COMMON PRE-BOARD EXAMINATION

BIOLOGY–Code No. 044

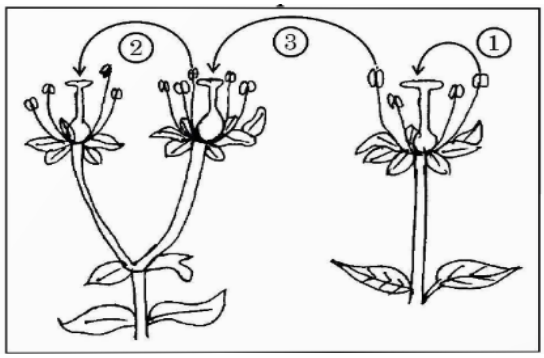
CLASS-XII-(2025-26)

SET: 1

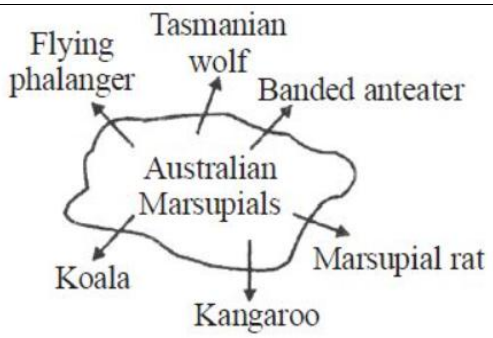
Time allowed: 3 Hrs. **Maximum Marks: 70**

General Instructions:

(i) **All questions are compulsory.**
(ii) **The question paper has five sections and 33 questions.**
(iii) **Section–A has 16 questions of 1 mark each; Section–B has 5 questions of 2 marks each; Section– C has 7 questions of 3 marks each; Section– D has 2 case-based questions of 4 marks each; and Section–E has 3 questions of 5 marks each.**
(iv) **There is no overall choice. Answer all 33 questions. However, internal choices have been provided in some questions. A student has to attempt only one of the alternatives in such questions.**
(v) **Wherever necessary, neat and properly labelled diagrams should be drawn.**

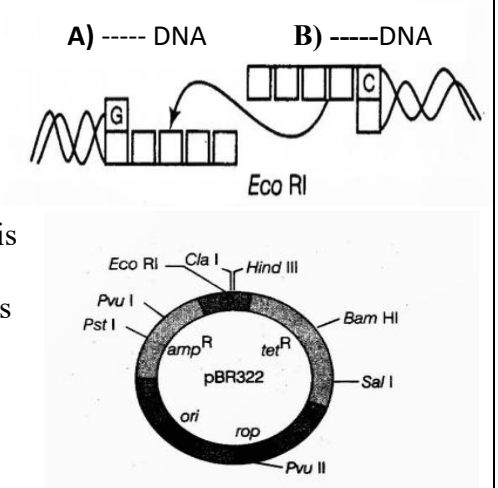
Q. No.	Section - A **Q. No. 1 to 12 are multiple choice questions. Only one of the choices is correct. Select and write the correct choice as well as the answer to these questions.**	Marks
1.	Name the type of enzyme used to treat bacterial cell to release DNA in recombinant technology A. chitinase B. cellulase C. lysozyme D. ribonuclease	**1**
2.	Choose the correct statement from the following. A. Type 1 pollination produces assured seed set even in the absence of pollinators as the flowers are cleistogamous. B. Type 3 pollination is genetically similar to autogamy.  C. Type 2 pollination is functionally cross pollination but genetically similar hence called Xenogamy. D. Type 3 pollination brings genetically different pollen grains to the stigma.	**1**

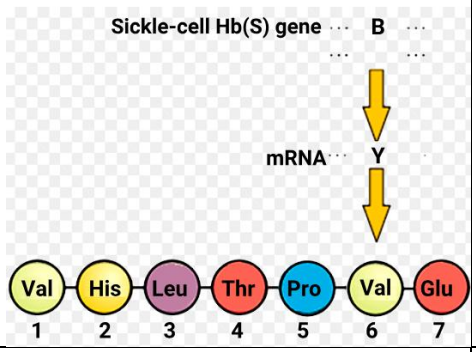
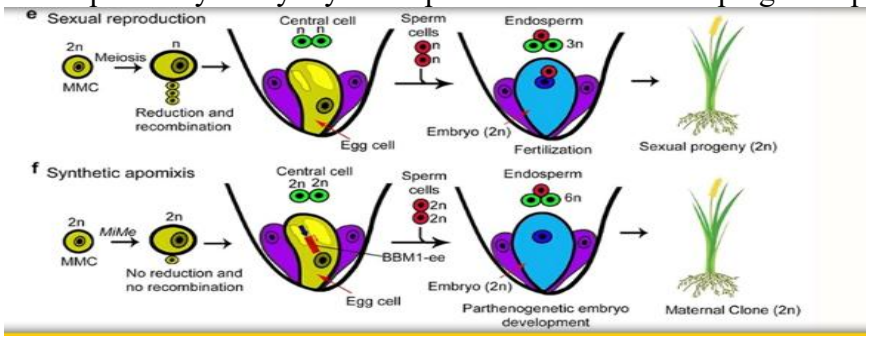
3.	A population is in genetic equilibrium/Hardy- Weinberg equilibrium for a gene with two alleles (dominant allele is 'A' and recessive alle 'a'). If the frequency of allele A is 0.6, then the frequency of genotype 'Aa' is A. 0.21 B. 0.42 C. 0.48 D. 0.32	**1**
4.	Match the items in column I with Column II and select the correctly matched option from those given below I: i Mendelian monohybrid; ii Mendelian dihybrid; iii Incomplete dominance; iv Test cross(monohybrid) II: p 1:2:1(F_2); q 1:1; r 3:1(F_2); s 9:3:3:1(F_2) A. i-q, ii-s, iii-p, iv-r B. i-r, ii-p, iii-s, iv-q C. i-r, ii-s, iii-p, iv-q D. i-q, ii-p, iii-s, iv-r	**1**
5.	Select the gene responsible for the production of insecticidal protein to kill corn borer A. cryIAc B. cryIIBc C. cryIIAc D. cryIAb	**1**
6.	In humans, the secondary oocyte completes meiotic division when A. it gets implanted in the uterine endometrium. B. it is released from the matured Graafian follicle. C. it is penetrated by the sperm cell D. acrosomal enzymes break down the zona pellucida.	**1**
7.	The promoter site and the terminator site for transcription are located at A. 3′ (downstream) end and 5′ (upstream) end, respectively of the transcription unit B. 5′ (upstream) end and 3′ (downstream) end, respectively of the transcription unit C. the 5′ (upstream) end of the transcription unit D. the 3′ (downstream) end of the transcription unit	**1**
8.	Given below is a list of steps Meselson and Stahl carried out in their experiment to prove that DNA replication is semi conservative. Select the option that gives the correct sequence of steps followed by them. (i) Bacteria transferred to a N^{14} medium and sampled every 20 minutes. (ii) All bacteria contain hybrid DNA (N^{14} DNA and N^{15} DNA. (iii) Bacteria grown in N^{15} medium for many generations. (iv) All bacteria contain N^{15} DNA. (v) Bacteria contain either all N^{14} DNA or all hybrid DNA. A. ii, iv, iii, i, v B. i, ii, v, iv, iii C. iii, iv, i, ii, v D. iv, iii, ii, v, i	**1**
9.	The functional megaspore of an angiosperm develops into A. Embryo B. Ovule C. Embryo sac D. Endosperm	**1**

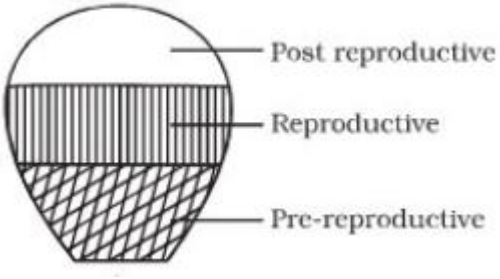
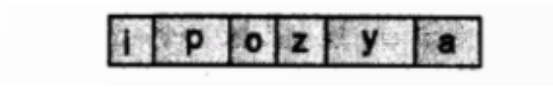
10.	The map distance between genes A and B is 3 units, between B and C is 10 units and between C and A is 7 units. The order of the genes in a linkage map constructed on the above data would perhaps be A. A, B, C B. A, C, B C. B, C, A D. B, A, C	**1**
11.	Observe the diagram and identify the type of evolution.  A. convergent evolution B. divergent evolution C. parallel evolution D. recapitulation	**1**
12.	Select the **incorrect** statement**.** A. Genetic modification has increased efficiency of mineral usage by plants. B. The main challenge for production of insulin using rDNA techniques was getting insulin assembled into a mature form. C. GEAC is Genetic Engineering Approval Company. D. In 1997, the first transgenic cow, Rosie, produced human protein enriched milk (2.4 grams per litre)	**1**
	Question No. 13 to 16 consist of two statements – Assertion (A) and Reason R. **Answer these questions selecting the appropriate option given below:** **A. Both A and R are true and R is the correct explanation of A.** **B. Both A and R are true and R is not the correct explanation of A.** **C. A is true but R is false.** **D. A is False but R is true.**	
13.	**Assertion (A):** Ground nut and sunflower seeds are examples for non-albuminous seeds. **Reason (R):** Non albuminous seeds have no residual endosperm.	**1**
14.	**Assertion (A):** The skull of baby chimpanzee is more like adult human skull than adult chimpanzee skull. **Reason (R):** Dryopithecus was man like primate.	**1**
15.	**Assertion (A):** Virus infected cells produce interferons. **Reason (R):** Interferons can cause inflammation of virus infected cells.	**1**
16.	**Assertion (A):** Transgenic animals are used to study the physiology and development of an organism. **Reason(R):** Transgenic animals are specifically designed to allow the study of normal functions of the body and development.	**1**
	Section – B	
17	**<u>Attempt either option A or B.</u>** A. Mention any four outbreeding devices developed by plants to prevent self pollination **OR** B. Draw the transverse section of a young anther and label the following parts. (i). Any two wall layers that perform the function of protection and help in the dehiscence of the anther	**2**

<table>
<tr><td></td><td>(ii). The inner nourishing layer.</td><td></td></tr>
<tr><td>18</td><td>A. (i) Write the initiating codon for translation, its anticodon and the amino acid it codes for.
(ii) Why does the adapter molecule need to be charged?</td><td>2</td></tr>
<tr><td>19</td><td>Draw the pyramids of biomass in a sea and in a forest. Explain, giving reasons, why the two pyramids are different.</td><td>2</td></tr>
<tr><td>20</td><td><u>Attempt either option A or B.</u>

A. Identify A, B, C and D in the given diagram

<table>
<tr><th>Scientific name of the plant</th><th>Drug</th><th>Effect on the human body/human system</th></tr>
<tr><td>(i) Papaver somniferum</td><td>A</td><td>Depressant</td></tr>
<tr><td>(ii) B</td><td>Cannabinoids</td><td>Stimulant</td></tr>
<tr><td>(iii) C</td><td>Cocaine</td><td>D</td></tr>
</table>
OR
B. Name and mention the events that occur in the cells when HIV gets into blood after gaining entry into human body.</td><td>2</td></tr>
<tr><td>21</td><td><u>Attempt either option A or B.</u>
A. (i) Label A and B.
(ii) Complete the palindrome recognized by the enzyme.
(iii) Which enzyme joins the DNA fragments.
OR
B. (i) Name the organism in which the vector shown is inserted to get the copies of the desired gene.
(ii)Identify and write the role of selectable markers in the vector shown.
 
</td><td>2</td></tr>
<tr><td></td><td>Section – C</td><td></td></tr>
<tr><td>22</td><td>(i) Mention the gonadotropins and explain their role in the process of spermatogenesis.
(ii) What is spermiation?</td><td>3</td></tr>
<tr><td>23</td><td>Alien species invasion has been a threat to biodiversity. Justify this statement with the help of one suitable example each from flora and fauna. List any other three causes responsible for biodiversity loss.</td><td>3</td></tr>
<tr><td>24</td><td>Explain the biochemical characterisation of transforming principle.</td><td>3</td></tr>
<tr><td>25</td><td>List any two bioactive molecules, source organisms and mention its uses.</td><td>3</td></tr>
<tr><td>26</td><td>(i)Suggest any two copper releasing IUDs. How do they act as effective contraceptive in human female?
(ii) Expand IUI.</td><td>3</td></tr>
<tr><td>27</td><td>Describe the three different ways by which natural selection can affect the frequency of a heritable trait in a population with a graphical representation.</td><td>3</td></tr>
</table>

28	Given below is the representation of a relevant part of amino acid composition of the β-chain of haemoglobin, related to the shape of human red blood cells. (i) Identify 'B' and 'Y' (ii) Why is the disease referred to as Mendelian disorder? Explain 	**3**
	Section – D	
29	Apomixis is a form of asexual reproduction in plants in which seeds are produced without fertilization, resulting in offspring that are genetic clones of the parent plant. Apomixis mimics sexual reproduction. There are several ways by which apomictic seeds can be developed. Polyembryony is the phenomenon of developing multiple embryos.  A. Give any two examples for flowering plant species that have evolved apomixis. (1) B. How can a plant develop multiple embryos? (2) **Attempt either subpart C or D** C. What are the advantages of using apomictic seeds in agriculture. (1) D. What is fruit production without fertilization called? (1)	**4**
30	It is often observed that the chances of a person suffering from measles in his or her lifetime are low if he or she has suffered from the disease during early childhood. The overall ability of the host to fight the disease-causing organisms, conferred by the immune system is called immunity. A. What is passive immunity? Give one example. (1) B. Justify the statement given in the passage related to measles. (2) **Attempt either subpart C or D** C. Which antibody is produced in our body during an allergic reaction? (1) D. What is an autoimmune disease? Give one example. (1)	**4**
	Section – E	
31	**Attempt either option A or B** A. (i)Mention the type of interaction seen in each of the following examples (a) Wasp pollinating fig inflorescence (b) Clown fish living among the tentacles of sea anemone	**5**

	(c) Disappearance of smaller barnacles when Balanus dominated in the coast of Scotland. (ii) Identify the type of age pyramid given in the figure. (iii) Explain Verhulst-pearl logistic growth curve with the help of diagrammatic representation. Write the equation.  **OR** B.(i) Which type of food chains are responsible for the flow of larger fraction of energy in an aquatic ecosystem and a terrestrial ecosystem, respectively. Mention any two differences between these two food chains. (ii) How do chemical nature and temperature influence the rate of decomposition?	
32	**<u>Attempt either option A or B</u>** A.(i) Name the technique used for separation of DNA fragments and mention the principle behind the separation of DNA fragments. (ii) Write the type of matrix used in this technique. (iii) How is the separated DNA visualised and extracted for use in recombinant DNA technology. **OR** B. (i) Name the process used for the amplification of gene of interest in Biotechnology invitro. (ii) Name the enzyme and its source used in this process. (iii) Explain the three steps involved in this process	**5**
33	**<u>Attempt either option A or B</u>** A. Given below is the schematic representation of Lac operon of E. coli. (i) Explain the functioning of this operon when lactose is provided in the growth medium of the bacteria.  **OR** B. (i) In which field of biotechnology is VNTR used? Mention its significance. (ii) Eukaryotes have a more complex transcription process compared to prokaryotes. Justify this statement by explaining the complexities involved in eukaryotic transcription.	**5**