23</td><td>Explain what is happening in the ovary of a female during the follicular phase, ovulatory phase and leuteal phase of menstrual cycle.
Follicular phase : Primary follicle become Graafian follicle
Ovulatory phase : LH surge leads to rupture of Graafian follicle to release ovum.
Leuteal Phase : Corpus luteum is formed which secrete the hormone progesterone</td><td>1 x 3</td></tr>
<tr><td>24</td><td>How would you apply your knowledge about the working of catalytic converter to justify its role in reducing the air pollution in Delhi?
Unleaded petrol should be used for vehicles with catalytic converter. Give reason.
Unburnt hydrocarbons are burnt into CO2 and water
CO and nitric oxide are changed to carbon dioxide and N2 gas
Lead in petrol inactivates the catalyst.</td><td>1 x 3</td></tr>
<tr><td></td><td>SECTION D</td><td></td></tr>
<tr><td>25</td><td>a) What is an ecological pyramid ? Compare the pyramids of energy, biomass and numbers. (b) Write any two limitations of ecological pyramids.

Graphical representation of the relationship among the organisms at differe trophic level =1

<table>
<tr><td>pyramid of energy</td><td>biomass</td><td>number</td></tr>
<tr><td>shows transfer of energ from one trophic level t another</td><td>shows transfer of food biomass from</td><td>shows numbers of organisms at eac trophic level</td></tr>
<tr><td>always upright</td><td>mostly upright can be inverted</td><td>mostly upright can be inverted</td></tr>
</table>

= ½ × 6

(c) It does not accomodate the food web / does not take into account th same species belonging to two or more tropic levels , Saprophytes are</td><td></td></tr>
</table>

	not given any place= ½ + ½ [5 Marks] **OR** **a) Explain any three remedial measures to overcome acute air pollut in our cities.** **b) Write three ways in which noise pollution affects human beings. Suggest one measure to reduce noise pollution.** a) Electrostatic precipitator removes particulate matter from the thermal power plants/Scrubber to remove SO2 from the exhaust of thermal pov plants/ Alternative source of energy in place of petrol/ Lead free petrol diesel/ catalytic converters to reduce air pollution/Use of CNG/ Use of low sulphur petrol and diesel/phasing out of old vehicles/ stringent enforcement of pollution level norms. (Any three) 1x3 b) Sleeplessness/ increased heart beat/ altered breathing pattern/ Damage hearing ability/Damage ear drum. (any three) 1x ½ Following stringent laws/ delimitation of horn free zones near schools and hospitals/To adopt permissible sound limit for crackers and loudspeakers/ use of sound absorbent materials/muffling of noise (any one) ½	
26	**a) Explain two ways in which apomictic seeds can be produced.** **b) List one advantage and one disadvantage of apomictic crop.** **c) Why do farmers find production of hybrid seeds costly?** **OR** **a) Explain one application of each of the following:** **(i) Amniocentesis** **(ii) Lactational amenorrhoea** **(iii) ZIFT** **b) Express the process of pollination in Vallisnaria.** a) A diploid egg is formed without reduction division which develops into embryo without fertilization. (1)/ some cells of the nucellus start dividing and developing into embryo. (1) b) Advantage : No segregation of character in the progeny/ can be used to grow crops year after year/economical (1) Disadvantage : cannot prevent deleterious mutation./ reduces genetic diversity from parents to offsprings as variations are less/ lack ability to adapt to changing environment. (1) c) Hybrid seeds are costly as farmers have to purchase year after year./ Production of hybrid seeds is technical and expensive method to be done under controlled conditions. (1) OR	

	a) (i) To detect chromosomal disorders/ fetal sex determination/genetic disorders/ gene karyotyping (1) (ii) To prevent pregnancy/ natural contraceptive method (iii)To assist infertile couple to have children by transferring the zygote **b)** Long stalk of female flowers, pollen released on the surface of water, pollen grains are carried passively by water current, pollen reach stigma. (1/2 x 4)	
27	**Differentiate between incomplete dominance and codominance. Substantiate your answer with one example of each.** Incomplete: F1 generation does not resemble either of the parents but show an intermediate trait. (1) eg: Snapdragon, Mirabilis/4'O clock plant cross between homozygous Red and White flowers produce Pink flowers in the F1. (1/2) Cross (1) Codominance: Both dominant traits express themselves in F1 generation. (1) eg: AB blood group in man.(1/2)/ cross (1) **OR** a) **Write the contribution of the following scientists in deciphering the genetic code.** **George Gamow, Hargobind Khorana, Marshall Nirenberg, Severo Ochoa** b) **State the importance of genetic code in protein biosynthesis.** a) George Gamow: Proposed that genetic code has 3 bases/ provided proof for genetic code is triplet. Hargobind Khorana: Synthesized RNA molecule with defined sequence of base pairs. Marshall Nirenberg :Cell free system for protein synthesis Severo Ochoa: Described enzyme which polymerise RNA with defined sequence in template independent manner. b) Codes for a specific aminoacid needed for protein systhesis.	