

**NO.3**

**M.SC. – ZOOLOGY**  
**(DEPTT. TEST)**

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M.Sc

ZOOLOGY

~~100~~ / =

Roll No. 6113004  
Application No.  
Date 10-06-2012  
Signature

**ALIGARH MUSLIM UNIVERSITY**  
**M.Sc. Zoology Entrance Examination**  
(2012-13)

Maximum Marks 200  
Time 2 hours

The question paper consists of Part I : 1-70 MCQs and Part II: 1-10 short answer type questions

**PART - I**

70x2= 140 marks

1. In *Drosophila*, 2A+XXX will be  
(a) super male (b) male  
(c) super female (d) para female
2. Meissner's corpuscles occur in  
(a) brain (b) nerve cells  
(c) skin (d) tongue
3. Trisomy 18 is called  
(a) Patau's syndrome (b) Edward's syndrome  
(c) Down's syndrome (d) Turner's syndrome
4. If two factors undergo independent assortment during meiosis, an individual with genotype  $XxYy$  will produce  
(a) two gametes (b) four gametes  
(c) eight gametes (d) sixteen gametes
5. The potential difference of approximately -70mV, across a neural membrane of a polarized neuron is called  
(a) resting potential (b) action potential  
(c) graded potential (d) spike potential
6. In PCR, deoxyligonucleotide-  
(a) serves as primer (b) serves as denaturant  
(c) helps in polymerization (d) activates Taq polymerase
7. Functioning of which gland is affected by consumption of iodised salt  
(a) pituitary (b) thyroid  
(c) adrenal (d) pancreas

8. The restriction enzyme(s) used in recombinant DNA technology for producing staggered cuts in DNA with sticky end is/are  
 (a) EcoRI (b) BamHI  
 (c) Both (a) & (b) (d) HindIII
9. The nerve fibres that transmit impulse from a receptor to the central nervous system are  
 (a) Efferent nerve fibres (b) Afferent nerve fibres  
 (c) Association neurons (d) Motor nerve fibres
10. The lac insect secretes lac for  
 (a) food (b) reproduction  
 (c) attracting predators (d) protection
11. Under normal conditions, which of the following portions of the nephron has a very low (almost negligible) permeability to water  
 (a) Thin segment of ascending limb of Loop of Henle  
 (b) Descending limb of Loop of Henle  
 (c) Thick segment of ascending limb of Loop of Henle  
 (d) Collecting duct
12. "Muscardine" of silk worm is a  
 (a) maggot disease (b) fungal disease  
 (c) bacterial disease (d) viral disease
13. Endogenous budding takes place in:  
 (a) *Volvox* (b) *Noctiluca*  
 (c) *Arcella* (d) *Monocystis*
14. The gastrointestinal hormone that stimulates contraction of gall bladder to release bile, relaxes the sphincter of Oddi, and stimulates secretion of bile from liver lobes is  
 (a) Pancreozymin (b) Secretin  
 (c) Cholecystokinin (d) Gastrin
15. Pseudocoelom develops from  
 (a) neurocoel (b) blastocoel  
 (c) archenteron (d) gut
16. The gene of sickle cell anaemia is inherited by  
 (a) Blood cells (b) Bone cells  
 (c) Sex chromosomes (d) Autosomes
17. Contractile vacuotes are commonly found in  
 (a) marine protozoa (b) parasitic protozoa  
 (c) fresh water protozoa (d) all protozoa
18. The cause of cretinism is  
 (a) hypothyroidism (b) hypoparathyroidism  
 (c) hyperthyroidism (d) hyperparathyroidism

19. Chitinous cuticle is a characteristic of phylum  
 (a) Annelida (b) Nematoda  
 (c) Mollusca (d) Arthropoda
20. Which of the following substance can be helpful in curing Parkinson's disease?  
 (a) GABA (b) Acetylcholine  
 (c) Dopamine (d) Glutamic acid
21. Tusks of elephant are modified  
 (a) canines (b) Incisors  
 (c) molars (d) premolars
22. The shape of the beaks of Darwin's finches, industrial melanism, and the changes in horse teeth are all examples of  
 (a) artificial selection (b) natural selection  
 (c) convergent evolution (d) homologous structures
23. Arthropods, the animals with jointed legs, possess a  
 (a) pseudocoel (b) nephrocoel  
 (c) haemocoel (d) gastrocoel
24. Antennae are absent in  
 (a) dragon fly (b) spider  
 (c) prawn (d) *Peripatus*
25. Cephalopoda is a molluscan class in which the members are characterized by:  
 (a) head is located on foot (b) head is fused with foot  
 (c) foot is located on head (d) notochord extends up to cephalic region
26. Which of the following cells are without endoplasmic reticulum?  
 (a) amphibian monocytes (b) matured erythrocytes of mammal  
 (c) matured leucocytes of mammal (d) mammalian monocytes
27. The process of transformation of a flat layer of ectodermal cells into a hollow tube is called  
 (a) invagination (b) neurulation  
 (c) notochord formation (d) gut formation
28. What phylum the birds belong to?  
 (a) Aves (b) Reptilia  
 (c) Chordata (d) Arthropoda
29. Microevolution takes place due to  
 (a) somatogenic variation (b) blastogenic variation  
 (c) continuous variation (d) successive variation



30. Speciation takes place as a result of  
 (a) variations -  
 (b) death of organisms  
 (c) accidents  
 (d) geographical isolation -
31. The nobel laureate famous for his work on *C. elegans* is  
 (a) Sydney Brenner  
 (b) David Suzuki  
 (c) Francis Crick -  
 (d) Carl Correns
32. The field of science that examines the relationship between organisms is called  
 (a) evolutionism -  
 (b) relational genetics  
 (c) systematics -  
 (d) nomenclature
33. Which of the following is the major component of honey?  
 (a) Dextrose -  
 (b) Levulose  
 (c) Maltose  
 (d) Water
34. Each mature female Lac insect lays about  
 (a) 2-5 eggs  
 (b) 20-50 eggs  
 (c) 200-500 eggs -  
 (d) 2000-5000 eggs
35. The intestine of elasmobranchs possesses  
 (a) caeca  
 (b) spiral valves  
 (c) typhlosole -  
 (d) microvilli
36. Which of the following does not have scales?  
 (a) *Labeo calbasu*  
 (b) *Cirrhinus reba*  
 (c) *Channa marulius*  
 (d) *Wallago attu* -
37. What adaptation of the fish allows it to orient itself in the upstream direction?  
 (a) the swim bladder  
 (b) lobed fins  
 (c) the operculum  
 (d) the lateral line system -
38. Amniotic eggs evolved as a means to  
 (a) protect the embryo while the parent sits on the egg.  
 (b) protect the embryo from predators  
 (c) allow the parent to gather food, rather than sitting on the nest  
 (d) prevent the embryo from drying out -
39. The correct sequence of stages in the formation of spermatozoa is  
 (a) spermatogonia, spermatids, spermatocytes, spermatozoa  
 (b) spermatids, spermatogonia, spermatocytes, spermatozoa -  
 (c) spermatogonia, primary spermatocytes, secondary spermatocytes, spermatozoa  
 (d) spermatids, spermatogonia, primary spermatocytes, secondary spermatocytes, spermatozoa

40. Monotremata is a group of  
 (a) fishes with a single gill aperture  
 (b) insects with a single pair of functional spiracle  
 (c) mammals with a single common cloacal opening -  
 (d) protozoans with single flagellum
41. When noxious or dangerous animals advertize the fact by bright, conspicuous colors and patterns, this is known as  
 (a) aposematism  
 (b) mimicry -  
 (c) crypsis  
 (d) allelopathy
42. Dental formula of human is  
 (a)  $\frac{1}{2/2}, \frac{c}{2/2}, \frac{pm}{2/2}, \frac{m}{2/2}$   
 (b)  $\frac{1}{2/2}, \frac{c}{1/1}, \frac{pm}{2/2}, \frac{m}{3/3}$   
 (c)  $\frac{1}{2/2}, \frac{c}{2/2}, \frac{pm}{3/3}, \frac{m}{2/2}$  -  
 (d)  $\frac{1}{3/3}, \frac{c}{1/1}, \frac{pm}{3/3}, \frac{m}{3/3}$
43. Kangaroo and Bison occupy the same niche; it means they are  
 (a) ecological equivalents  
 (b) ecological dominants  
 (c) ecotone species  
 (d) keystone species
44. A niche can be put to measurements and can be explained by 'n' dimensions, the concept is given by  
 (a) Grinnell  
 (b) Elton  
 (c) Odum  
 (d) Hutchinson -
45. The square root of variance is  
 (a) invariance  
 (b) standard error  
 (c) standard deviation  
 (d) standard dispersion
46. While generating the hybridomas for monoclonal antibody production which of the following component of the HAT selection medium is toxic to non hybrid cells?  
 (a) Hypoxanthine  
 (b) Aminopterin  
 (c) Thymidine  
 (d) Both b and c -
47. The expression  $Y = a + bx$  is an example of  
 (a) non-linear regression equation  
 (b) linear regression equation  
 (c) quadratic regression equation -  
 (d) hyperbolic regression equation
48. All the living things in a grassland and the physical environment around them make up the grassland's  
 (a) community  
 (b) population  
 (c) ecosystem  
 (d) niche
49. Ductus caroticus is present between  
 (a) 2<sup>nd</sup> and 3<sup>rd</sup> aortic arches  
 (b) 3<sup>rd</sup> and 4<sup>th</sup> aortic arches  
 (c) 4<sup>th</sup> and 5<sup>th</sup> aortic arches  
 (d) 5<sup>th</sup> and 6<sup>th</sup> aortic arches
50. The RPMI-1640 used for the culture of human cell lines is a  
 (a) Normal saline  
 (b) Basal salt solution  
 (c) Non-nutrient medium -  
 (d) Nutrient medium

51. Which set of mammals belong to order Rodentia?  
 (a) squirrel, rat, porcupine (b) squirrel, rat, rabbit  
 (c) squirrel, porcupine, rabbit (d) squirrel, rabbit, Guinea pig
52. In humans, the pancreas produces \_\_\_\_\_ which regulates the level of \_\_\_\_\_ in the blood.  
 (a) insulin, starch (b) glucagon, glucose  
 (c) glycogen, epinephrine (d) amylase, glucose
53. The spur formation in Ouchterlony's Double Immunodiffusion occurs in the reaction of  
 (a) complete identity (b) partial identity  
 (c) non-identity (d) ring formation
54. Left aortic arch is absent in  
 (a) birds (b) fishes  
 (c) reptiles (d) mammals
55. A population shows  $N=K$  where N is population size and K is the carrying capacity. The growth rate ( $dN/dT$ ) of the population will be  
 (a) maximum (b) minimum  
 (c) zero (d) cannot be predicted
56. The disease caused by Mercury pollution in man is  
 (a) Itai Itai (b) Minamata  
 (c) Dementia (d) Parkinson's
57. Bilateral adrenalectomy in a laboratory rat will cause  
 (a) total salt imbalance (b) loss of glucocorticoids  
 (c) death of the animal (d) all of the above
58. At the climax stage of succession the primary productivity is  
 (a) higher than consumption (b) lower than the consumption  
 (c) equal to consumption (d) not related to consumption
59. Which of the following is a breed of cattle?  
 (a) Aryshire (b) Ghagus  
 (c) Kadakanath (d) Scampi
60. Jaws, directly attached to the cranium by ligaments are referred as  
 (a) amphistylic (b) autodiastylic  
 (c) holostylic (d) hyostylic
61. The exotic variety of honey bee is  
 (a) *Apis cerana* (b) *Apis mellifera*  
 (c) *Apis dorsata* (d) *Apis florea*

62. Ligation is a procedure in which  
 (a) the amplified fragment is inserted into a plasmid vector  
 (b) circularized DNA is linearized by DNA ligase  
 (c) fragment of interest is nicked  
 (d) reverse transcriptase is used
63. Epiglottis is the modification of  
 (a) 1<sup>st</sup> branchial arch (b) 2<sup>nd</sup> branchial arch  
 (c) 4<sup>th</sup> branchial arch (d) 5<sup>th</sup> branchial arch
64. The following are density-dependent factors that limit animal populations EXCEPT  
 (a) weather (b) food competition  
 (c) predation (d) mortality
65. Horns are the projections on the  
 (a) parietal bone (b) frontal bone  
 (c) mesosphenoid bone (d) occipital bone
66. The catalyst used for the polymerization of the acrylamide gel is  
 (a) Sodium hydroxide (b) Ammonium persulphate  
 (c) Potassium permanganate (d) Sodium thiosulphate
67. Decrease in pH or increase in  $CO_2$  causes a right shift of the oxygen equilibrium curve. This phenomenon is termed as  
 (a) Bohr Effect (b) Haldane Effect  
 (c) Chloride Shift (d) Respiratory alkalosis
68. A well ossified vertebra having slender transverse processes, procoelous centrum, long neural spine, Y-shaped Chevron bone is most likely a  
 (a) cervical vertebra of a bird (b) thoracic vertebra of a mammal  
 (c) trunk vertebra of an amphibian (d) caudal vertebra of a reptile
69. Which of the following histone (s) is/are extremely conserved?  
 (a) H3 (b) H4  
 (c) Both (a) & (b) (d) H1
70. A person breathing normally at rest takes in and expels about half a litre of air during each respiration cycle. It is called  
 (a) Tidal Volume (b) Vital Capacity  
 (c) Inspiratory Reserve Volume (d) Expiratory Reserve Volume

## PART - II

10x6= 60 marks

- ✓ 1. Write short notes on the following:
  - (a) Placoid scales
  - (b) Feathers
- ✓ 2. (a) Differentiate between simple and facilitated diffusion?  
(b) Discuss the functions of plasma membrane
3. Write in brief about the
  - ✓ (a) stages involved in fertilization
  - (b) chemical composition of bird's yolk
- ✓ 4. Discuss
  - (a) movement of pesticides in the food chain
  - (b) trophic groups and their significance
5. Name
  - (a) two edible species each of marine prawns, lobsters and mollusks.
  - (b) five important pharmaceuticals from animals
6. Draw a labelled diagram of
  - ✓ (a) Urinogenital system of a reptile
  - ✓ (b) Heart of a mammal
- ✓ 7. Describe briefly
  - (a) social behavior of termites
  - (b) concept of biological clock in animals
8. Explain
  - (a) the telomeric theory of Ageing.
  - (b) the role of reactive oxygen species in Apoptosis
9. Differentiate between
  - (a)  $\beta$ -DNA and Z-DNA.
  - ✓ (b) Endocrine and exocrine glands
10. Discuss
  - (a) taxonomic position of Hemichordata
  - ✓ (b) taxonomic relevance of *Archaeopteryx*

# ALIGARH MUSLIM UNIVERSITY

## M. Sc Zoology Entrance Test

(2011-2012)

Maximum marks 200

PART A

Time 2 hours

70 x 2 = 140 marks

1. The respiratory pigment chlorocruorin is present in  
a) Mammals    b) Birds    c) Mollusc    d) Annelids
2. The excretory product of spider is  
a) Guanine    b) Uric acid    c) Urea    d)  $\text{NH}_3$
3. Glucose is converted to Glucose-6-phosphate by  
a) ATP, Hexokinase,  $\text{Ca}^{2+}$     b) ATP, Hexokinase,  $\text{Mg}^{2+}$   
c) ATP, Glucokinase,  $\text{Ca}^{2+}$     d) ATP, Dehydrogenase,  $\text{Mg}^{2+}$
4. Which one of the following ensures correct segregation of homologous chromosomes during meiosis and mitosis  
a) Telomeres    b) centromeres    c) kinetochores    d) chromatids
5. X-chromosome activation is a mechanism for  
a) Distinguishing between males and females  
b) Maintaining polymorphism in the population  
c) Gene dosage compensation in mammals  
d) Elimination of deleterious genes from X-chromosomes
6. Sickle cell anemia results from a single amino acid change of glutamic acid to  
a) Valine    b) Phenylalanine    c) Aspartic acid    d) Tyrosine
7. In Gaucher's disease the protein which is altered is  
a)  $\beta$ -Glucosidase    b) Hexosaminidase    c)  $\beta$ -globulin    d) Adenosine deaminase
8. Who first used the term "chromatin"  
a) Balbiani    b) Flemming    c) Meischerid    d) Waldeyer
9. The number of gill slits in Chimaeras is  
a) 5 pairs    b) 7 pairs    c) 4 pairs    d) 6 pairs
10. Aortic arches pass directly through gill region without interruption in  
a) *Bdellostoma*    b) *Protopterus*    c) *Neoceratodus*    d) *Heptanchus*
11. Which of the following is not extinct  
a) Indian Cheetah    b) Jerdon's Courser    c) Pinkheaded duck    d) Great Pied Hornbill
12. Who wrote the book "Territory in Bird's life"  
a) Eliot Howard    b) Konard Lorenz    c) N.B. Davies    d) J. Brown

13. Which of the following is most acceptable statement regarding similarities of Obelia and Aurelia  
 a) Mesoglea is non-cellular in both b) both are ciliated and free swimming  
 c) In both reproductive cells are derived from ectoderm d) All of the above
14. In cephalochordates  
 a) Only cerebral nerves are present b) Only spinal nerves are present  
 c) Nerves are absent d) both cerebral and spinal nerves are present
15. Sabella is  
 a) Ciliary feeder b) Raptorial feeder c) Bottom dweller d) Filter feeder
16. No two species can occupy the same niche in the same habitat at the same time  
 a) because of the interactions that shape the ecosystem  
 b) unless the species require different abiotic factors  
 c) because of the competitive exclusion principle  
 d) unless the species require different biotic factors
17. In which type of vertebrae the centrum is concave posteriorly and convex anteriorly  
 a) procoelous b) opisthocelous c) amphicoelous d) acoelous
18. Modern fishes (Teleosts) possess  
 a) cosmoid and cycloid scales b) placoid and ctenoid scales  
 c) cycloid and ctenoid scales d) cosmoid and ctenoid scales
19. The venom of which of the following snakes is generally used as a coagulant to arrest the hemorrhage  
 a) Cobra b) Krait c) Russell's Viper d) King Cobra
20. Which of the following is an indigenous edible freshwater fish  
 a) *Ctenopharyngodon idella* b) *Mystus aor*  
 c) *Tilapia mossambica* d) *Hypophthalmichthys molitrix*
21. In which type of fish culture practice, fish do not depend on plankton for their food:  
 a) Extensive fish culture b) Semi-intensive fish culture  
 c) Intensive fish culture d) Integrated fish culture
22. In *Entamoeba histolytica* infection, which of the following is not a metastatic lesion  
 a) Intestinal abscess b) Lung abscess c) Liver abscess d) Brain abscess
23. Postellar hooks are not found in  
 a) *Taenia solium* b) *Taenia saginata* c) *Echinococcus granulosus* d) *Hymenolepis nana*
24. Which of the following group has Byssus gland  
 a) Ctenophora b) Annelida c) Pelecypoda d) Echinodermata
25. Dolphin belongs to the order  
 a) Ederata b) Pholidota c) Cetacea d) Fissipedia

26. Cardiac and respiratory centers are located in  
 a) Myelencephalon b) Metencephalon c) Diencephalon d) Prosencephalon
27. Flow of calcium into axon terminal through voltage gated  $Ca^{2+}$  channel  
 a) stimulates neurotransmitter filled vesicle and leads to fusion of docked vesicles with terminal membrane  
 b) inhibits production of neurotransmitter and fusion of docked vesicle with terminal membrane  
 c) inhibits production of neurotransmitter and leads to fusion of docked vesicle with terminal membrane  
 d) stimulates neurotransmitter filled vesicle and inhibits fusion of docked vesicle with terminal membrane.
28. The correct sequence of eras: (1) Proterozoic (2) Mesozoic (3) Coenozoic (4) Palaeozoic from oldest to recent is  
 a) 1, 2, 3, 4 b) 1, 2, 4, 3 c) 1, 3, 2, 4 d) 1, 4, 2, 3
29. In the Biochemical origin of life, the concept of Hot dilute soup was given by  
 a) Haldane b) Miller c) Fox d) Oparin
30. *Archaeopteryx* is the connecting link between  
 a) Reptiles and mammals b) Amphibians and reptiles  
 c) Reptiles and birds d) Birds and mammals
31. Biologists define evolution as  
 a) Origin of species b) Heritable change over generation  
 c) Inheritance of acquired characters d) Progressive change
32. The common name of *Apis dorsata* is  
 a) Indian bee b) Sarang  
 c) Little bee d) European bee
33. Which is the most purified form of lac  
 a) Seed lac b) Pure lac  
 c) Sheet lac d) Shell lac
34. Silk is  
 a) Animal fat b) Carbohydrate  
 c) Animal protein d) Phospholipid
35. Which of the following is not a breed of buffalo  
 a) Murrah b) Jafarabadi  
 c) Surti d) Rath
36. Which of the following is not a disease of dairy animal  
 a) Foot and mouth disease b) Jone's disease  
 c) Rinderpest d) Apoplexy

61. Pollen basket in the honey bee is present on:  
 a) prothoracic leg                      b) mesothoracic leg  
 c) metathoracic leg                    d) antenna
62. The neurotransmitter generally present at neuro-muscular junction is:  
 a) Dopamine    b) Acetyl choline    c) Serotonin    d) Enkephalin
63. After ovulation, the graffian follicle forms  
 a) Corpus allatum    b) Corpus callosum    c) Corpus cardiacum    d) Corpus luteum
64. The 'Living Coelacanth' is:  
 a) *Chimaera*    b) *Latimeria*    c) *Protopterus*    d) *Acipenser*
65. Monotremes are confined to:  
 a) Oriental region                      b) Ethiopian region  
 c) Australian region                    d) Neotropical region
66. Reptiles with solid roof of skull belong to the subclass:  
 a) Parapsida    b) Diapsida    c) Anapsida    d) Synapsida
67. The calcium binding protein in skeletal muscle is:  
 a) Tropomyosin    b) Troponin    c) Colmodulin    d) Myosin
68. The partial pressure of  $\text{CO}_2$  in the venous blood is about  
 a) 32 mmHg    b) 40 mmHg    c) 46 mmHg    d) 100 mmHg
69. The natural cell death is known as:  
 a) necrosis    b) pyknosis    c) autolysis    d) apoptosis
70. The phenomenon of 'Industrial Melanism' demonstrates  
 a) Natural selection                    b) Induced mutation  
 c) Geographical isolation                d) Reproductive isolation

## PART B

1. Differentiate between
  - a) Arachnida and Insecta
  - b) Gastropoda and Cephalopoda
2. Differentiate between
  - a) Stomach of a ruminant and a man
  - b) Sympathetic and parasympathetic nervous system
3. Write notes on
  - a) Multipolar neuron
  - b) Cardiac muscle cell
  - c) Pseudostratified columnar epithelium
4. Briefly explain
  - a) Natural selection with the help of an example
  - b) Geological time scale
5. Briefly explain
  - a) Mechanism of fertilization
  - b) Development of extra embryonic membrane
6. Briefly discuss
  - a) Polyculture of Indian major carps
  - b) Significance of "Operation flood" in white revolution
7. Differentiate between
  - a) X-linked and holandric inheritance
  - b) Epistasis and dominance
8. Briefly explain
  - a) Mechanism of presynaptic neurotransmitter release
  - b) Menstrual cycle
9. Briefly explain
  - a) ELISA
  - b) RFLP
10. Write short notes on
  - a) Transposons *jumping gene*
  - b) Gene therapy

M.Sc. Zoology Entrance Test  
2010-2011

(MM 200, Time 2 hours)

Part A

140 marks

- 1/ The calcium binding protein in skeletal muscles is  
a) Tropomyosin      b) troponin      c) calmodulin      d) myosin
- 2/ Gamma aminobutyric acid is synthesized by  
a) deamination of histidine      b) decarboxylation of histidine  
c) deamination of glutamic acid      d) decarboxylation of glutamic acid
- 3/ How many molecules of acetyl CoA are produced during  $\beta$ -oxidation of a C18 fatty acid?  
a) 2      b) 8      c) 9      d) 10
4. In which of the following are larval traits retained in the adults?  
a) *Ichthyophis*      b) *Alytes*      c) *Ambystoma*      d) *Hyla*
5. The ampulla of Lorenzini responds to changes in  
a) temperature      b) pressure      c) density      d) salinity
6. Retrogressive metamorphosis occurs in  
a) frog and *Herdmania*      b) frog and *Necturus*  
c) *Botryllus* and *Necturus*      d) *Botryllus* and *Herdmania*
7. According to the Genic balance theory of sex determination, if the ratio of X/A is 4X/3A the individual will be  
a) female      b) metafemale  
c) triploid female      d) tetraploid female
8. If the female is a carrier of a X-linked disorder, then  
a) 100% of her female and male offsprings will be affected  
b) 50% of her female and male offsprings will be affected  
c) 100% of her male offsprings will be affected  
d) 50 % of her male offsprings will be affected and 50% of her female offsprings will be carriers
9. The cyst of this species contains four nuclei grouped and located near one pole  
a) *Entamoeba gingivalis*      b) *Entamoeba histolytica*  
c) *Iodamoeba butschlii*      d) *Giardia intestinalis*

10. Homologous structures support the idea of  
a) divergent evolution b) convergent evolution  
c) connecting links c) co-evolution
11. The *Archaeopteryx* belongs to which period?  
a) Permian b) Devonian c) Jurassic d) Cretaceous
12. The template to make cDNA is  
a) DNA b) mRNA c) a plasmid d) a DNA probe
13. The polymerase chain reaction was discovered by  
a) Robert Holley b) Kary Mullis  
c) Har Gobind Khorana d) D. Nathans
14. T-cells can recognize only those antigens which are  
a) free floating in blood but not associated with MHC  
b) bound to cell surface but not associated with MHC  
c) bound to cell surface and associated with MHC  
d) free floating in blood and associated with MHC
15. The epiglottis is a modification of which branchial arch?  
a) 2<sup>nd</sup> b) 3<sup>rd</sup> c) 4<sup>th</sup> d) 5<sup>th</sup>
16. Hollow horns are the projection of  
a) parietals b) frontal c) mesosphenoid d) maxilla
17. Which of the following chromosomes has satellite DNA?  
a) 21 b) 2 c) 20 d) 18
18. A population is a  
a) group of organisms of all species  
b) group of individuals of the community  
c) group of organisms of the same species  
d) group of individuals with a set characteristic
19. A tetraxon spicule where the four rays are almost equal in size is known as  
a) sigma b) cladone c) calthrops d) chela
20. A euryptylous type of canal system is found in  
a) *Leucosolenia* b) *Leucilla* c) *Stellata* d) *Spongilla*
21. The *Plasmodium* species responsible for quartan malaria is  
a) *P. vivax* b) *P. ovale*  
c) *P. malariae* d) *P. falciparum*
22. *Attacus ricinii* is the ..... silk worm  
a) mulberry b) Tasar c) Muga d) Eri

23. Which of the following is not normally an air pollutant  
a) CO<sub>2</sub> b) SO<sub>2</sub> c) CO d) hydrocarbons
24. Which of the following is present in the highest proportion in lac.  
a) resin b) dye c) wax d) water
25. This is a disease of dairy animals  
a) foot and mouth disease b) muscardine  
c) pebrine d) polyhedrosis
26. The helicotrema occurs in the  
a) sacculus b) utricle c) cochlea d) semicircular canals
27. Which of the following is a secondary air pollutant?  
a) SO<sub>2</sub> b) NO<sub>2</sub> c) CO d) PAN
28. The potamon zone is present in  
a) oceans b) lakes c) ponds d) rivers
29. Permafrost is a characteristic feature of  
a) grasslands b) tundra c) tundra d) savannah
30. The guano deposits along the sea coast is the good source of  
a) sulphur b) phosphorus c) nitrogen d) ammonia
31. The larva of *Obelia* is  
a) amphiblastula b) schyphistoma  
c) planula d) parenchymula
32. In sponges the food is captured with the help of  
a) pinacocytes b) choanocytes  
c) trophocytes d) monocytes
33. The filariform larva of this parasite enters the human body by penetrating the skin  
a) *Ancylostoma duodenale* b) *Schistoma mansoni*  
c) *Schistoma haematobium* d) *Tricinnella spiralis*
34. In *Pheretima* two pairs of lateral oesophageal hearts are present in segments  
a) 7 and 9 b) 8 and 9 c) 12 and 13 d) 17 and 19
35. The mandibular gland secretion of the queen bee that inhibits ovarian development among workers in the same hive is an example of  
a) allomone b) pheromone  
c) kairamone d) synomone

35. Which of these is an example of Mullerian mimicry?  
 a) A bee that looks like a wasp  
 b) A fly that looks like a bee  
 c) A katydid that looks like a leaf  
 d) A caterpillar that looks like a snake
37. Which cell organelle forms the acrosome of the sperm?  
 a) mitochondrion  
 b) golgi body  
 c) centriole  
 d) ribosome
38. When the cleavage furrow divides the animal pole but does not extend up to the vegetal pole, the cleavage is  
 a) holoblastic  
 b) superficial  
 c) meroblastic  
 d) discoidal
39. Which set of mammals belong to the order Rodentia  
 a) squirrel, house rat, rabbit  
 b) squirrel, house rat, porcupine  
 c) squirrel, rabbit, guinea pig  
 d) house rat, porcupine, rabbit
40. In *Uromastix* the cloaca is divided into  
 a) coprodaeum and urodaeum  
 b) coprodaeum and proctodaeum  
 c) coprodium, urodaeum and proctodaeum  
 d) urodaeum and proctodaeum
41. Ceruloplasmin is a plasma protein that transports  
 a) copper  
 b) iron  
 c) cobalt  
 d) zinc
42. This glial cell belong to the macrophage system  
 a) astrocyte  
 b) microglia  
 c) oligodendrocytes  
 d) ependyma
43. Extra-gonadal androgens are secreted by  
 a) pituitary  
 b) hypothalamus  
 c) adrenals  
 d) ultimobranhial gland
44. Posterior pituitary hormones are produced in  
 a) subcortical and supraoptic nuclei  
 b) supraoptic and suprachiasmatic nuclei  
 c) paraventricular and supraoptic nuclei  
 d) paraventricular and subcortical nuclei
45. When the carrying capacity is equal to the population size, the net rate of increase in the population equals  
 a) carrying capacity  
 b) one  
 c) zero  
 d) the intrinsic growth factor
46. The syrinx is the sound producing organ of  
 a) birds situated at the beginning of trachea  
 b) amphibians situated in the larynx  
 c) birds situated at base of trachea  
 d) amphibians situated at base of trachea
47. Which is/are not modification(s) of the oesophagus  
 a) rumen  
 b) reticulum and omasum  
 c) omasum and abomasum  
 d) abomasum
48. The Mesozoic era is considered the age of  
 a) amphibians  
 b) bony fishes  
 c) mammals  
 d) reptiles
49. Which is the duct of the pancreas  
 a) Stenons's duct  
 b) duct of Wirsung  
 c) Wharton's duct  
 d) ductus Choledochus
50. Which would be the correct sequence of larval development in Asteridea  
 a) dipleurula, auricularia, doliolaria  
 b) dipleurula, bipinnaria, brachiolaria  
 c) vitellaria, bipinnaria doliolaria  
 d) vitellaria, auricularia, brachiolaria
51. In Diplopoda, in the segments where legs are present, the arrangement is as follows.  
 a) All have two pairs of legs.  
 b) The first has one pair, the rest have two pairs.  
 c) The first and second have one pair each, the rest have two pairs.  
 d) The first, second and third have one pair each, the rest have two pairs.
52. The nectocalyx is a ..... zooid  
 a) locomotory  
 b) protective  
 c) nutritive  
 d) tactile
53. The auditory cortex is located in the ..... lobe  
 a) frontal  
 b) parietal  
 c) temporal  
 d) occipital
54. The pituitary gland is situated in the  
 a) sella turcica  
 b) Rathke's pouch  
 c) otic capsule  
 d) osseous labyrinth
- Lack of vitamin C results in  
 a) deficient production of collagen and bone matrix  
 b) excess deposition of inorganic material in bone  
 c) excessive hardening of bone  
 d) excess production of collagen and bone matrix

56. High levels of DPG  
 a) increases the affinity of haemoglobin to oxygen  
 b) reduces the affinity of haemoglobin to oxygen  
 c) increases the affinity of haemoglobin to hydrogen  
 d) decreases the affinity of haemoglobin to carbon dioxide
57. How many sperms and ova will be produced by 25 primary spermatocytes and 25 primary oocytes respectively?  
 a) 100 and 100  
 b) 50 and 50  
 c) 50 and 25  
 d) 100 and 25
58. The most common type of hinge teeth in Bivalvia is  
 a) toxodont  
 b) heterodont  
 c) schizodont  
 d) isodont
59. Which of these clotting factors are cofactors and not enzymes?  
 a) IX and VIII  
 b) XI and X  
 c) VIII and V  
 d) X and V
60. Which of the following sets of features is correct for *Trypanosoma* spp?  
 a) T. cruzi, salivaria, triatomid bugs, Chagas' disease  
 b) T. gambiense, salivaria, tse-tse flies, sleeping sickness  
 c) T. cruzi, stercoraria, tabanid flies, Chagas' disease  
 d) T. gambiense, stercoraria, tse-tse flies, sleeping sickness
61. In humans the tubular maximum ( $T_m$ ) for glucose is approximately ..... mg/ml  
 a) 1.3  
 b) 2.3  
 c) 4.3  
 d) 5.3
62. Many arctic and antarctic fish survive in the freezing waters because they  
 a) have anti-freeze in their blood  
 b) are freeze tolerant  
 c) can be supercooled  
 d) have a fatty layer below the skin
63. The respiratory structures of scorpions are  
 a) tracheae  
 b) gills  
 c) book lungs  
 d) chelicerae
64. The mouth and anal opening are located on the oral surface in  
 a) Asterozoa  
 b) Echinozoa  
 c) Holothurozoa  
 d) Crinozoa
65. In humans the average volume of fluid filtered into the Bowman's capsule (GFR) is approximately ..... L/day  
 a) 1.8  
 b) 8.0  
 c) 80  
 d) 180
66. Water reabsorption under the influence of ADH occurs in the  
 a) PCT  
 b) descending limb of loop of Henle  
 c) ascending limb of loop of Henle  
 d) collecting ducts

Which of these is the 'coelacanth'?

- a) *Chimaera*  
 b) *Latimeria*  
 c) *Protopterus*  
 d) *Acipenser*

Mixing of oxygenated and deoxygenated blood is highest in  
 a) fish  
 b) frog  
 c) lizard  
 d) snake

Which of the following statements is incorrect for histone proteins?  
 a) Basic in nature  
 b) Highly conserved during evolution  
 c) Present in eukaryotes and bacteria  
 d) Act as polycations

In recombinant methods, the term vector refers to  
 a) the enzyme that cuts DNA into restriction fragments  
 b) the sticky end of a DNA fragment  
 c) a RFLP marker  
 d) a plasmid or other agent used to transfer DNA into a living cell

#### Part B Short answer questions

1. a) Briefly describe the retrogressive changes in *Herdmania*.  
 b) Differentiate between neoteny and paedogenesis.
2. a) What are the characteristics of snake venom?  
 b) Name the different patterns of fish migration giving examples.
3. a) List three characters that define the class Insecta.  
 b) Briefly explain "protective adaptation"?  
 c) Name the components of an Asteroid water vascular system.
4. a) Differentiate between segmentation and peristalsis.  
 b) Briefly describe the structure of the Graafian follicle.  
 c) What is the Hashimoto disease?
5. a) Name the various types of cell junctions.  
 b) Differentiate between mucous, serous and mixed glands.  
 c) Give three differences between smooth and skeletal muscles.
6. a) Explain briefly adaptive radiation?  
 b) What is a 'living fossil'? Give an example.

a) What are axenic and monoxenic cultures?

b) What are the characteristic features of a stereoscopic binocular microscope?

c) Name the various types of adolophils and basophil of the anterior pituitary and the hormones they produce.

d) What is the role of GIP?

e) Name the various ways in which torsion can be brought about in Gastropods and give its significance.

f) What are adaptive features of Cetaceans to live in underwater for long periods?

g) Give the structure of chromatin in a eukaryote.

h) What are the biochemical components of a nucleosome?