

**MARKING SCHEME**  
**Senior Secondary School Compartment Examination TERM-II, 2022**  
**BIOLOGY (Subject Code — 044)**  
**[ Paper Code — 57/6/3 ]**

**Maximum Marks : 35**

Q. No.	EXPECTED ANSWER / VALUE POINTS	Marks
<b>SECTION – ‘A’</b>		
<b>1.</b>	(a) <ul style="list-style-type: none"> <li>• statins</li> <li>• blood cholesterol lowering agents</li> </ul> (b) <ul style="list-style-type: none"> <li>• cyclosporin A</li> <li>• immunosuppressive agent (in organ transplant patient)</li> </ul>	1/2 1/2 1/2 1/2 2
<b>2.</b>	<ul style="list-style-type: none"> <li>• Pneumonia</li> <li>• <i>Streptococcus pneumoniae</i> / <i>Haemophilus influenzae</i></li> <li>• <b>Symptoms</b> – fever, chills, cough, headache, in severe cases lips and fingers nails may turn grey to bluish in colour.</li> </ul> <p style="text-align: right;"><i>(any two)</i></p>	1/2 1/2 1/2+1/2 2
<b>3.</b>	<ul style="list-style-type: none"> <li>• Hibernation - during winter some animals (bears) go into hibernation to escape in time</li> <li>• Aestivation - some animals (snails and fishes) go into aestivation to avoid summer related problems heat and dessication.</li> <li>• Diapause - Zooplankton species in ponds and lakes enter diapause, a stage of suspended development.</li> </ul> <p style="text-align: right;"><i>(any two)</i></p> <p style="text-align: center;"><i>(Award half mark for term and half mark for explanation)</i></p>	1 × 2 2
<b>4.</b>	(a) <ul style="list-style-type: none"> <li>(i) A – cat</li> <li style="padding-left: 20px;">B – lizard</li> <li>(ii) ‘A’ (Regulator) can maintain homeostasis or constancy in body temperature, but only over a limited range of environmental conditions</li> <li>‘B’ (Conformer) changes its body temperature in accordance with the external temperature</li> <li>(as shown in the graph, range 35° – 45° C, beyond which they simply conform)</li> </ul> <p style="text-align: center;"><b>OR</b></p> (b)	1/2 1/2 1/2 1/2



	<p>(i) Exponential growth model / Geometric growth pattern</p> <p>(ii) 'r' – intrinsic rate of natural increase</p> <p>(iii) 'J' shaped curve</p> <p>(iv) Unlimited resources</p>	<p>1/2</p> <p>1/2</p> <p>1/2</p> <p>1/2</p>	2						
5.	<p>(a)</p> <ul style="list-style-type: none"> <li>• NACO – National AIDS Control Organisation</li> <li>• Transmission of HIV – sexual contact with infected person, by transfusion of contaminated blood and blood products, by sharing infected needles as in the case of intravenous drug abusers, from infected mother to her child through placenta</li> </ul> <p style="text-align: right;"><i>(any three)</i></p> <p>( 1/2 mark to be deducted if infected / contaminated not mentioned)</p> <p style="text-align: center;"><b>OR</b></p> <p>(b)</p> <ul style="list-style-type: none"> <li>• <i>Papaver somniferum</i></li> <li>• fruit / latex of poppy plant / inflorescence</li> <li>• acts as depressant / slows down body functions by binding to the opioid receptors present in the central nervous system and gastro intestinal tract.</li> </ul>	<p>1/2</p> <p>1/2 × 3</p>	<p>1</p> <p>2</p>						
6.	<p>(a) (A)</p> <p>(b)</p> <ul style="list-style-type: none"> <li>– In the aeration tanks the effluent is constantly agitated mechanically and air is pumped into it.</li> <li>– Vigorous growth of aerobic microbes into flocs (masses of bacteria associated with fungal filaments to form mesh like structures) takes place.</li> <li>– While growing these microbes consume the major part of the organic matter in the effluent thus decreasing / reducing BOD.</li> </ul>	<p>1/2</p> <p>1/2</p> <p>1/2</p> <p>1/2</p>	2						
<b>SECTION – 'B'</b>									
7.	<p>(a) • B lymphocytes produce an army of proteins called antibodies in response to pathogen.</p> <ul style="list-style-type: none"> <li>• T cells themselves do not secrete antibodies but help B cells to produce it.</li> </ul> <p>(b)</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">Primary Response</th> <th style="width: 50%;">Secondary Response</th> </tr> </thead> <tbody> <tr> <td>Response produced when our body encounters a pathogen for the first time.</td> <td>Subsequent encounter with the same pathogen</td> </tr> <tr> <td>Slow response / slow intensity</td> <td>Fast response / highly intensified</td> </tr> </tbody> </table>	Primary Response	Secondary Response	Response produced when our body encounters a pathogen for the first time.	Subsequent encounter with the same pathogen	Slow response / slow intensity	Fast response / highly intensified	<p>1</p> <p>1</p>	
Primary Response	Secondary Response								
Response produced when our body encounters a pathogen for the first time.	Subsequent encounter with the same pathogen								
Slow response / slow intensity	Fast response / highly intensified								



	Body does not have the memory of the encounter	Body has memory of the encounter.	$\frac{1}{2} + \frac{1}{2}$
	<i>(any two points of difference)</i>		3
8.	(a)	<ul style="list-style-type: none"> <li>• loss of habitat leads to loss of biodiversity and threatens the survival of plants and animals to extinction.</li> <li>• Mammals and birds requiring large territories and certain animals with migratory habits are badly affected due to fragmentation, leading to population decline.</li> </ul>	1
	b)	Many commercially important species are overharvested, <u>endangering</u> their existence which may lead to their <u>extinction</u> .	1
			3
9.	(a)	Normal ADA gene is inserted into patient's cell / tissue / embryo to treat a disease. It is done by isolation of lymphocytes from the blood of the patient and culturing of lymphocytes outside the body, introduction of functional ADA cDNA into lymphocyte using retroviral vector, modified lymphocytes are injected back to the patient, if gene isolated from marrow cells producing ADA is introduced into the cells at early embryonic stage, it is a permanent cure.	$\frac{1}{2}$
		<b>OR</b>	$\frac{1}{2} \times 5$
	(b)	<ul style="list-style-type: none"> <li>• <b>Insulin production in human body:</b> <ul style="list-style-type: none"> <li>– Synthesised naturally in the form of proinsulin consisting of polypeptide chain A and polypeptide chain B, linked together by disulphide bonds and an extra stretch called C-peptide</li> <li>– The C-peptide is removed during processing and proinsulin matures into functional insulin.</li> </ul> </li> <li>• <b>Insulin production by rDNA technology</b> <ul style="list-style-type: none"> <li>– Two DNA sequences corresponding to chain A and chain B of human insulin are synthesised</li> <li>– They are introduced into two different plasmids of E.coli</li> <li>– Chain A and chain B are produced separately,</li> <li>– extracted and combined by disulphide bond to form human insulin.</li> </ul> </li> </ul>	$\frac{1}{2} + \frac{1}{2}$
			$\frac{1}{2} \times 4$
			3
10.		<ul style="list-style-type: none"> <li>– <i>Bacillus thuringiensis</i> has Bt gene which produces insecticidal Bt toxin protein,</li> <li>– the Bt toxin gene is cloned from this bacteria and introduced in cotton plant where it is expressed,</li> <li>– in bacteria this protein exists in inactive protoxin form,</li> <li>– the inactive toxin when ingested by pest (cotton bollworm) it gets converted into active form due to alkaline pH of its gut,</li> </ul>	





	<ul style="list-style-type: none"> <li>– activated toxin binds to the mid gut wall of the insect and creates pores in the epithelium,</li> <li>– that causes swelling and lysis and eventually its death. In this way, Bt cotton plant is protected against cotton bollworm and the cotton yield increased.</li> </ul>	$\frac{1}{2} \times 6$ 3
11.	<ul style="list-style-type: none"> <li>• CT (Computed Tomography), MRI (Magnetic Resonance Imaging)</li> <li>• <b>Computed Tomography</b> – uses X-rays to generate a three dimensional image of the internals of an object. /</li> <li>• <b>MRI</b> – uses strong magnetic fields / non – ionising radiations to accurately detect the cancer in internal organs. <i>(explain any one technique)</i></li> </ul>	1 + 1  1  3
12.	(a) X – Insects Y – Molluscs  (b) • X – makes most species rich taxonomic group • more than 70% of the total	1 1 $\frac{1}{2}$ $\frac{1}{2}$ 3
<b>SECTION – ‘C’</b>		
13.	(a) i) <ul style="list-style-type: none"> <li>• <i>EcoRI</i></li> <li>• 5' – GAATTC – 3' 3' – CTTAAG – 5'</li> <li>• <i>EcoRI</i> cuts the DNA between bases G and A from 5' end of both DNA strands. / ↓ 5' GAATTC 3' 3' CTTAAG 5' ↑</li> </ul> <p style="text-align: center;"><i>(or any other correct example with relevant answer)</i></p> ii) <ul style="list-style-type: none"> <li>– DNA molecule being negatively charged moves towards the anode / positive electrode through a medium of agrose gel under an electric field.</li> <li>– DNA fragments separate according to their size / molecular weight (smaller the fragment size, the farther it moves)</li> </ul> <p style="text-align: center;"><b>OR</b></p> (b) i) <ul style="list-style-type: none"> <li>• When monkeys are treated with saline solution, serum cholesterol level increases from 24 hours to 264 hours.</li> <li>• When monkeys are treated with 2.5mg/kg SiRNAs, level of serum cholesterol decreases from 24 hours to 264 hours.</li> </ul>	1 1  1  1  1  1  1



	<p>ii)          using Agrobacterium vectors,          nematode specific genes are introduced into the host plant,          introduced DNA forms both sense and anti-sense RNA in the host cell,          these two RNAs being complementary to each other, form a double stranded RNA,          that initiates RNAi and thus silencing the specific mRNA of the nematode,          nematode is unable to survive in the transgenic plant.</p>	1/2 x 6
		5

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