CBSE

ADDITIONAL PRACTICE QUESTIONS-Marking Scheme
Biology (044)
Class XII| 2023–24

Max Marks: 80 **Time: 3 hours**

Q.Nos.	Answers	Marks
	Section A	
1	(a) n	1
2	(d) only P, Q and R	1
3	(b) Yes, as the genetic code is degenerate.	1
4	(d) Sperms that have an O chromosome will give rise to a male cricket.	1
5	(c) disruptive	1
6	(d) *Australopithecines*	1
7	(d) S	1
8	(b) 50%	1
9	(c) distillation	1
10	(b) It is the first enzyme isolated from strain S2 of the bacterium.	1
11	(a) only Sumi	1
12	(a) No, because every level still gets 10% of the energy from the lower level.	1
13	(a) Both A and R are true, and R is the correct explanation for A.	1
14	(a) Both A and R are true, and R is the correct explanation for A.	1
15	(d) A is false, but R is true.	1
16	(c) A is true, but R is false.	1
	Section B	
17	(a) 0.5 marks each for the following: - No she is not correct.	1.0

	- Relaxin is produced by the ovaries and not the placenta. (b) 0.5 marks each for any two of the following: - human chorionic gonadotropin (hCG) - human placental lactogen (hPL) - estrogens - progestogens	1.0
18	(a) 0.5 marks for each of the following: - Genotypic ratio: 1:1 ratio of carriers:affected - Phenotypic ratio: 50% will not show major symptoms while 50% will show the symptoms. (b) 0.5 marks for each of the following: - Yes - Since both proteins are produced/both types of RBCs are visible, it is codominance. *[Accept any other valid answer.]*	1.0 1.0
19	1 mark each of any two of the following: - HIV has a high mutation rate and genetic variability making it difficult to target. - HIV can be latent for more extended periods of time, making it difficult to diagnose the disease. - HIV replicates in immune cells of the human body and targeting them might pose a risk to the individual's immune system and safety.	2.0
20	(a) 0.5 marks each for the following: - The air inlet/sparger should be absent. - Since lactobacillus is anaerobic, it may not thrive well if oxygen is present. (b) 0.5 marks each for any two quantities such as: - A sensor should monitor **<u>temperature</u>** as bacteria are likely to die if the temperature fluctuates. - **<u>Dissolved oxygen</u>** should be measured to ensure anaerobic conditions are maintained. *[Accept any other valid answer.]*	1.0 1.0
21	(a) 0.5 marks for each of the following:	1.0

	- B to C will be slower than A to B - Since millipedes contain chitin, their decomposition will be slower than that of leaves which have cellulose. (b) The flow of energy is A to B to C to D. **OR** a) 0.5 marks for any TWO of the following: - A coral is a self-regulating and stable system. - It has a variety of biotic (living) components, including corals, fish, invertebrates, algae, bacteria, plants, animals, and other organisms. - It has a variety of abiotic (non-living) components, including water, sunlight, nutrients, and soil. - The biotic and abiotic components interact with each other for life to sustain. - Flow of energy and nutrients occurs in the system. - It is a self-sustaining system as corals and other organisms that live on the reef produce their own food through photosynthesis, and the reef itself provides a stable habitat for the organisms that live there. *[Accept any other valid answers]* (b) GPP - R = NPP *[0.5 marks]* 4000 - R = 2000 R = 2000 g C/m^2/year *[0.5 marks]*	1.0 1.0 1.0
	Section C	
22	(a) 0.5 marks for each type of cell: - Leydig cells - Sertoli cells - Spermatogonium - Primary spermatocyte (b) 0.5 marks for each of the following: - Leydig cells - produces androgens	2.0 1.0
23	(a) 5th July (b) 0.5 marks for each for the following: Estrogen - The highest level	1.0 2.0

	Progesterone - The lowest level FSH - The highest level LH - The highest level *[Do not award marks if the level is not mentioned.]*	
24	(a) 0.5 marks for each of the following: - For less than 8 cells, blastomere is transferred to the fallopian tube. - For more than 8 cells, blastomere is transferred to the uterus. (b) Embryos with more than 8 cells are generally considered healthier and have a better chance of successful implantation and further development and hence are placed in the uterus and not the fallopian tube. (c) 0.5 marks for each of the following: - For less than 8 cells, zygote intra-fallopian transfer is done. - For more than 8 cells, the intra-2 uterine transfer is done.	1.0 1.0 1.0
25	(a) 0.5 marks for any FOUR of the following: - gene migration - genetic drift - mutation - genetic recombination - natural selection (b) For the population to be in Hardy-Weinberg equilibrium, the expected frequency of the heterozygous genotype (Aa) has to be 2pq = 2*0.7*0.3 = 0.42 *[0.5 marks]* Since the frequency of the heterozygous genotype (Aa) is 49%, it deviates from the Hardy-Weinberg equilibrium/the population is not in Hardy-Weinberg equilibrium. *[0.5 marks]*	2.0 1.0
26	(a) - False *[0.5 marks]* - Flocs reduce pollution by decomposing the organic matter present in water and decreasing its BOD. *[1 mark]* (b) - False *[0.5 marks]* - Mycorrhiza is a type of symbiotic relationship in which both plants benefit from fungi and vice versa. *[1 mark]*	1.5 1.5
27	0.5 marks each for the following: - Use the sequence of exons to form a dsDNA molecule in vitro. - Insert the dsDNA molecule into an appropriate vector. - Introduce the recombinant vectors in bacterial hosts and select cells	3.0

	containing the recombinant vector with the gene of interest. - Purify the vector and amplify it using PCR. - Using a gene gun or any appropriate technique introduce the recombinant vector into host human cells/Namalwa cells. - Grow these cells in bioprocessors and extract and purify the glycoprotein from the culture. *[Award marks if the answer is presented as a flowchart or diagram]* **OR** (a) 1 mark each for the following: - Polymerase Chain Reaction (PCR) - It can be used to detect very small quantities of nucleic acid sequences as would be the case with DNA from a single cell. (b) 0.5 marks each for the following: - Yes, it can be used. - PCR can be used to amplify/detect any nucleotide sequence. *[Accept any other valid answer.]*	2.0 1.0
28	(a) 1 mark for the formula and 0.5 marks for the S value of each region: $S = CA^z$, where S = Species richness A = Area Z = Regression coefficient C = Y-intercept - For Antarctica, $S = 5*(14*10^6)^{(1)} = 70*10^6$ - For Asia, $S = 10*(44*10^6)^{(1)} = 44*10^7$ (b) 0.5 marks each for the following: - Asia - Since the species richness of Asia is more they have more species and so greater biodiversity than Antarctica	2.0 1.0
	Section D	
29	(a) 0.5 marks each for the following: - It helps the vector replicate in different hosts. - When adding bacterial genes of interest into plant vectors, having ori's that help the same plasmid replicate in both bacteria and plants would help simplify the process of gene cloning.	1.0

	[Accept any other valid answer.] **OR** The uncut vector without the gene of interest *[1 mark]* *[Deduct 0.5 marks if a student writes the religated vector without gene of interest]* (b) EcoRI would be ideal to use *[1 mark]* 0.5 marks each for any TWO advantages such as: - It has a single restriction site, meaning that only two products will be obtained - either with the gene of interest or without it and will not give multiple products. - The restriction site is within the chloramphenicol resistance gene, which on insertional inactivation will help select recombinant vectors. *[Accept any other valid answer.]* (c) Using ScaI and/or HindIII would lead to multiple end products/fragments being formed which would make selection of the recombinant vector complicated.	1.0 2.0 1.0
30	(a) 0.5 marks each for the following: - Since prey X is the primary food for prey Y, as the prey population increases, so does the predator population. - More predators consume the prey causing the prey population to drop. - As the prey population drops, predators do not have enough prey and so their population also drops. - When this happens, the prey population increases again. (b) The vegetation will also slowly disappear. (c) 0.5 marks each for the following: - The two species will compete for the same prey and the inferior one is likely to be eliminated over time. - Since they both feed on the same prey, resources are limited causing the elimination of the inferior predator. *[Accept any other valid answer.]* **OR** 0.5 marks each for the following:	2.0 1.0 1.0 1.0

	- amensalism - The black walnut is neither harmed nor benefitted while the plants surrounding it are harmed.	
	Section E	
31	(a) 15-24 years *[Accept any other valid answer which includes a nearby age group]* (b) 1 mark each for the following: - Chronic pain and discomfort in various body organs - Infertility in some STDs - Lower immunity levels and increased risk of other infections - Higher risk of transmitting the diseases to others. *[Accept any other valid answer]* (c) 0.5 marks each for the following: - condoms - They act as a barrier preventing the mixing of body fluids. (d) 0.5 marks each for any two of the following: - Oral Contraceptive Pills - Vasectomy or Tubectomy - IUDs **OR** (a) Amniocentesis - It involves taking a sample of the amniotic fluid and testing it for genetic abnormalities. *[0.5 marks each for suggesting the name of the method and explaining it]* (b) Medical Termination of Pregnancy (MTP) (c) Yes, it is currently safe *[1 mark]* This option should be considered before the completion of the first trimester, as it might be riskier after this period. *[1 mark]* (d) MTP is illegal in cases involving determining the gender of the unborn child and female foeticide.	1.0 2.0 1.0 1.0 1.0 1.0 2.0 1.0
3	(a) 0.5 marks each for the following:	1.0

	- X-chromosome - recessive (b) 1 mark each for the following: - It is appearing in both males and females but more in males which need only one X chromosome for the trait to be expressed. - The trait is being expressed in only in some children/small fraction and so is likely to be recessive. *[Accept any other valid answer.]* (c) 0.5 marks each for the following: - P: XY - Q: X^oX - R: X^oX - S: XY **OR** (a) TYR ALA SER GLU HIS *[1 mark]* (b) Correct drawing with anticodon 3' -AGA - 5' *[1 mark]* Reason: The mRNA sequence is translated in the 5' to 3' direction so the anticodon has to be in the 3' to 5' direction *[1 mark]* (c) point mutation *[0.5 marks]* (d) 0.5 marks each for the following: - mRNA will be formed - protein will not be formed - The first codon is a stop codon due to which translation will not happen	2.0 2.0 1.0 2.0 0.5 1.5
4	(a) 0.5 marks each for mentioning the type of immunity and 0.5 marks each for the reason: (i) Passive immunity Pre-formed antibodies are being transferred from the mother to the fetus as the fetus does not make its own antibodies. (ii) Active immunity A tetanus shot, which contains inactivated tetanus toxin, will stimulate the person's immune system to produce his own specific antibodies against tetanus.	3.0

	(iii) Passive immunity The person receiving the blood transfusion is passively acquiring antibodies from the vaccinated donor that were made by the donor's body and not the recipient's body. (b) - Zaheer is not likely/less likely get malaria. *[1 mark]* - Since Zoya has been bitten by an infected mosquito and the process of infection of the liver cells and red blood cells takes more than 5 days, the non-infected second mosquito is not likely/ less likely to get infected by biting Zoya, and thus cannot/less likely to transfer the *Plasmodium* to Zaheer. *[1 mark]* **OR** (a) Malignant tumour/ Cancer (b) 0.5 marks each for any four causes such as: - genetic factors/family history - carcinogens - high energy ionising radiations (e.g. X-rays, gamma rays, etc.) - non-ionizing radiations (e.g., UV) - infection by oncogenic viruses 0.5 marks each for any four diagnosis techniques such as: - X-rays - CT scans - MRI scans - Blood tests - Biopsies *[Accept any other valid answer]*	2.0 1.0 2.0 2.0