

Studentpad

ZOOLOGY FULL PORTION PAPER 2022-23

Time : 150 Min

Zoology : Full Portion Paper

Marks : 200

Hints and Solutions

01) Ans: **B)** The portion of myofibril between two successive 'Z' line.

Sol: The sarcomere comprises A-b and half of each adjacent I-band. Sarcomere is the functional unit of myofibril.

02) Ans: **A)** a-45 to 50, b-1/5th

Sol: Nearly 45 to 50 million MTPs are performed in a year all over the world that accounts to 1/5th of the total number of conceived pregnancies in a year.

03) Ans: **B)** Fish

Sol: Sea horse or hippo campus is a fish.

04) Ans: **B)** Ammonia, urea

Sol: Ammonia is an extremely toxic compound and its accumulation in body, that can be fatal.

So, it needs to be converted into a less toxic substance known as urea, which is then excreted out of the body in the form of urine. The production of urea from ammonia through a cycle of biochemical reactions is called urea cycle, which primarily takes place in liver of mammals.

05) Ans: **A)** epiphyseal plates close after adolescence

Sol: Hypersecretion of growth hormone in adults does not cause further increase in height, due to epiphyseal plates close after adolescence. Epiphyseal plate is a hyaline cartilage plate in the metaphysis at each end of long bone and it is part of long bone where new bone growth takes place. In adults, elevated levels of GH results in acromegaly where no increase in height occurs due to ossified epiphyseal plate.

06) Ans: **C)** endodermal

Sol: Endoderm, mesoderm and ectoderm are the three germ layers formed during embryogeny which produces all the tissues and organs of the body. Internal lining of alimentary canal, pancreas, liver, lungs, trachea, thyroid, parathyroid, thymus, urinary bladder, middle part of ear, greater part of prostate, reproductive glands etc. are formed from the endoderm.

07) Ans: **A)** cancer of epithelial cells

08) Ans: **D)** cell mediated immunity

09) Ans: **C)** Workers in grinding and stone-breaking industries may suffer, from lung fibrosis.
Sol: In specific industries, especially those involving grinding or stone breaking so much dust is produced that the defense mechanism of the

body cannot fully defended with the situation. Long exposure can give rise to inflammation leading to fibrosis (proliferation of fibrous tissues) and thus causing serious lung damage. Workers in such industries should wear protective masks.

10) Ans: **D)** STH

Sol: Acromegaly characterized by abnormal elongation of limbs and lower jaw, giving gorilla like appearance and kyphosis protruding bony ridge over the eyes which occurs because of over secretion of STH in adult.

11) Ans: **D)** shortening of sperm

Sol: Spermatogenesis initiates the formation of four haploid spermatids from each spermatogonium (diploid). Spermatid is non-motile, become functional, motile male gamete, i.e., spermatozoan, it has to undergo spermiogenesis. It includes changes like distinguishing of centrioles into proximal and distal, spiral coiling of mitochondria, formation of axial filament by distal centriole and formation of acrosome from Golgi complex, etc.

12) Ans: **D)** Can replicate independently

Sol: Plasmid is an extra chromosomal circular DNA molecule that replicates independently in the host chromosome.

13) Ans: **A)** Rh antibodies

Sol: In erythroblastosis fetalis, the antibodies in the blood stream of the mother, pass through the placenta and cause damage to the red cells of the foetus.

14) Ans: **B)** Both Statement 1 and Statement 2 are true and the Statement 2 is correct explanation of the Statement 1

Sol: Salivary glands of leeches secrete an anticoagulant called hirudin. It prevents clotting of blood while the leech is taking its meal, thus ensuring a continuous supply of blood.

15) Ans: **B)** Both Statement 1 and Statement 2 are true and the Statement 2 is correct explanation of the Statement 1

Sol: Alcohol is absorbed from mucous membranes of mouth, oesophagus, small intestine and large intestine. As alcohol absorbed directly by the alimentary canal, there is no need of digestion with in the body.

16) Ans: **C)** the adrenal medulla, leading to increased secretion of epinephrine and norepinephrine

Sol: Fight -or - flight reactions cause activation of

the adrenal medulla, leading to increased secretion of epinephrine and norepinephrine. The adrenal medulla secretes two hormones known as adrenaline or epinephrine and noradrenaline or norepinephrine. These are commonly called as catecholamines. Adrenaline and noradrenaline are rapidly secreted in response to stress of any kind and during emergency situations and are called emergency hormones or hormones of Fight or Flight and these hormones increase alertness, pupillary dilation, piloerection (raising of hairs), sweating etc. Both are hormones increase the rate of heart beat, the strength of heart contraction and the rate of respiration. In addition, they also stimulate the breakdown of lipids and proteins.

17) Ans: A) They carry about 20-25 per cent of CO_2

Sol: Blood is the transport medium of O_2 and CO_2 . About 97% of O_2 is transported by RBCs in the blood and the remaining 3% of O_2 is carried in a dissolved state through the plasma. Nearly 20-25% of CO_2 is transported by RBCs whereas 70% of it is carried as bicarbonate. About 7% of CO_2 is carried in dissolved state through plasma.

18) Ans: B) uricotelic

Sol: The phenomenon of excretion of uric acid is called as uricotelism and animals which excrete their nitrogenous wastes mainly in the form of uric acid are called as uricotelic animals. Uricotelic animals include most insects (e.g., cockroach), some land crustaceans (e.g. Oniscus commonly known as "wood louse"), land snails, land reptiles (e.g., lizards and snakes) and birds.

19) Ans: B) A-(ii) B-(iv) C-(i) D -(iii)

Sol: (c) A-(ii) B-(iv) C-(i) D -(iii)

20) Ans: B) Plasma to RBCs

Sol: During the internal respiration, the carbon dioxide in gaseous form diffuses out of the cells into the capillaries. The largest fraction of CO_2 is converted to bicarbonate ions (HCO_3^-) in the RBCs and these ions are quite diffusible, so, they diffuse from RBCs into the plasma. To maintain ionic balance chloride (Cl^-) ions move from the plasma into the RBCs. The ionic exchange is known as chloride shift.

21) Ans: A) A plasmids that can transfer foreign DNA into a living cell

Sol: Vector is a DNA molecule that act as a carrier for a foreign DNA segment and replicates inside a host cell. The vector DNA and foreign DNA carrying gene of interest are cut using the same restriction endonuclease enzyme to produce complementary sticky ends and with the help of DNA ligase enzyme, the complementary sticky ends of the two DNAs are joined to produce a recombinant DNA, which is then introduced into the host cell.

22) Ans: C) The diet contains much more proteins so liver has to do more work

23) Ans: D) a-8th sternum, b-anal cercus, c-10th tergum d-anal

24) Ans: D) Proventriculus

Sol: Proventriculus is not a sensory structures in cockroach. Antennae perceive touch as they have tactile sensillae and smell as they have olfactory sensillae. Eyes are organs of sight. Anal cerci bear auditory sensillae or the sensillae for hearing. Maxillary palps have gustatory (taste receiving) and olfactory (smell receiving) sensillae. So all of these are sense organs.

Proventriculus is gizzard. It is thick walled and has six teeth which are used for grinding of food.

25) Ans: B) Muscle fibres

Sol: The plasma membrane covering the muscle fibre is known as sarcolemma.

26) Ans: A) tetany

Sol: Low Ca^{++} in the body fluid may be the cause of tetany disease. Tetany is a spasm and twitching of the muscles, particularly those of the face, hands, and feet. It is usually caused by a reduction in the blood calcium level, which may be because of underactive parathyroid glands (hypoparathyroidism).

27) Ans: D) Regulation of body temperature

Sol: Hypothalamus present at the base of the thalamus. It provides anatomical connection between the nervous and endocrine systems by its relationship to the pituitary gland. Hypothalamus is thermoregulatory centre. So, it is called "thermostat" of the body. It keeps body temperature at roughly 37°C by means of a complex thermostat system. Any localised injury to hypothalamus will, so, disrupt regulation of body temperature.

28) Ans: C) Gonorrhoea

Sol: Neisseria gonorrhoeae bacteria causes gonorrhoea. It spreads through sexual contact, common toilets and under-clothes. Both male and female genitals are affected by gonorrhoea. The bacterium lives in genital tubes, produces pus-containing discharge, pain around genitalia and burning sensation during urination. It damages the eyes of babies born of infected mothers.

29) Ans: C) The inactive protein gets converted into active form in the insect gut.

Sol: The Bt proteins present as inactive protoxins but once an insect ingests the inactive toxin, it is converted into an active form of toxin because of the alkaline pH of the alimentary canal (gut) that solubilises the crystals and the activated toxin binds to the surface of midgut epithelial cells and creates pores which cause cell swelling and lysis

and finally cause death of the insect.

30) Ans: A) Sympathetic

Sol: Sympathetic nervous system increases defence system of body against adverse conditions which is active in stress condition like pain fear and anger.

31) Ans: D) Macula lutea

Sol: A small oval, yellowish area of the retina lying exactly opposite the centre of the cornea is named as the macula lutea or yellow spot that has at its middle a shallow depression.

32) Ans: C) a specific part of DNA from the Ti plasmid gets integrated with the plant chromosome

Sol: Ti plasmid from the *Agrobacterium tumefaciens* is effectively used as vector for gene transfer to plant cells. The part of Ti plasmid transferred into plant cell DNA, is known as the T-DNA. This T-DNA with desired DNA spliced into it, is inserted into the chromosomes of the host plant where it produces copies of itself, by migrating from one chromosomal position to another at random. Such plant cells are then cultured, induced to multiply and differentiate to form plantlets and transferred into soil, the plantlets grow into mature plants, carrying the foreign gene, expressed throughout the new plant.

33) Ans: B) Podocyte

Sol: The inner lining of the kidney has podocyte, which are a layer of specialized epithelial cells in Bowman's capsule of kidney with major foot like processes, each supporting a series of minor processes. These minor processes are interwoven with those from other podocytes to form a number of slits, through which filtration can occur and these slits (approximately 0.1 mm wide) permit the passage of all plasma constituents but act as a barrier to blood cells.

34) Ans: A) Both Statement 1 and Statement 2 are true but Statement 2 is not the correct explanation of Statement 1

Sol: The theory of natural selection suggests that phenotypes adapted to the environmental conditions are selected for whereas non-adapted phenotypes are selected against and eventually eliminated. The fate of an individual organism is relatively insignificant in the history of a species. The long term effects of natural selection are at the level of the gene and the population rather than the individual because members of population can interbreed, exchange genes thereby pass on genes to the next generation and there is therefore a flow of genes between members of a population.

35) Ans: D) Reporter

36) Ans: A) LNG-20

Sol: LNG -20 is the hormone releasing IUD. Multiload 375 and Cu7 are copper releasing IUDs and Lippes loop is a non- medicated IUD.

37) Ans: D) 5 vertebrae

Sol: Our vertebral column is made up of 26 serially arranged units known as vertebrae and is dorsally placed. It extends from the base of the skull and constitutes the main framework of the trunk. The vertebral column is differentiated into cervical (7), thoracic (12), lumbar (5), sacral (1-fused) and coccygeal (1-fused) regions starting from the skull.

38) Ans: D) Mucosa

Sol: Mucosa layer lining the lumen of the human alimentary canal. The wall of alimentary canal comprises of four basic layers. From the outer surface inwards to the lumen, the layers are -visceral peritoneum (serosa), muscularis (muscular coat), submucosa and mucosa (mucous membrane). Mucosa is the innermost layer lining the lumen of the alimentary canal and it is so named due to it secretes mucus to lubricate the inner lining of the gut. It is further composed of three layers- muscularis mucosa, lamina propria and epithelium.

39) Ans: B) Gliding joint - Between zygapophyses of the successive vertebrae

Sol: Articular ends of both bones are either flat or slightly curved to allow gliding or sliding movements as between zygapophysis of vertebrae.

40) Ans: C) Cardiac

Sol: Because of long refractory period.

41) Ans: A) Both Statement 1 and Statement 2 are true but Statement 2 is not the correct explanation of Statement 1

Sol: Clasper is the copulatory organ of a male elasmobranch fish like shark. Uterus is the organ in female mammals in which the embryo develops.

42) Ans: C) Ureotelic

Sol: Frog is ureotelic because nitrogenous excretory product is usually urea.

43) Ans: D) calcium chloride

Sol: In order to induce the bacterial uptake of plasmids the bacteria are made competent by first treating with calcium chloride. Calcium salts increase the efficiency so that DNA enters the bacterium through pores in its cell wall. Recombinant DNA can then be forced into such cells by incubating cells in the recombinant DNA on ice, followed by placing them briefly at high temperature i.e. 42°C (heat shock) and then putting them back on ice.

44) Ans: A) Yellow fever

Sol: Because yellow fever is transmitted by mosquito.

45) Ans: C) Both Statement 1 and Statement 2 are false

Sol: ATP is a nucleotide which consists of ribose sugar, adenine base and three phosphate groups. ATP has two high energy bonds while ADP has one

high energy bond.

46) Ans: **B)** A: alveolar cavity-main site of exchange of respiratory gases

47) Ans: **B)** Nucleotide

48) Ans: **A)** Reptiles and birds

Sol: The event of excretion of uric acid is known as uricotelism and animals which excrete their nitrogenous wastes mainly in the form of uric acid are called as uricotelic animals. Uricotelic animals include most insects (e.g., cockroach), some land crustaceans (e.g., Oniscus commonly known as "wood louse"), land snails, land reptiles (e.g., lizards and snakes) and birds.

49) Ans: **A)** two populations live together and freely interbreed to produce sterile offspring

Sol: Populations are said to be sympatric when two populations live together and freely interbreed to produce sterile offspring.

50) Ans: **C)** Spleen

Sol: Spleen is a vertebrate organ, lying behind the stomach, that is basically a collection of lymphoid tissue and its functions include producing lymphocytes and destroying foreign particles. It acts as a reservoir for erythrocytes and can regulate the number in circulation and also the site for the breakdown of worn out erythrocytes and it stores the iron they contain.