MARKING SCHEME

Senior Secondary School Compartment Examination TERM–II, 2022

BIOLOGY (Subject Code — 044)

[Paper Code — 57/6/1]

Maximum Marks : 35

Q. No.	EXPECTED ANSWER / VALUE POINTS	Marks
	SECTION – 'A'	
1.	• Pneumonia • *Streptococcus pneumoniae / Haemophilus influenzae* • **Symptoms** – fever, chills, cough, headache, in severe cases lips and fingers nails may turn grey to bluish in colour. ***(any two)***	½ ½ ½+½ 2
2.	• *Anabaena / Nostoc / Oscillatoria* ***(or any other correct example)*** • fix atmospheric nitrogen, acts as biofertiliser, add organic matter to the soil, increases soil fertility, reduces dependence on chemical fertilisers, replenish the soil nutrients ***(any two)***	1 ½ + ½ 2
3.	(a) • NACO – National AIDS Control Organisation • 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 ***(any three)*** (½ mark to be deducted if infected / contaminated not mentioned) **OR** (b) • *Papaver somniferum* • fruit / latex of poppy plant / inflorescence • acts as depressant / slows down body functions by binding to the opioid receptors present in the central nervous system and gastrointestinal tract.	½ ½ × 3 ½ ½ 1 2
4.	(a) (A) (b) – In the aeration tanks the effluent is constantly agitated mechanically and air is pumped into it.	½ ½

*These answers are meant to be used by evaluators

	– Vigorous growth of aerobic microbes into flocs (masses of bacteria associated with fungal filaments to form mesh like structures) takes place. – While growing these microbes consume the major part of the organic matter in the effluent thus decreasing / reducing BOD.	½ ½ 2
5.	– *Ophyrs* employs sexual deceit (to get pollination done) – one petal of its flower (has uncanny) resemblance to the female bee in size / colour / markings – The male bee is attracted and 'pseudocopulates' with the female flower achieving pollination – When this same bee 'pseudocopulates' with another flower, it transfers pollen to it and pollinates the flower.	½ ½ ½ ½ 2
6.	(a) *(i)* A – cat B – lizard *(ii)* 'A' (Regulator) can maintain homeostasis or constancy in body temperature, but only over a limited range of environmental conditions 'B' (Conformer) changes its body temperature in accordance with the external temperature (as shown in the graph, range 35° – 45° C, beyond which they simply conform) **OR** (b) *(i)* Exponential growth model / Geometric growth pattern *(ii)* 'r' – intrinsic rate of natural increase *(iii)* 'J' shaped curve *(iv)* Unlimited resources	½ ½ ½ ½ ½ ½ ½ ½
		2
	SECTION – 'B'	
7.	• CT (Computed Tomography), MRI (Magnetic Resonance Imaging) • **Computed Tomography** – uses X-rays to generate a three dimensional image of the internals of an object. / **MRI** – uses strong magnetic fields / non – ionising radiations to accurately detect the cancer in internal organs. ***(explain any one technique)***	1 + 1 1 3
8.	(a) 'X' – Lymph nodes 'Y' – Thymus	½ ½

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	(b) • Lymph nodes (secondary lymphoid organ) – to trap the microorganisms or other antigens present in lymph or tissue fluid. • Thymus (primary lymphoid organ) – provide microenvironment for the development and maturation of T-lymphocytes.	1 1 3
9.	(a) Advantages: large volumes (100 – 1000 litres) of culture can be processed, foam control system can control foam formation, temperature can be controlled by temperature control system, pH control system, optimum growth conditions can be maintained, substrate / salt / vitamins can be periodically added, small volumes of cultures can be withdrawn periodically through sampling ports ***(any four)*** (b) Product has to be formulated with suitable preservatives, clinical trials are required in case of drugs, strict quality control testing of each product is required ***(any two)***	½ × 4 ½ × 2 3
10.	(a) X – Insects Y – Molluscs (b) • X – makes most species rich taxonomic group • more than 70% of the total	1 1 ½ ½ 3
11.	(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. **OR** (b) • **Insulin production in human body:** – 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 – The C-peptide is removed during processing and proinsulin matures into functional insulin. • **Insulin production by rDNA technology** – Two DNA sequences corresponding to chain A and chain B of human insulin are synthesised – They are introduced into two different plasmids of E.coli – Chain A and chain B are produced separately,	½ ½ × 5 ½ + ½

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	– extracted and combined by disulphide bond to form human insulin.	½ × 4 3
12.	(a) • loss of habitat leads to loss of biodiversity and threatens the survival of plants and animals to extinction. • Mammals and birds requiring large territories and certain animals with migratory habits are badly affected due to fragmentation, leading to population decline. b) Many commercially important species are overharvested, endangering their existence which may lead to their extinction.	1 1 1 3
	SECTION – 'C'	
13.	(a) i) • *EcoRI* • 5' – GAATTC – 3' 3' – CTTAAG – 5' • *EcoRI* cuts the DNA between bases G and A from 5' end of both DNA strands. / ↓ 5' GAATTC 3' 3' CTTAAG 5' ↑ ***(or any other correct example with relevant answer)*** ii) – DNA molecule being negatively charged moves towards the anode / positive electrode through a medium of agrose gel under an electric field. – DNA fragments separate according to their size / molecular weight (smaller the fragment size, the farther it moves) **OR** (b) i) • When monkeys are treated with saline solution, serum cholesterol level increases from 24 hours to 264 hours. • When monkeys are treated with 2.5mg/kg SiRNAs, level of serum cholesterol decreases from 24 hours to 264 hours. 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.	1 1 1 1 1 1 1 ½ x 6 5

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