COMMON PRE-BOARD EXAMINATION

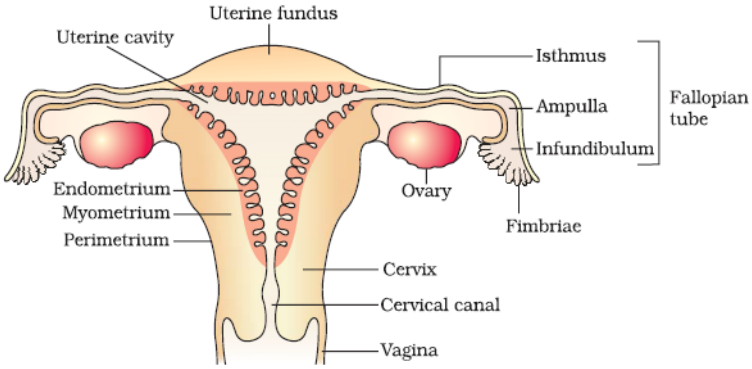
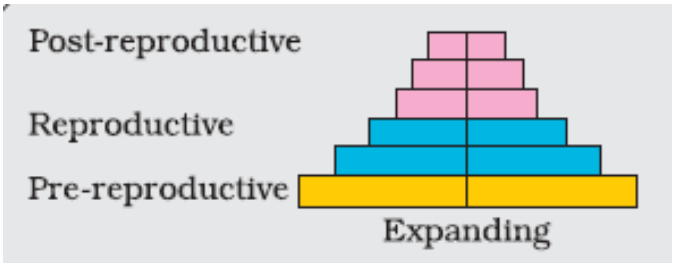
BIOLOGY–Code No. 044

CLASS-XII-(2025-26)

SET:2 MARKING SCHEME

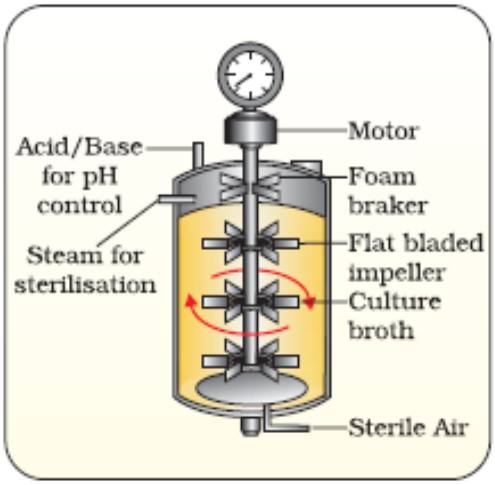
Time allowed: 3 Hrs. **Maximum Marks: 70**

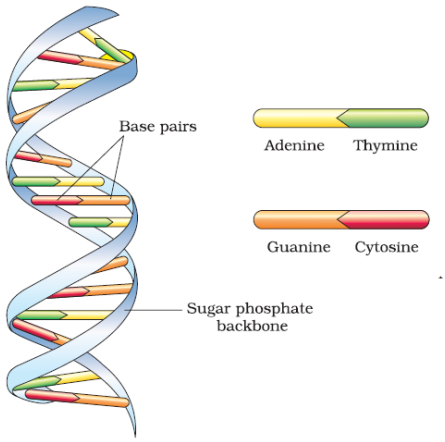
	SECTION A		
1	A. The plant is dioecious and bears only staminate flowers		1
2	D. water to land		1
3	B. they share a common ancestor		1
4	C. Emasculation		1
5	C. life can arise from non-living things only		1
6	A. Parthenocarpy		1
7	B. IgA type		1
8	B. A-iv, B-iii, C-i, D-ii		1
9	A. Nicotine		1
10	B. DNA dependent DNA polymerase catalyses polymerisation only in one direction (5' → 3')		1
11	C. Alkaline pH of gut		1
12	B. 5′ – U A C U U A C – 3′		1
	Assertion and Reason Type Questions		
13	C. Assertion is true but the Reason is false.		1
14	A. Both Assertion and Reason are true and the Reason is correct explanation of the Assertion.		1
15	C. Assertion is true but the Reason is false.		1
16	A. Both Assertion and Reason are true and the Reason is correct explanation of the Assertion.		1
	SECTION-B		
17	<table><tr><th>Drugs</th><th>*Medicinal Use*</th></tr><tr><td>Atropine</td><td>Dilating pupil of eye during eye test</td></tr><tr><td>Belladona</td><td>Diuretic and Antispasmodic</td></tr><tr><td>Morphine</td><td>Sedative and painkiller used during surgery</td></tr><tr><td>Barbiturates</td><td>Treating depression and insomnia</td></tr></table>	4x ½	2
18	In the absence of an antibiotic, both transformants and non-transformants will be produced. It would result in the production of poor-quality yield. The non-transformants might outgrow the transformants resulting in less product formation and wastage of nutrients and culture media.	1+1	2

19	Crop field and aquarium. The man-made ecosystem involves few organisms as compared to the natural ecosystem, which leads to lower productivity than natural ecosystem. In artificial ecosystem, the maintenance will be artificially done by regular feeding and cleaning while natural ecosystems are self-sustainable. Any one point	1 1	2
20	(a) 'A' transports aminacid Serine 'B' transports aminoacid tyrosine. (b) AUG acts as chain initiating codon and UAA, UAG, UGA act as chain terminating codons.	1+1	2
21	One a male gamete fuses with the female gamete, results in the formation of a zygote. The other male gamete fuses with the two polar nuclei located in the central cell and produce a triploid primary endosperm nucleus.	1+1	2
	SECTION-C		
22	Diagram-2, Labelling-1  **Figure 3.3 (b)** Diagrammatic sectional view of the female reproductive system	2+1	3
23	(a) If the age distribution (per cent individuals of a given age or age group) is plotted for the population the resulting structure is called the age pyramid (b) Planning of health / education / transport / infra-structure / finance / food / employment can depend on the age-pyramid analysis of a population / any other relevant point.  Diagram **OR** The pie-charts represent global biodiversity proportionate number of species of major taxa of invertebrates and vertebrates. A-Molluscs B-Insects C-Fishes D-Reptiles	2x1 1 1 4x ½	3

24	<table><tr><th>Drugs</th><th>Role</th></tr><tr><td>Cyclosporin A</td><td>Immuno-suppressive agent</td></tr><tr><td>Statins</td><td>Lowers blood cholesterol levels</td></tr><tr><td>Streptokinase</td><td>Clot buster for removing blood clots from the blood vessels of patients of myocardial infarction</td></tr></table>	3x1	3
25	In a population of diploid organisms If frequency of allele A = p and frequency of allele a = q = ½ Expected genotype frequency under random mating are AA = p^2 (for the AA homozygotes) = ½ aa = q^2 (for the aa homozygotes) = ½ Aa = 2pq (for the Aa heterozygotes) = ½ In absence of selection, mutation, genetic drift or other forces allelic frequency p and q are constant through generation Therefore p2 + 2pq +q2 = 1 = 1		3
26	(i) Condoms: They block the entry of sperms and microbes in the cervix. (ii) Surgical methods such as tubectomy or vasectomy as these are highly effective but irreversible methods. (iii) Oral pills containing progestogens or progestogen-estrogen combination are very effective and can be repeated as long as the female desires to prevent conception.	3x1	3
27	Autosomal Recessive Trait skips generations Any two reasons Males and females are equally affected Unaffected parents (carriers) can have affected children Carriers occur at heterozygous condition Sickle cell anemia, Cystic fibrosis, Phenylketonuria (PKU) Any two diseases	1 1 1	3
28	(a) Lac Operon (b) Lactose (c) Operator (d) The *z* gene codes for beta-galactosidase The *y* gene codes for permease The *a* gene encodes a transacetylase.	3x ½ 3x ½	3
	SECTION-D		
29	(a) Viruses having RNA as genetic material, HIV (b) Replication of viral RNA into viral DNA (c) New viruses are formed by the assembly of viral protein and RNA. Macrophages act as HIV factory. **OR**	½ + ½ 1 1+1	4

	The progeny viruses attack helper T-lymphocytes and decrease their number. Hence immunity is reduced. Enzyme Linked Immuno-Sorbent Assay (ELISA).	1+1	
30	(a) Autogamy is prevented by the flower shown in figure-(A) (b) Xenogamy or cross pollination occurs in figure-(B). It leads to recombination. (c) Pollen-pistil interaction is a dynamic process involving pollen recognition followed by promotion or inhibition of the pollen. If the pollen is of the right type, the pistil accepts the pollen and promotes post-pollination events. If the pollen is of the wrong type, the pistil rejects the pollen by preventing pollen germination on the stigma or the pollen tube growth in the style. **OR** Flowers with exposed anthers and stigma are called chasmogamous flowers. Autogamy: Autogamy is the transfer of pollen grains from anther to stigma of the same flower. Geitonogamy: Geitonogamy is the transfer of pollen grains from anther to stigma of different flowers of the same plant.	1 ½ + ½ 1 ½ ½ 1 1	4
	SECTION-E		
31	**(a) Commensalism:** Commensalism is an interaction between two species in which one species gets benefited while the other remains unaffected. An orchid growing on the branches of a mango tree and barnacles attached to the body of whales are examples of commensalisms. **(b) Parasitism:** One species is benefited while the other species is affected. E.g. Liver fluke Hence, the parasite is benefited as it derives nutrition from the host, while the host is affected as the parasite reduces the host fitness, making its body weak. **(c) Camouflage:** Camouflage is a natural phenomenon used by plants and animals to blend with their surroundings. E.g. Monarch butterfly mimics viceroy butterfly. **(d) Mutualism:** Both the species are benefited. E.g. Lichens **(e) Interspecific competition:** Both the species get affected. E.g. The competition between flamingoes and resident fishes in South American lakes for common food resources i.e., zooplankton. **OR** **Fragmentation** The breakdown of larger detritus into smaller particles by the detritivores (e.g., earthworm) is called fragmentation. **Leaching** The process by which water-soluble inorganic nutrients go down into the soil horizon and get precipitated as unavailable salts is called leaching. **Catabolism**	5x1 Definition ½ Example ½ 5x1	5

	The process by which bacterial and fungal enzymes degrade detritus into simpler inorganic substances is called as catabolism. **Humification** The process of accumulation of a dark coloured amorphous substance is called humification. Humus is highly resistant to microbial action and undergoes decomposition at an extremely slow rate. **Mineralization** The process by which humus is further degraded by some microbes and released into the soil as inorganic nutrients is known as mineralization.		
32	(a) PCR is used for early diagnosis of diseases. (b) *Thermus aquaticus* (c) Steps of PCR **A- Denaturation:** During denaturation, break-down of hydrogen bonds between DNA strands occur to unwind the DNA. **B - Annealing:** During this step and the primers or oligonucleotides are supplied to bind with the complementary nucleotides of the template strand. **C- Extension:** During this step extension of DNA is carried out using Taq Polymerase. **OR** ➢ Isolation of DNA ➢ Fragmentation of DNA by restriction endonucleases ➢ Isolation of a desired DNA fragment ➢ Ligation of the DNA fragment into a vector ➢ Transferring the recombinant DNA into the host ➢ Culturing the host cells in a medium at large scale and extraction of the desired product  	1 1 3x1 6x ½ =3 Diagram 2	5
33	(a) Alec Jeffreys (b) Suspect 3 is the culprit	1 1	

	(c) Steps involved in DNA fingerprint technology (i) Isolation of DNA. (ii) Digestion of DNA by restriction endonucleases. (iii) Separation of DNA fragments by electrophoresis. (iv) Transferring (Southern blotting) of separated DNA fragments to synthetic membranes, such as nitrocellulose or nylon. (v) Hybridisation using labelled VNTR probe. (vi) Detection of hybridised DNA fragments by autoradiography. **OR** A=T (Adenine pairs with Thymine) If A= 520 (Adenine containing nucleotides) A+T = 520+520 =1040 **Adenine = 520**, Thymine = 520 =1 Guanine pairs with Cytosine Therefore G+C = 2000-1040 = 960 G=C So, C=960/2 = 480 **Guanine = 480,** Cytosine 480 =1 Purines = A+G = 520+ 480 = 1000 Total number of purines = 1000 =1 Diagram =2  	6x ½ =3	5

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