



ISLAMIAH MAT HR SEC SCHOOL,
KILAKARAI, RAMANATHAPURAM DT.

XII COMMON PUBLIC EXAMINATION, MARCH -2023 (27-03-2023)

TENTATIVE ANSWER KEY
Question type B

SUB: BIO - ZOOLOGY
MARKS: 35

Q.NO	CONTENT	MARKS	MODE OF QUESTION
PART - I			
I.	CHOOSE THE CORRECT ANSWER	8 X 1 = 8	BOOK BACK / BOOK INSIDE/ CREATIVE
1	b. Progesterone and estrogen	1	BOOK INSIDE
2	a. Amphibians	1	BOOK BACK
3	c. Fungi	1	BOOK BACK
4	d. IgA	1	BOOK BACK
5	d. 13 - Trisomy	1	BOOK BACK
6	d. Exogenous budding	1	BOOK INSIDE
7	d. Lipase	1	BOOK INSIDE
8	d. antiviral substances	1	BOOK INSIDE
Q.NO	CONTENT	MARKS	MODE OF QUESTION
PART - II			
II.	ANSWER ANY SIX OF THE FOLLOWING QUESTION NUMBER 19 IS COMPULSORY	4 X 2 = 8	BOOK BACK / BOOK INSIDE/ CREATIVE
09	THREE LAYERS OF UTERINE WALL : The wall of the uterus has three layers of tissues. The outermost thin membranous serous layer called the perimetrium, the middle thick muscular layer called myometrium and the inner glandular layer called endometrium. The endometrium undergoes cyclic changes during the menstrua	2	BOOK INSIDE

	cycle while myometrium exhibits strong contractions during parturition.		
10	UAA, UAG and UGA codons are designated as termination codons and also are known as non – sense codons	2	BOOK INSIDE
11	Divergent evolution. Structures which are similar in origin but perform different functions are called homologous structures that bring about divergent evolution. Similarly the thorn of Bougainvillea and the tendrils of Curcubita and Pisum sativum represent homology. Convergent evolution Organisms having different structural patterns but similar functions are termed as analogous structures. For example, the wings of birds and insects are different structurally but perform the same function of flight that brings about convergent evolution.	2	BOOK INSIDE
12	Viral diseases: Common cold, Mumps, Measles, Viral hepatitis, Chicken pox, Poliomyelitis, Dengue fever (Break bone fever) and Chikungunya (ANY FOUR)	2	BOOK INSIDE
13	THE EXPANSION OF CFC - CHLOROFLUOROCARBONS PAN - PEROXYACETYL NITRATE	2	BOOK BACK
14	Stenotherm: Those organisms which can tolerate only a narrow range of temperature are Stenotherms (Fish, Frogs, Lizards and Snakes).	2	BOOK INSIDE
III	PART -III ANSWER ANY SIX OF THE FOLLOWING QUESTION NUMBER 33 IS COMPULSORY	6 X 3= 18	BOOK BACK / BOOK INSIDE/ CREATIVE
15	Regeneration is regrowth in the injured region. Regeneration was first studied in Hydra by Abraham Trembley in e.g. star fish, tail of wall lizard. Regeneration is of two types, morphallaxis and epimorphosis. In morphallaxis the whole body grows from a small fragment e.g. Hydra and Planaria	2	BOOK INSIDE
16	Applications of Karyotyping: <ul style="list-style-type: none"> • It helps in gender identification. • It is used to detect the chromosomal aberrations like deletion, duplication, translocation, nondisjunction of chromosomes. • It helps to identify the abnormalities of chromosomes like aneuploidy. • It is also used in predicting the evolutionary relationships between species. • Genetic diseases in human beings can be detected by this 	2	BOOK INSIDE

	technique. (ANY THREE)		
17	Single cell protein (SCP) Single cell protein refers to edible unicellular microorganisms like Spirulina. Protein extracts from pure or mixed cultures of algae, yeasts, fungi or bacteria may be used as an ingredient or as a substitute for protein rich foods and is suitable for human consumption or as animal feed.	2	BOOK INSIDE

18	Conservation		3	BOOK INSIDE
	Insitu Conservation	Exsitu Conservation		
	It is the on-site conservation or the conservation of genetic resources in natural populations of plant or animal species.	This is a conservation strategy which involves placing of threatened animals and plants in special care locations for their protection.		
	It is the process of protecting an endangered plant or animal species in its natural habitat, either by protecting or restoring the habitat itself, or by defending the species from predators.	It helps in recovering populations or preventing their extinction under simulated conditions that closely resemble their natural habitats.		
	National Parks, Biosphere Reserve, Wild Life Sanctuaries form insitu conservation strategies.	Zoological parks and Botanical gardens are common exsitu conservation programs.		
19	Adult stem cells are found in various tissues of children as well as adults. An adult stem cell or somatic stem cell can divide and create another cell similar to it. Most of the adult stem cells are multipotent and can act as a repair system of the body, replenishing adult tissues. The red bone marrow is a rich source of adult stem cells.	3	CREATIVE	

Q.NO	CONTENT	MARKS	MODE OF QUESTION
	PART –IV		
IV.	ANSWER ALL THE QUESTION	2 X 5 = 10	BOOK BACK / BOOK INSIDE CREATIVE

20 (a) **Structure of human spermatozoan** The human sperm is microscopic, flagellated and motile gamete . The whole body of sperm is enveloped by plasma membrane and is composed of a head, neck and a tail. The head comprises of two parts namely acrosome and nucleus. Acrosome is a small cap like pointed structure present at the tip of the nucleus and is formed mainly from the Golgi body of spermatid. It contains hyaluronidase, a proteolytic enzyme, popularly known as sperm lysin which helps to penetrate the ovum during fertilisation. The nucleus is flat and oval. The neck is very short and is present between the head and the middle piece. It contains a proximal centriole towards the nucleus which plays a role in the division of the zygote and the distal centriole gives rise to the axonemal filament of the sperm.

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BOOK INSIDE

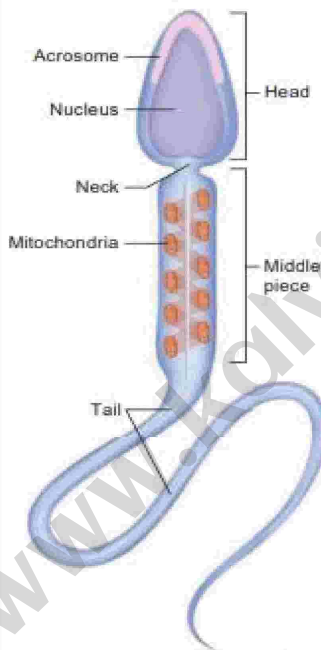


Fig. 2.7 Structure of human sperm

The middle piece possesses mitochondria spirally twisted around axial filament called mitochondrial spiral or nebenkern. It produces energy in the form of ATP molecules for the movement of sperms. tail is the longest part of the sperm and is slender and tapering. It is formed of a central axial filament or axoneme and an outer protoplasmic sheath. The lashing movements of the tail push the sperm forward. The human male ejaculates about 200 to 300 million sperms during coitus. It is estimated that around 60 percent of sperms must have normal shape of which at least 40 per cent must show vigorous motility for normal fertility

20 (b)

Antibodies are immunoglobulin (Ig) protein molecules synthesized on exposure to antigen that can combine specifically with the antigen. Whenever pathogens enter our body, the B-lymphocytes produce an army of proteins called antibodies to fight with them. Thus, they are secreted in response to an antigen (Ag) by the effect of B cells called plasma cells. The antibodies are classified into five major categories, based on their physiological and biochemical properties. They are IgG (gamma), IgM (mu), IgA (alpha), IgD (delta) and IgE (epsilon).

5

BOOK BACK

In the 1950s, experiments by Porter and Edelman revealed the basic structure of the immunoglobulin. An antibody molecule is a Y shaped structure that comprises of four polypeptide chains, two identical light chains (L) of molecular weight 25,000 Da (approximately 214 amino acids) and two identical heavy chains (H) of molecular weight 50,000 Da (approximately 450 amino acids). The polypeptide chains are linked together by disulphide (S-S) bonds. One light chain is attached to each heavy chain and two heavy chains are attached to each other to form a Y shaped (Fig. 8.7) structure. Hence, an antibody is represented by H₂L₂. The heavy chains have a flexible hinge region at their approximate middles. Antigen binds.

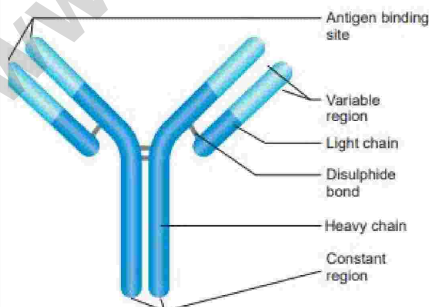


Fig. 8.7 Structure of immunoglobulin

Each chain (L and H) has two terminals. They are C-terminal (Carboxyl) and amino or N-terminal. Each chain (L and H) has two

regions. They have variable (V) region at one end and a much larger constant (C) region at the other end. Antibodies responding to different antigens have very different (V) regions but their (C) regions are the same in all antibodies. In each arm of the monomer antibody, the (V) regions of the heavy and light chains combines to form an antigen – binding site shaped to ‘fit’ a specific antigenic determinant. Consequently each antibody monomer has two such antigen – binding regions. The (C) regions that forms the stem of the antibody monomer determine the antibody class and serve common functions in all antibodies. The functions of immunoglobulin are agglutination, precipitation, opsonisation, neutralization etc.

21 (a) **tRNA – the adapter molecule**

The transfer RNA, (tRNA) molecule of a cell acts as a vehicle that pick up the amino acids scattered through the cytoplasm and also reads specific codes of mRNA molecules. Hence it is called an adapter molecule. This term was postulated by Francis Crick. The two dimensional clover leaf model of tRNA was proposed by Robert Holley. The secondary structure of tRNA depicted in Fig. 5.11 looks a clover leaf. In actual structure, the tRNA is a compact molecule which looks like an inverted L. The clover leaf model of tRNA shows the presence of three arms namely DHU arm, middle arm and TΨC arm. These arms have loops such as amino acyl binding loop, anticodon loop and ribosomal binding loop at their ends.

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BOOK INSIDE

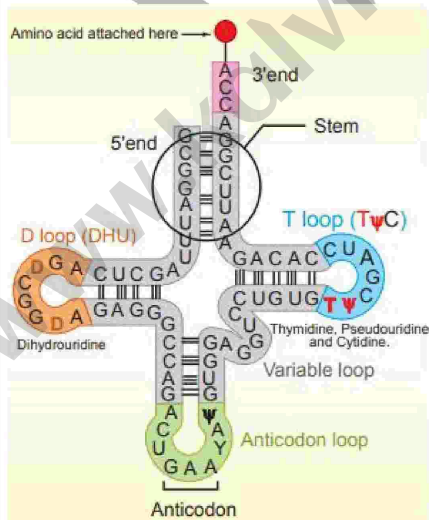


Fig. 5.11 Holley's two-dimensional clover leaf model of transfer RNA

	<p>In addition it also shows a small lump called Variable loop or extra arm.</p> <p>The amino acid is attached to one end (amino acid acceptor end) and the other end consists of three anticodon nucleotides. The anticodon pairs with a codon in mRNA ensuring that the correct amino acid is incorporated into the growing polypeptide chain. Four different regions of double-stranded RNA are formed during the folding process. Modified bases are especially common in tRNA. Wobbling between anticodon and codon allows some tRNA molecules to read more than one codon.</p>		
20 (b)	<p>Causes of biodiversity loss The major causes for biodiversity decline are:</p> <ul style="list-style-type: none"> • Habitat loss, fragmentation and destruction (affects about 73% of species) • Pollution and pollutants (smog, pesticides, herbicides, oil slicks, GHGs) • Climate change • Introduction of alien/exotic species • Over exploitation of resources (poaching, indiscriminate cutting of trees, over fishing, hunting, mining) • Intensive agriculture and aquacultural practices • Hybridization between native and nonnative species and loss of native species • Natural disasters (Tsunami, forest fire, earth quake, volcanoes) • Industrialization, Urbanization, infrastructure development, Transport – Road and Shipping activity, communication towers, dam construction, unregulated tourism and monoculture are common causes of specific threats • Co-extinction (ANY FIVE) 	5	BOOK BACK

E. VINOTH KUMAR., M.Sc., M.Sc., B.Ed.,
PGT IN ZOOLOGY,
ISLAMIAH MAT HR SEC SCHOOL,
KILAKARAI, RAMANATHAPURAM DT.,
7639082621

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