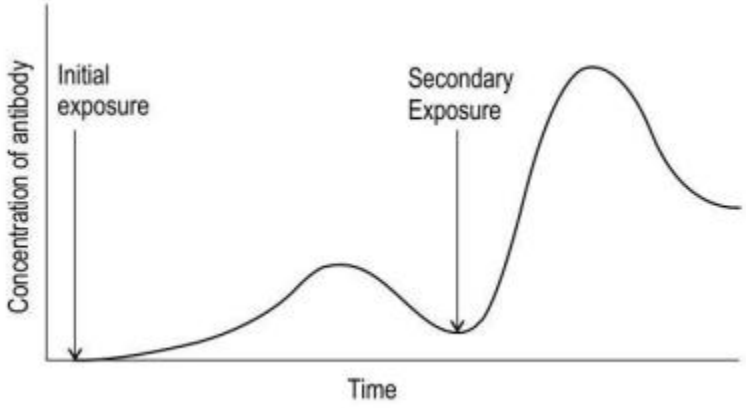
PRE-BOARD EXAMINATION 2025-26
MARKING SCHEME
SET - I

CLASS : XII **Subject : Biology (044)**

Section – A		
Q. No.	**Questions**	**Marks**
1	B. A–degenerating synergids, B–zygote, C–PEN, D–degenerating antipodals	1
2	B. Dioecious plant bearing only male or female flowers.	1
3	C. 2 polar nuclei + 1 male gamete nucleus	1
4	D. second polar body and a haploid ovum.	1
5	D. Polygenic and quantitative inheritance	1
6	B. A- (ii), B- (iii), C- (iv), D- (i)	1
7	B. G 17%, A 33%, T 33%	1
8	B. 5′ (upstream) end and 3′ (downstream) end, respectively of the transcription unit	1
9	C. Oenothera lamarckiana	1
10	C.analogous organs that have evolved due to convergent evolution	1
11	C.passive immunity	1
12	A. Morphine	1
13	A. Both A and R are true and R is the correct explanation of A	1
14	C. A is true but R is false	1
15	A. Both A and R are true and R is the correct explanation of A	1
16	C. A is true but R is false	1
Section – B		
17	**<u>Attempt either option A or B.</u>** **A.** Coconut endosperm develops as a free-nuclear type, followed by cellularization, where cell walls form to create a multicellular, solid endosperm (1+1) **OR** B. In a male gametophyte of an angiosperm, (i) germ pores are located on the surface of the pollen grain, and (ii) generative cells are found inside the pollen grain, near the vegetative cell. ½ + ½ <u>Functions</u> The germ pore is a small opening on the pollen grain wall where the pollen tube emerges when it germinates ½ The generative cell divides to produce the sperm cells (male gametes) ½	2 1+1
18	• **lac z gene product: β-galactosidase, Function:** Catalyzes the hydrolysis (breakdown) of lactose into two simpler sugars: glucose and galactose. ½ + ½	1+1

	• **lac Y gene product: Permease, Function:** A transmembrane protein that facilitates the transport of lactose across the bacterial cell membrane into the cell. ½ + ½	
19	(i) The type of antibody responsible is **IgE** (Immunoglobulin E)- ½ the chemicals are **histamine** and **serotonin**, ½ + ½ (ii) An **antihistamine** is a drug that can be given for immediate relief from these symptoms. – ½	2
20	**Attempt either option A or B.** A. (i) most widely used plasmids that function as a cloning vector in genetic engineering- ½ (ii) To code for proteins involved in plasmid replication- ½ (iii)Transformants, recombinants- ½ + ½ **OR** B. **(i)** DNA is negatively charged and is pulled toward the positive electrode - 1 (ii) Ethidium bromide, uv light- ½ + ½	2 2
21	**Attempt either option A or B.** **A.** (i) Sea, phytoplanktons less- 1 (ii) No- ½ , loss of energy at every step means that the bottom of the pyramid (producers) will always have the most energy - ½ **OR** **B.** (i) EX- SITU- ½ (ii) it is primarily **driven by human activities** like habitat destruction, climate change, pollution, and overexploitation, whereas past extinctions were caused by natural events like asteroid impacts or volcanic eruptions.- 1 ½	2 2
	Section – C	
22	(i) Part A hormones are secreted by the **pituitary gland**, and Part B hormones are secreted by the **ovaries**. ½ + ½ (ii) Between days 6 and 15 of the menstrual cycle, the hormones from the ovaries, primarily estrogen, cause the uterine lining to thicken and proliferate, preparing it for a potential pregnancy. – 1 (iii) If the ovum is fertilized, the corpus luteum continues to produce progesterone to maintain the uterine lining for pregnancy.- ½ If the ovum is not fertilized, the corpus luteum degenerates into a scar tissue called the corpus albicans- ½	3
23	(i) Any two reasons- ½ + ½ (ii) Any two reasons- 1+1	3

24	(i) Case I disease examples include hemophilia, which is caused by a mutation on the X chromosome, while Case II disease examples include sickle cell anemia, an autosomal recessive disease. – ½ + ½ (ii) a female needs two copies of the mutated gene (one on each X chromosome) to have the disorder- ½ (iii) The normal visioned woman is a carrier of the colorblind gene, and her sons have a **50%** chance of being colorblind. ½ . Pedigree chart- 1	3
25	hnRNA, or heterogeneous nuclear RNA, is the precursor to mature messenger RNA (mRNA) in eukaryotic cells. – ½ **splicing** (removing non-coding introns), **5' capping** (adding a modified guanosine triphosphate to the 5' end), and **3' polyadenylation** (adding a tail of adenine nucleotides to the 3' end). – 1 ½ Image- 1	3
26	(i) X- viral DNA, Y- New viral DNA produced by infected cell- ½ + ½ (ii) Macrophage- ½ (iii)Any two modes- ½ + ½ (iv)Role- ½	3
27	(i) His experiment demonstrated chemical evolution, showing that complex molecules could be synthesized from simple inorganic precursors. -1 (ii) amino acids- 1 (iii) Any two factors- ½ + ½	3
28	(i) X is the **post-reproductive** group (older individuals), and Z is the **pre-reproductive** group (younger individuals). ½ x 2 (ii) Expanding, declining- ½ x 2 (iii) An **expansive population pyramid** is triangular with a broad base, indicating high birth rates and rapid growth. In contrast, a **stable population pyramid** is more rectangular or bell-shaped, showing a low and balanced birth and death rate, resulting in little to no population growth. ½ x 2	3
29	A. **1. Autogamy** (pollen transfer within the same flower) and **2. Geitonogamy** (pollen transfer between different flowers on the same plant) (1) B. (i) **Water lily**: Pollination is accomplished by **wind or insects**. The flowers emerge above the surface of the water to attract these agents for pollen transfer. (ii) **Vallisneria**: Pollination is accomplished by **water**. (2)	4

	Attempt either subpart C or D. B. Any one (1) **OR** C. Any two- ½ + ½	
30	The graph given below shows the levels of antibodies against a pathogen over a period of 30 years in a person's body.  A. The two peaks represent the body's response to a primary and a secondary exposure to the same pathogen (1) B. The difference in peak size is due to the presence of memory cells. After the first exposure (primary response), the body creates memory B-cells that are specific to the pathogen. Upon a second exposure (secondary response), these memory cells quickly recognize the pathogen and generate a much larger and faster antibody response, resulting in a higher antibody peak compared to the initial response. (2) **Attempt either subpart C or D.** C. B-lymphocytes and T-lymphocytes. (1) **OR** D. The type of antibody produced in response to allergens is **IgE** (immunoglobulin E). (1)	4
	Section – E	
31	(i) Explanation- 2, image- 1 (ii) it acts as a bridge, linking the genetic code on a messenger RNA (mRNA) molecule to the specific amino acids that build a protein.- 1 (iii) any two features of a genetic codon.- ½ + ½ **OR** (i) A is the DNA, B is the H1 histone linker, and C is the histone octamer. – ½ x 3 (ii) neatly labeled structure of a transcription unit.- 2 ½ (iii) dual functions of AUG codon. – ½ + ½	5

32	(i) *Agrobacterium tumefaciens* transforms plant cells into tumors by transferring a segment of its tumor-inducing (Ti) plasmid, called the T-DNA, into the plant cell's nucleus. The T-DNA contains genes that cause the plant cells to produce hormones that lead to uncontrolled cell division and to create opines, which are food for the bacteria. - 2 (ii) A DNA probe is a small, single-stranded piece of DNA or RNA- ½ that is labeled and used to detect the presence of a complementary nucleic acid sequence. ½ (iii) EcoRI acts on DNA by recognizing and binding to the specific palindromic sequence 5'-GAATTC-3'. It then cuts both strands of the DNA molecule between the G and A nucleotides, creating "sticky ends" that have a short, single-stranded overhang of 5'-AATT-3'. – 2 **OR** (i) A - Motor, B - Foam breaker, C - Flat bladed impeller, and D - Acid/base for pH control. – ½ x 4 (ii) β-Galactosidase is considered a better selectable marker because it allows for a simple, single-step visual screening method (blue-white screening) to identify recombinant colonies, which is much faster and less cumbersome than using antibiotic resistance markers that often require multiple antibiotic plates. This is achieved through insertional inactivation- 2 (iii) Thermus aquaticus- ½ , Thermo stable- ½	5
33	(i) exponential growth and logistic growth- ½ x 2 , Image- 2 (ii) any two special adaptations evolved in parasites.- ½ x 2 (iii) two species cannot coexist indefinitely if they occupy the exact same ecological niche and compete for the same limiting resources.-1 **OR** (i) The naturalist was **Alexander von Humboldt**. – ½ His key observation was that within a given region, species richness increases as the explored area increases, but only up to a certain limit. – 1 (ii) (i) 0.1 and 0.2,- small area (ii) 0.6 and 1.2 – large area like continent- ½ + ½ (iii) 'Z' – slope of the line- ½ (iv) David Tilman's experiment (2 points).- 1+1	5

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