SET - 1

SAHODAYA PRE BOARD EXAMINATION – 2024-25

CLASS – XII

Sub.: BIOLOGY (044)

MARKING SCHEME

Q.No.	SECTION – A (1 marks)			
1.	(c) Meiosis I Meiosis II Mitosis Mitosis Embryo	1		
	sac			
2.	(d) Progesterone level is high during the post ovulatory phase of menstrual cycle.	1		
3.	(b) 1/8 AaBbCc	1		
4.	(b) Smaller sub unit binds at codon AUG \rightarrow cognate tRNA binds to	1		
	codon \rightarrow larger sub unit binds to smaller sub unit.			
5.	(b) 0.6	1		
6.	(c) Naturally acquired passive immunity	1		
7.	(a) A-ii, B-iv, C-v, D-iii	1		
8.	(c) A-Competency, B-Calcium, C-microinjection method	1		
9.	(d) Using a retroviral vector nematode specific were introduced into gene the host plant.	1		
10.	(c) Our technology has allowed us to keep increasing K.	1		
11.	(b) Primary productivity depends on the plant species inhabiting a	1		
	particular area.			
12.	(c) for conservation of biodiversity and sustainable utilization of its	1		
	benefits			
13.	(b) Both Assertion and Reason are true but Reason is not the correct	1		
	explanation of Assertion.			
14.	(a) Both Assertion and Reason are true and Reason is the correct	1		
	explanation of Assertion.			
15.	(c) Assertion is true but Reason is false.	1		
16.	(c) Assertion is true but Reason is false.	1		
	SECTION – B (2 marks)			
17.	(a) Synergid embryo is haploid and nucellar embryo is diploid.	¹ / ₂ x 4		
	(b) (i) Dehydration (ii) Dormancy.			
18.	(i) Numbat (ii) Lemur (iii) Tasmanian tiger cat (iv) Wolf	½ x 4		
19.	(a) Saccharomyces cerevisiae - ethanol	½ x 4		
	(b) Monascus Purpureus - Statins			
20.	B-DNA polymerase	½ x 4		
	C- Plasmid			
	D- Restriction endonuclease			
	E- plasmid with sticky ends			
21.	If the rate of reproduction of phytoplanktons slows down then the net	½ x 4		

	primary productivity decrease. As a result, flow of energy will also			
	decrease in the successive trophic level. The following two factors cause reduction in phytoplankton reproduction:			
	(i) Less water availability (ii) Less nutrient availability. OR			
	• Nile perch introduced in Lake Victoria eventually led to the			
	extinction of an ecologically unique assemblage of more than 200 species of cichild fish.	1+1		
	• Parthenium/Lantana/water hyacinth caused environmental damage			
	and threat to our native species			
	• African catfish- <i>Clarias gariepinus</i> introduced for aquaculture			
	purposes is posing a threat to the indigenous catfishes in our rivers. (Any			
	SECTION C (3 marks)			
22	$\frac{\text{SECTION} - C (5 \text{ marks})}{(6) A Endognerm provides nourishment to the growing embryon$	1/ x 6		
22.	(a) A-Endosperin, provides nourisiment to the growing emoryo.	72 X O		
	(c) In 'E' seedcoat is covered by root can & coleorrhiza but in the bean			
	seed only by root cap.			
23.	Definition with example, quantitative-thalassemia qualitative-sickle cell	11/2		
	anemia.	$+1\frac{1}{2}$		
24.	(a)	2+1		
	Parents Vvaa VvAA Violet, Terminal × Violet, Axial			
	Gametes Va va vA			
	Violet, Axial Violet, Axia Violet, Axial Violet, Axial Violet, Axial Violet, Axial Vio			
	(b) Law of Independent Assortment: When two pairs of traits are			
	combined in a hybrid, segregation of one pair of characters is			
	independent of the other pair of character.			
25.	(a) A colony of bacteria (say A) growing in a given medium has built	2+1		
	in variation in terms of ability to utilise a feed component, a change in the			
	(see P) that can survive under the new conditions			
	In due course of time this variant population outgrows the others and			
	appears as new species thus organisms with shorter life-cycle or life-span			
	will undergo evolution faster / for the same thing to happen in fish or fowl			
	would take millions of years as life spans of these animals are in years.			
	(b) During industrialisation period in England, the lichens got wiped			
	out due to air pollution and tree trunks became dark due to industrial			
	smoke. So, that the dark coloured moths could camouflage in the dark			
	background without any risk of predation.			
	Thus, they escaped predation, survived and therefore increased in			
	population, whereas white winged moth did not survive due to predation			
	and industrial pollution.			

26.	(a) Bacteria & Fungi	$\frac{1}{2} + \frac{1}{2}$			
	(b) Here sample C has greatest BOD value hence it is most polluted. If we				
	correctly label the three samples, then sample A should be secondary				
	effluent discharged from a sewage treatment plant (20 mg/L), sample B	½ x 4			
	should be river water (8 mg/L) and sample C should be untreated sewage				
	water (400 mg/L)				
27.	(a) If denaturation of double-stranded DNA does not take place, then	1			
	primers will not be able to anneal to the template, no extension will take				
	place, hence no amplification will occur.				
	(b) (i) In selection of recombinants due to inactivation of antibiotics, the				
	transformed cells are first plated on the antibiotic plate which has not				
	been insertionally inactivated (i.e., ampicillin) and incubated overnight				
	for growth of transformants.				
	(ii) For selection of recombinants, these transformants are replica-				
	plated on second antibiotic (say, tetracycline) plate (which got inactivated				
	due to insertion of gene). Non-recombinants grow on both the plates (one				
	carrying ampicillin and the other carrying tetracycline) while				
	recombinants will grow only on ampicillin plate.				
	(iii) This entire exercise is laborious and takes more time (two				
	overnight incubation) as well. However, if we choose insertional				
	inactivation of a marker that produces colour in the presence of a				
	chromogenic compound, we can distinguish between the recombinants				
	and non-recombinants on a single medium plate (containing one				
	antibiotic and the chromogenic, compound) after overnight growth.				
28.	A.	½ x 6			
	(i) By measuring the size of a population, following can be predicted:				
	(a) Status of the population in a habitat.				
	(b) Outcome of competition with other species.				
	(c) Impact of predator or pesticides.				
	(d) Increase or decrease of population size.				
	(e) Effect of pesticide application (any four)				
	(ii) Example: Banyan tree and Parthenium plants.				
	When 1 banyan tree is compared with 100 Parthenium plants, the				
	population of banyan in terms of number is very much low as				
	compared to Parthenium. But in terms of percentage cover or				
	biomass, the banyan tree provides a much larger cover in				
	comparison to 100 Parthenium plants. Thus, the percentage cover				
	or biomass is a more meaningful measure of population size.				
	UK				
	D. (i) (a) They predators not as conduits for anounce transfer across transfer	14 - 2			
	(1) (a) They predators act as conduits for energy transfer across trophic	72 X J			
	(b) They keep prev populations under control				
	(c) They help in maintaining species diversity in a community by				
	reducing the intensity of competition among prev species				
	reducing the intensity of competition among prey species.				

	(ii) Definition & Example – Orchid Ophrys & its explanation.	¹ / ₂ x 3	
	SECTION – D (4 marks)		
29.	(a) Label - (A) GIFT, Label - (B) IUI, Label - (C) ICSI, Label - (D) AI	¹ / ₂ x 4	
	(b) IUT, Explain	$1/_2 + 1/_2$	
	OR		
	(c) GIFT, Explain	$\frac{1}{2} + \frac{1}{2}$	
	(d) Explain (any 2 causes)	$\frac{1}{2} + \frac{1}{2}$	
30.	(a) PCR, ELISA	$\frac{1}{2} + \frac{1}{2}$	
	(b) Using probe, explanation	$\frac{1}{2} \times 4$	
	OR		
	(c) ELISA, explanation, No	1/2 +1+1/2	
	(d) cystic fibrosis alzheimer's cancer, rheumatoid arthritis. (any two)	$\frac{1}{2} + \frac{1}{2}$	
	SECTION – E (5 marks)		
31.	А.	5	
	(i) Elevated level of luteinizing hormone (A) and consistently low level of		
	follicle stimulating hormone (D) disrupt the delicate balance essential for		
	a regular menstrual cycle. High LH can trigger premature or irregular		
	ovulation, affecting fertility and menstrual regularity. Concurrently, low		
	FSH levels hinder proper follicle growth, impacting egg quality and		
	release. These imbalances may often lead to irregular periods, and		
	difficulties in conception, necessitating medical assistance for diagnosis		
	and treatment.		
	(11) Implications of sustained high levels of progesterone (point C) during early pregnancy:		
	• Implantation support is facilitated by thickening of the uterine		
	• Prevents contractions by relayation of utering muscles preventing		
	nremature contractions that could lead to miscarriage		
	Embryo development by supporting early embryo development		
	ensuring a stable pregnancy.		
	These levels indicate a healthy luteal phase, ensuring the stability of the		
	pregnancy until the placenta takes over hormone production.		
	Maya's graph shows a favorable scenario for sustaining a potential		
	pregnancy.		
	OR		
	В.		
	(i) Self incompatibility is the phenomenon in which self pollens fail to	2	
	germinate on stigma of pistil. It is a gene physiological process in which		
	both pollen pistil have same gene so self pollination (autogamy) cannot		
	take place in self incompatible plants. Cross pollens on the other hand,		
	will not have common alleles with pistil and hence, cross pollination can		
	easily take place in such plants.		
	(ii) Hydrophilic pollination is commonly found in algae, bryophytes,		
	pteridophytes, and some angiosperms. The pollen grains of hydrophilic	2	

	flowers may have a mucilaginous covering that helps protect them from		
	getting wet and thus facilitates pollination in aquatic environments.		
	(iii) egg -200, Male gametes- $400 = total 600$	1	
32.	(a) A protein is coded for by 999 bases in RNA for every 333 amino	2	
	acids.	_	
	If the base at 901 places is removed, the first 900 bases will be		
	normal, but bases following the 901st base will be modified implying		
	that 99 bases will be altered.		
	Because 3 bases equal 1 codon, the cancellation of one base at 901		
	locations will modify 99 bases = 33 codons.		
	(b)		
	A T G C A T G C A T A C $3' \leftarrow$ Promoter $5' \leftarrow$ Promoter $3' \leftarrow$	1	
	(c) Act as catalyst releasing factor - binds to stop codon – stop		
	translation.	$\frac{1}{2} + \frac{1}{2}$	
	(d) Refer to NCERT – fig 5.12 (ser(AGU), anticodon – UCA) OR	1	
	(a)	¹ /2 v /	
	(i) 2000bp per second, 18 mins	/2 А Т	
	(ii) act as substrate, provide energy		
	(b) Further polymerisation up to the end would not occur as the 3-OH on	1	
	sugar molecule is not for forming ester bond, which is required to add		
	another nucleotide.	1	
	(c) 0 : 1 : 31		
	(d) If histone proteins were rich in acidic amino acids instead of basic	1	
	amino acids then they may not have any role in DNA packaging in	1	
	eukaryotes as DNA is also negatively charged molecule. The packaging		
	of DNA around the nucleosome would not happen. Consequently, the		
	chromatin fibre would not be formed.		
33.	(a) (i) Retrovirus has RNA as the genetic material. RNA does not have	1 + 1	
	the ability to replicate. Therefore, reverse transcriptase converts it		
	to DNA first and then replicates using host machinery.		
	(ii) In step 7 the viral DNA becomes the part of host DNA for		
	multiplication and expression In step 8 the new viral RNA is produced		
	multiplication and expression. In step 8, the new viral KNA is produced by the infected cell		
	(b) All humans have cellular oncogenes or proto-oncogenes, but only a		
	few suffer from cancer because cancer only occurs on activation of	11/2	
	oncogenes. This activation is induced by carcinogens which can be		
	physical, chemical or biological.		
	(c) Allergy, Histamine, Serotonin.	11/2	
	OR		

(a)	Tobacco has nicotine that stimulates the release of adrenaline and	
	non adrenaline which raise blood pressure. Smoking tobacco	2
	releases carbon monoxide which reduces the concentration of	
	haem-bound oxygen. This causes emphysema.	
(b)	Plant source of 'smack' is Papaver somniferum or poppy.	11/2
	Smack is a depressant and slows down body functions.	
(c)	Tetanus is caused by a microbe which has a deadly and fast	
	action. Action of vaccine is slow and this delay may become fatal.	11/2
	Therefore, antitoxins are administered which neutralise the effect	
	of the bacterial toxin.	