

1st-PRE-BOARD EXAM 2025-26**BIOLOGY SET-II****Answer key and Marking Scheme**

Q. No.	Answers	Marks
1	D. No, because pollen grains needs to be stored at much lower temperatures to be viable.	1
2	D. (iv) and (v)	1
3	B. zygote intra fallopian transfer	1
4	A. DNA polymerase can read only in the direction of 3' to 5'	1
5	B. only R	1
6	C. Only the male parent is heterozygous.	1
7	C. Translation - Elongation	1
8	A. It verifies that DNA is the carrier of genetic information.	1
9	D. survival of the fittest	1
10	B. Artificially acquired active immunity	1
11	C. Fruit juice	1
12	C. both P and Q	1
13	B. Both A and R are true, but R is not a correct explanation for A.	1
14	A. Both A and R are true, and R is the correct explanation of the assertion.	1
15	C. A is true, but R is false.	1
16	C. A is true, but R is false.	1
	SECTION B	
17	1 mark each for any two differences such as: - Sex determination in humans is of the XY type i.e the male has two different sexchromosomes (X and Y) and females have two copies of X chromosome where as it is of the haplodiploid type in bees i.e, females are diploid and males are haploid (only one set of chromosomes) - Males in bees are produced by parthenogenesis and females by fertilization,whereas both male and female offspring in humans are produced by fertilization. - Sperm production by mitosis in bees and by meiosis in humans.	1+1

18	1 mark each for any two of the following: -If pregnancy is continued, it would threaten the mental, emotional, and physical well-being of the pregnant woman. -There is possibility that the infant would suffer from physical or mental abnormalities as to be seriously handicapped. -The pregnancy is unwanted by the pregnant woman, in case of rape victim OR 1 mark each for any two of the following: (i) sharing of injection needles or surgical instruments with infected person, (ii) blood transfusion from an infected person (iii) sexual contact with an infected person	1 X 2 1 + 1
19	(a) Lack of breastfeeding in new-borns can result in lower passive immunity, potentially increasing susceptibility to infections due to the absence of protective factors present in breast milk. (b) A tumour cell that enters the bloodstream can reach a distant tissue and possibly form a secondary tumour, or metastasis, in that location. OR (i) 0.5 marks for each of the following: - FALSE - Elephantiasis is a vector-borne disease caused by worms. (ii) 0.5 marks for each of the following: - FALSE - Typhoid is caused by a bacterium and it spreads through contaminated food and water.	$\frac{1}{2} + \frac{1}{2}$ $\frac{1}{2} + \frac{1}{2}$ $\frac{1}{2} + \frac{1}{2}$ $\frac{1}{2} + \frac{1}{2}$
20	Species which are harmful to human beings can be made extinct, e.g., HIV, polio virus, etc. Such micro-organisms are not part of any food chain and thus, their extinction would not affect the ecosystem. OR The prey defence mechanisms (a) To avoid being detected easily by the predators, some species of insects and frogs are cryptically coloured (camouflaged). (b) The Monarch butterfly is highly distasteful to its predator (birds) because of a special chemical present in its body which is acquired by the butterfly by feeding on a poisonous weed in its caterpillar stage. (c) Some plants have thorns or spines for defence mechanism, e.g., Acacia, cactus. d) Some plants produce highly poisonous chemicals like cardiac glycosides, quinine, strychnine, opium, nicotine, caffeine etc., are produced by plants as defence against grazers and browsers. (ANY TWO)	1 + 1 1 + 1
21	Selectable markers are essential to identify and eliminate non-transformants, by selectively permitting the growth of the transformant. • To link the alien DNA, the vectors require very few (mostly single) recognition SITE for a restriction enzymes as more than one recognition sites within the vector, can complicate the gene	1 + 1

	cloning as it will generate several fragments. Ligation of alien DNA can be carried out at a restriction site present in one of the two antibiotic resistance genes.	
	SECTION C	
22	(a) 0.5 MARK FOR EACH - Name of the enzyme: BamHI - The convention used to name a restriction enzyme is the first letter comes from the genus (Bacillus) - and next two letters from the species (amyloliquefaciens). - The fourth letter refers to the strain (strain H). - The roman number in the end indicating the order in which the enzyme was isolated from the strain (first enzyme). (b) 5'-G G A T C C-3' 3'-C C T A G G-5' OR DNA being hydrophilic cannot pass through cell membrane. A cell must be made competent so that it can take up the hydrophilic DNA from the external medium. Methods: gene gun , heat shock treatment, microinjection, disarmed pathogen , electroporation (explanation of any two)	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ 1 1+1
23	(a) The level of pollution in these samples - Sample A > Sample C > Sample B. <i>[Appropriate marks to be deducted even if any one is incorrect]</i> (b) BOD (Biological Oxygen Demand) measures the amount of oxygen consumed by microorganisms for oxidizing the organic matter present in one litre of water. <i>[1 mark]</i> Microorganisms need more oxygen to break down organic matter in the polluted water, hence increased value of BOD indicates the poor quality of water. <i>[1 mark]</i>	1 1 1
24	Diagram of Expanding (triangular shaped) age pyramid Age pyramid helps in planning the healthcare programmes, the education policies and the infrastructure of the area. Analysis of age pyramid of a population can give the correct information about the status of the people in the area so that appropriate budget can be allocated to different sectors. OR Any one difference of each with example	1 $\frac{1}{2} + \frac{1}{2} + \frac{1}{2}$ $+ \frac{1}{2}$ $1 + \frac{1}{2}$ $1 + \frac{1}{2}$
25	(a) 0.5 marks for each correct answer: - P: endosperm - Q: embryo (b) The coconut water would have been consumed by the developing embryo. (c) 0.5 marks for each correct answer: - 3n - it is free-nuclear endosperm	$\frac{1}{2} + \frac{1}{2}$ 1 $\frac{1}{2} + \frac{1}{2}$
26	1 mark for each correct answer: (a) The pollen grain will have a mucilagenous covering to avoid getting wet.	1X3

	(b) The pollen grains will have a sticky exterior. (c) Pollen grains are light in weight, dry and winged. <i>[Accept any other valid answer]</i> OR 2.5 marks for labelled diagram(at least 4 correct labelling) The filiform apparatus guides the pollen tube into the synergids.	$\frac{1}{2} + \frac{1}{2} + \frac{1}{2}$ $+ \frac{1}{2} + \frac{1}{2}$ $\frac{1}{2}$
27	(a) proteins (b) The transfer of genetic material can transform a cell to perform a different function. (c) 1.5 mark for any of the following: - Avery, MacLeod and McCarthy purified biochemicals (DNA, RNA and protein) from the heat-killed S cells to see which ones could transform live R cells into S cells and found that DNA alone from S bacteria caused R bacteria to become transformed. - Hershey and Chase allowed bacteriophages with radioactively (^{32}P) labelled DNA and bacteriophages with radioactively (^{35}S) labelled protein coats to infect two separate populations of bacteria and found that only radioactively (^{32}P) labelled DNA was found to enter/get transferred to the bacterial cells.	$\frac{1}{2}$ 1 1.5
28	a. A = electrode, B = boiling water, C = methane, ammonia, hydrogen and water vapour b. the role of 'A' is to create electric discharge, for condition similar to those in primitive atmosphere of earth. c. The conclusion made by Miller after this experiment: -Provides experimental evidence for the theory of chemical evolution. OR A. Explanation of Convergent evolution B. (i) homologous organ as both are modification of stem. (ii) homologous structures – have similar anatomical structure	1 1 1 1 $\frac{1}{2} + \frac{1}{2}$ $\frac{1}{2} + \frac{1}{2}$
SECTION - D		
29	i) C. Luteinizing Hormone ii) B. Progesterone iii) A. Corpus Luteum iv) B. Subject 2 is pregnant	1 1 1 1
30	(a) 0.5 marks each for each of the following: - X - Cocaine - Y - Morphine (b) 0.5 marks each for each of the following: - Cocaine - Coka alkaloids - Morphine - Opioids (c) 1 mark each for any TWO of the following: - Increase in crime rate	$\frac{1}{2} + \frac{1}{2}$ $\frac{1}{2} + \frac{1}{2}$ 1 + 1

	- Increase in the number of unhealthy people due to short-term and long-term effects of drugs - Burden on healthcare systems - Disruption in relationships with family and friends - Reduction in educational attainment and workforce productivity	
	SECTION E	
31	• A nematode <i>Meloidogyne incognita</i> infects the roots of tobacco plants which reduces the production of tobacco. • It can be prevented by using RNA interference (RNAi) process which is checked by silencing of specific mRNA due to a complementary dsRNA. • dsRNA binds and prevents translation of the mRNA (silencing). • By using <i>Agrobacterium</i> vectors, nematode-specific genes were introduced into the host plant which produce both sense and anti-sense RNA in the host cells. • These two RNAs are complementary to each other and form a double-stranded RNA (dsRNA) that initiates RNAi and hence silence the specific mRNA of the nematode *Source of complementary RNA – retrovirus, transposons • The parasite cannot survive in the transgenic host, so protects the plants from pests (Other suitable points may also be considered for the process of RNS i) OR a) Recombinant DNA technology involves the following steps: ✓ Isolation of DNA ✓ Fragmentation of DNA by restriction endonucleases. ✓ Isolation of a desired DNA fragment. ✓ Amplification of the gene of interest by PCR ✓ Ligation of the DNA fragment into a vector. ✓ Insertion of recombinant DNA into the host. ✓ Culturing the host cells on a suitable medium at a large scale. ✓ Extraction of the desired gene product. ✓ Downstream processing of the products as finished product, ready for marketing. (b) Insertional inactivation On the basis of colour production in the presence of chromogenic substrate, the recombinants and non-recombinants can be differentiated. Here, a recombinant DNA is inserted within the coding sequence of an enzyme B-galactosidase, which results into inactivation of the enzyme.	1 1 1 1 1 3 1 1

	. The bacterial colonies having inserted plasmid, shows no colouration while those without inserted plasmid form blue colour colonies.	
32	(a) Draw correct Punnett squares for F1 and F2 offsprings with the correct signs and ratios. (b) Since the recessive parental trait is expressed without any blending in the F2 generation, the alleles from the parental pair separate or segregate from each other and only one allele is transmitted to the offspring. (c) 0.5 mark each for the following: - He would have arrived at a 1:1 ratio in the F1 generation - A trait would not disappear in F1 and reappear in F2. OR Translation – definition Fig Three steps: - Initiation Elongation Termination	1 +2 1 $\frac{1}{2} + \frac{1}{2}$ 1 1 1 1 1
33	2 differences – 1 mark example of each food chain – 1mark Labelled pyramid ---- 2 marks the pyramid is inverted because the biomass of fishes is much more than that of the phytoplankton OR in situ conservation of biodiversity with example. ex situ conservation of biodiversity with example. Need of both type of methods (Correct explanation)	$\frac{1}{2} + \frac{1}{2}$ $\frac{1}{2} + \frac{1}{2}$ 1 + 1 1 1+1 1 + 1 1