M. Sc. ZOOLOGY

1. The nonflagellated cells of amphiblastula do not give rise to

A) Porocytes B) Scleroblast C) Amoebocytes D) Epidermis

2. The antibody produced by Plasmodium in the blood of human is

A) Haemozoin B) Haematin C) Haemotoxin D) None of these

3. Liver flukes lack

A) Cirrus sheath B) Ootype C) Laurer's canal D) All of these

4. Which of the following is a viviparous parasites

A) *Loa Loa* B) *Wuchereria bancrofti*

C) *Dracunculus medinensis* D) All of these

5. In hirudinea, the internal metamerism is evident only in

A) Circulatory system B) Circulatory and Nervous system

C) Nervous system D) Nervous and Excretory system

6. In which types of mouth parts are mandibles entirely absent?

A) Siphoning type B) Chewing and lapping type

C) Biting and Chewing type D) Sponging type

7. Guitarfish is applicable to

A) *Rhinobatus* B) *Trygon* C) *Stegostoma* D) *Hexanchus*

8. What is not common between tadpoles and adult anurans?

A) A wide head B) A short vertebral column

C) Lack of neck D) A small mouth

9. The largest mammalian order is

A) Rodentia B) Carnivora C) Chiroptera D) Primates

10. Chief cells secrete:

A) HC1 B) pepsinogen C) intrinsic factor D) HCO_3^-

11. Which stimulates parietal cell secretion?

A) prostaglandins B) Aspirin

C) Vinegar D) Acetylcholine

12. Cytosolic calcium concentration in unexcited state is about

A) 2.5 MM B) 10 mM C) 100 μM D) 150 μM

13. Renshaw cells inhibition of alpha-motor neuron is an example of

A) Presynaptic inhibition B) Postsynaptic inhibiyion

C) Negative feedback inhibition D) Feedfrward inhibition

14. Most excitatory neurotransmission in the brain is believed to be mediated by

A) Glutamate B) Glycine C) GABA D) Acetylcholine

15. Telomeric sequences are found in

A) HAC B) BAC C) YAC D) PAC

16. Paul Berg's gene splicing experiment created the first rDNA molecule which was

A) A T4 phage fragment incorporated into SV40 vector

B) A lambda phage fragment incorporated into SV40 vector

C) A T4 phage fragment incorporated into pSC 101 vector

D) A lambda phage fragment incorporated into SV40 vector

17. The first engineering plasmid vector is

A) pSC 101 B) pUC vectors C) pBR 322 D) pUC 19

18. Autonomously replicating sequences (ARS) is a characteristic feature of

A) Plasmid vectors B) Phage vectors

C) E.coli vectors D) Yeast vectors

19. Specific biomolecules which show easily detectable differences among different strains of a species or among different species is termed as————

A) DNA finger printing B) Molecular markers

C) Molecular scissors D) Molecular printings

20. Pfu and Vent polymerase are more efficient than Taq polymerase because

A) of more efficient polymerase activity B) of proof reading activity

C) Both A and B D) None of these

21. Arrange the following in correct order:

(i) Southern Blotting - A. RNA-DNA hybrid

(ii) Western blotting — B. DNA-DNA hybrid

(iii) Northern blotting - C. Southern blotting

(iv) DNA fingerprinting -D. Antigen-Antibody reaction

A) i-A, ii-C, iii-D, iv-B

B) i-B, ii-D, iii-A, iv-C

C) i-B, ii-A, iii-D, iv-C

D) i-B, ii-C, iii-A, iv-C

22. The cell line used for the production of polio vaccine was

A) Primary kidney cell line
B) CHO cell line
C) Dog kidney cell line
D) Mouse fibroblast cell line

23. The first vaccine developed from animal cell culture was

A) Hepatitis B vaccine
B) Influenza vaccine
C) Small pox vaccine
D) Polio vaccine

24. Which one of the following statements regarding thyroid gland is incorrect?

A) The apex of each lobe is directed upward to the lamina of the thyroid cartilage.
B) It is enclosed within the pretracheal fascia
C) The inferior thyroid veins drain into the internal jugular vein
D) The recurrent laryngeal nerve lies medial to it.

25. Which one of the following structures is posterior to the pituitary gland:

A) Optic chiasma B) Diaphragmasellae C) Mammilary bodies D) Sphenoidal air sinuses

26. Which one of the following structures is superior to the pituitary gland?

A) Optic chiasma B) Diaphragma sellae C) Mammilary bodies D) Sphenoidal air sinuses

27. Which cell type is also called C cells:

A) Principal cell B) Oxyphil cell C) Parafollicular cells D) Follicular cells

28. Which of the following is not part of the neurohypophysis:

A) Median eminence
B) Pars distalis
C) Pars nervosa
D) Infundibular stalk

(*Continued*)

29. Which one of the following hormones is secreted by the posteriorpituitary gland:

A) Adrenocorticotropic hormone (ACTH) B) Oxytocin

C) Thyroid-stimulating hormone (TSH) D) Prolactin

30. Which of the following is a glycoprotein in nature:

A) Growth hormone B) Anti diuretic hormone

C) Acetylcholine D) Thyroid stimulating hormone

31. Which of the following is not a steroid hormone?

A) Leutinizing hormone B) Testosterone

C) Estrogen D) Progesterone

32. In the regulation of hormone secretion:

A) Neural mechanisms are more common than feedback mechanisms

B) Positive feedback represents most of the feedbacks of hormones

C) The primary example of negative feedback is the effect of Estrogen on FSH and LH

D) Negative feedback is self-limiting and positive feedback is self-augmenting

33. Prolactin secretion is tonically suppressed in nonpregnant women by:

A) Estrogens B) Progesterone C) Dopamine D) SH

34. Insulin release:

A) is inhibited by raised cyclic AMP in pancreatic β cells

B) is not stimulated by blood glucose levels below 6mmol/l

C) is increased by β adrenergic stimulators

D) is inhibited by phosphor diesterase inhibitors

35. In the adrenal cortex:

A) the zona glomerulosa has 17 alpha-hydroxylase and no aldosterone synthase

B) all the cholesterol is synthesised from acetate

C) zona fasciculata makes up 10% of the mass of the adrenal gland

D) angiotensin II binds to receptors in the zona reticularis

36. How many Kcals are in 1 gram of protein, carbohydrate and fat?

A) 6, 4 and 9 Kcals

B) 4, 4 and 9 Kcals

C) 4, 6 and 9 Kcals

D) 6, 6 and 9 Kcals

37. Steatorrhoea occurs with all of the following EXCEPT:

A) gastrinoma

B) congenital defect in gastric lipase

C) ileal disease with failure to reabsorb bile salts

D) exocrine pancreatic disease

38. pH of 0·1N HCl is

A) 1 B) 14 C) i10 D) 13

39. Pineal gland secretes

A) **Melatonotrophic** hormone

B) Melatonin

C) **Melanine**

D) None of the above

40. Renshaw cells inhibition of alpha-motor neuron is an example of

A) presynaptic inhibition

B) postsynaptic inhibition

C) negative feedback inhibition

D) Feedforward inhibition

41. Alpha neurons are

A) Motor neuron B) Sensory neurons C) **Multipolar** neurons D) Both of A & C

42. All excitatory neuro transmitter cause

A) release of acetyl **choline**

B) opening of **ligand** gated sodium channels

C) closing of **ligand** gated sodium ion channel

D) None of the above

43. An mRNA produced from an operon has more than one

A) Stop codon B) Promotor C) Intron D) Operator

44. Myoglobin is an oxygen-carrying molecule in muscle. It consists of just one polypeptide chain. Myoglobin lacks:

A) primary structure B) secondary structure

C) tertiary structure D) quaternary structure

45. The exoskeleton of many insects is made of chitin which is a modified form of

A) carbohydrate B) lipid C) protein D) nucleic acid

46. Unlike triglycerides, phospholipid molecules:

A) have 1 lipid tail B) have 2 lipid tails

C) have 3 lipid tails D) have 4 lipid tails

47. The genetic disorder sickle-cell anemia is an example of

A) pleiotropy B) heterozygous dominance

C) epistasis D) homozygous dominance

48. The following chemical reaction occurs during "glycolysis":

Glucose + ATP $\rightarrow$ glucose-6-phosphate + ADP

The enzyme that catalyzes this reaction is a

A) Ligase B) Kinase C) Isomerase D) Oxidoreductase

49. All of the following are considered "weak" interactions in proteins, *except:*

A) hydrogen bonds.

B) hydrophobic interactions.

C) ionic bonds.

D) peptide bonds.

50. Hydrophobic interactions make important energetic contributions to:

A) binding of a hormone to its receptor protein.

B) membrane structure.

C) three-dimensional folding of a polypeptide chain.

D) All of the above are true.

51. One round of Edman degradation of the peptide: H2N—Gly—Arg—Lys—Phe—Asp— COOH would result in which of the following structures or their phenyl isothiocyanate derivatives?

A) H_2N—Gly—Arg—COOH + H_2N—Lys—Phe— Asp—COOH

B) H_2N—Gly—Arg—Lys—Phe—COOH + Asp

C) H_2N—Arg—Lys—Phe—Asp—COOH + Gly

D) H_2N—Gly—Arg—Lys—COOH + H_2N—Phe—Asp—COOH

(*Continued*)

52. Sucrose does not occur in its anomeric form while its hydrolyzed product glucose and fructose have anomers. The reason is

A) Cl of glucose and Cl of fructose are bonded in glycosidic linkage

B) Cl of glucose and C2 of fructose are bonded in glycosidic linkage

C) Sucrose is polysaccharide

D) Sucrose is not soluble in water

53. Which of the following statements about the mammalian brain is incorrect?

A) Enlarged dorsal ventricular ridge

B) Enlarged dorsal pallium called cerebral cortex

C) Cerebral cortex receives and analyses sensory information and initiates motor activity

D) None of these

54. For amino acids with neutral R groups, at any pH below the pi of the amino acid, the population of amino acids in solution will have:

A) a net negative charge.

B) a net positive charge.

C) no charged groups.

D) no net charge.

55. Down syndrome occurs when a baby is born with an extra copy of chromosome in

A) Chromosome 9

B) Chromosome 11

C) Chromosome 21

D) Chromosome 22

56. The amino acid substitution of Val for Glu in Hemoglobin S results in aggregation of the protein because of ———— interactions between molecules.

A) covalent B) disulfide C) hydrogen bonding D) hydrophobic

57. The zona pellucida is synthesized by the

A) sperm B) oocyte C) follicle cells D) corona radiate

58. At the point of fertilization, mammalian eggs have how many polar bodies?

A) 1 B) 2 C) 3 D) 4

59. During sea urchin fertilization, egg cytoplasm calcium ion content

A) drops. B) rises. C) stays constant. D) disappears.

60. In general telolecithal eggs undergo ——— cleavage.

A) synchroblastic B) holoblastic C) teloblastic D) meroblastic

61. In amphibian embryos, involution occurs at the

A) dorsal lip of the blastopore.

B) dorsal and lateral lips of the blastopore.

C) dorsal, lateral, and ventral lips of the blastopore.

D) dorsal, lateral, ventral, and central lips of the blastopore.

62. In mammals, the inner cell mass becomes,

A) Neural crest B) Allantois C) Yolk sac D) Embryo

63. An individual molecular structure within an antigen to which an individual antibody binds is as *a(n)*:

A) Antigen B) Epitope C) Fab region D) Fc region

64. Which of the following parts of the IgG molecule are not involved in binding to an antigen?

A) Fab B) Fc C) Heavy chain D) Light chain

(Continued)

65. A monoclonal antibody differs from a polyclonal antibody in that monoclonal antibodies:

A) are labeled with chemicals that can be visualized.

B) are produced by cells from the same organism that produced the antigen.

C) are synthesized by a population of identical, or "cloned," cells.

D) are synthesized only in living organisms.

66. The energy that is released by the hydrolysis of ATP by actin is used for:

A) actin filament assembly.
B) actin filament disassembly.
C) actin-myosin assembly.
D) actin-myosin disassembly.

67. Which of the following is applicable to pond ecosystem?

A) Xeric
B) Lotic
C) Lentic
D) Ventic

68. Which of the following, with reference to net primary productivity, is correct sequence of ecosystems?

A) Open ocean → Savana → Coral reefs → Tropical rain forests → Estuary

B) Tropical rain forests → Coral reefs → Open ocean → Savana → Estuary

C) Coral reef → Tropical rain forest → Estuary → Savana → Open ocean

D) Coral reef → Estuary → Tropical rain forest → Savana → Open ocean

69. An ecological pyramid is:

A) Upright
B) Inverted
C) Spindly shaped
D) All of the above

70. Eutropic lakes are:

A) Rich in nutrient content
B) Poor in dissolved oxygen
C) Rich in productivity
D) All

71. Which of the following is the correct sequence of the process of succession?

A) Migration → Nudation → Competition → Reaction → Stabilization

B) Nudation → Migration → Ecesis → Competition → Reaction → Stabilization

C) Ecesis → Migration → Competition → Stabilization → Reaction

D) Nudation → Ecesis → Migration → Competition → Reaction → Stabilization

72. In sea water:

A) Blue rays penetrate deeper than red rays

B) Green rays penetrate deeper than red rays

C) Red rays penetrate deeper than blue and green rays

D) Blue and Green rays penetrate deeper than red rays

73. Body temperature is independent of ambient temperature in:

A) Reptiles B) Mammals C) Fishes D) Amphibians

74. Humus soil bears:

A) Electropositive charge B) Electronegative charge

C) Neutral charge D) Both A and B

75. Consider the following statements about k-selected species:

(i) Live near the carrying capacity of their environment

(ii) Density dependent species

(iii) Food availability is one resource that controls population size (iii) Long lifespan

A) i & ii B) i & iii C) i, ii & iii D) All

(Continued)

76. Grouping of several female mice in a cage suppresses or modifies estrous. This is known as:

A) Lee-Boot effect
B) Fountain effect
C) Whitten effect
D) Trafalgar effect

77. Cooperative breeding occurs when more than one pair

A) Share in building a nest
B) Lay eggs in a single nest
C) Help to feed one brood
D) All

78. Identify the major phospholipids in mammalian plasma membrane which is not derived from glycerol.

A) Phosphatidylethanolamine
B) Phosphatidylserine
C) Phosphatidylcholine
D) Sphingomyelin

79. A mixture of 5 proteins having molecular weight of 17000, 29000, 45000, 65000 and 95000 with variable charge due to presence different quantities of charged amino acids were separated on SDS-PAGE and stained with Coomassie blue. What is the correct sequence of proteins from cathode to anode?

A) 17000, 29000, 45000, 65000 and 95000
B) 95000, 65000, 45000, 29000, 17000
C) 65000,45000,95000,29000,17000
D) these proteins cannot be separated on SDS-PAGE

80. During a test of relative permeability of a synthetic lipid bilayer to different classes of molecules, some of the molecules did not pass across the membrane. Choose the correct molecule which did not pass across the membrane.

A) Oxygen
B) Urea
C) Glycerol
D) Na^+

81. Acetylcholine receptor forms a transmembrane aqueous pore line by a ring of five transmembrane helices. The identical five transmembrane units are

A) $2\alpha, 1\beta, 1\gamma, 1\delta$ B) $1\alpha, 2\beta, 1\gamma, 1\delta$

C) $1\alpha, 1\beta, 2\gamma, 1\delta$ D) $1\alpha, 1\beta, 1\gamma, 2\delta$

82. Among the following representative of ion channel subfamilies, which one has the inhibitory effect?

A) Voltage-gated Na^+ channels B) Serotonin-gated cation channels

C) Glycine-gated Cl^- channels D) Voltage gated Ca^{2+} channels

83. Correctly folded protein does not need any special signal to be transported out of the endoplasmic reticulum membrane, where as BiP, a chaperone protein of endoplasmic reticulum lumen needs a retention signal such as:

A) Lys-Glu-Leu-Asp B) Asp-Glu-Lys-Leu

C) Lys-Asp-Glu-Leu D) Asp-Lys-Glu-Leu

84. Hurler's disease, often known as inclusion-cell disease, fail to process the lysosomal hydrolases and result in accumulation of their undigested substrate in lysosome. In these individuals all the hydrolases missing from lysosomes are found in the blood, as they fail to be sorted properly in:

A) Rough Endoplasmic Reticulum B) Smooth Endoplasmic Reticulum

C) Golgi complexes D) Lysosomes

85. The signal peptides required for protein import into peroxisomes are

A) Ser-Lys-Leu B) Lys-Ser-Leu C) Leu-Lys-Ser D) Ser-Leu-Lys

86. Intermediate filaments are polymers of fibrous proteins made up of

A) Actin and tubulin with heptad repeats

B) amino terminal head, central rod domain, carboxyl terminal

C) amino terminal head, central rod domain with heptad repeats, carboxyl terminal

D) amino terminal head, central rod domain, carboxyl terminal heptad repeats

(Continued)

87. Polymerization of pure actin *in vitro* requires ATP as well as both monovalent and divalent cations of

A) Na^+ and K^+ B) Mg^{2+} and K^+ C) Ca^{2+} and Mg^{2+} D) Mg^{2+} and Zn^+

88. Select the correct statement:

In dihybrid cross,

A) tightly linked genes on the same chromosomes show higher recombination

B) tightly linked genes on the same chromosomes show very few recombination

C) genes far apart on the same chromosome show very few recombination

D) genes loosely linked on the same chromosome show similar recombination

89. Identify the condition in human which is correctly matched with its chromosomal abnormality.

A) Erythroblastosis foetalis; X-linked

B) Down's syndrome; 44 autosome+XXY

C) Klinefelter syndrome; 44 autosome+XXY

D) Colour blindness; Y-linked

90. Test crossing in Drosophila melanogaster involves crossing between

A) two genotypes with recessive trait

B) two F_1 hybrid

C) F_1 hybrid with a double recessive genotype

D) two genotypes with dominant traits

91. A true breeding line of green pod pea plants is crossed with a true breeding line of yellow pod plants. The offspring of all have green pods. It states that the green color to yellow color is

A) recessive in nature
B) dominant in nature
C) blended type
D) none of the above

92. Mendel's work with dihybrid cross led directly to which of the following?

A) Chromosomal theory of inheritance
B) Theory of Biological evolution
C) Law of independent assortment
D) Law of segregation

93. In a plant, gene for tallness is represented as '*T*' and its recessive dwarfness is represented as '*t*', and for its color red is represented as '*R*' and for its recessive allele white as '*r*'. When a tall and red plant with genotype *TtRr* is crossed with dwarf and red flowered plant with genotype *ttRr*, what is the percentage of drawf and white flowered offspring of above cross.

A) 50%
B) 25%
C) 12.5%
D) 6.25%

94. Identify the condition which correctly describes the manner of determining the sex:

A) Homozygous sex chromosomes (ZZ); female sex in birds
B) Sex chromosome type (XO); male sex in grasshopper
C) Human sex chromosome (XO) in Turner's syndrome; female sex
D) Homozygous sex chromosomes (XX); male sex in Drosophila

95. Huntington's disease is caused by a mutation in *HTT*gene locus at chromosome 4p. The onset of this diseases has been studied to affect an average age group of 35 years and majority of the individuals affected are heterozygote. A 25 year old women with no symptoms, who is a daughter of a man affected with Huntington's disease and a mother who does not have Huntington disease. What is the chance of mutant *HTT* allele in her child?

A) 25%
B) 50%
C) 75%
D) 100%

(*Continued*)

96. Match the following correctly

(i) Pleiotropism	a. More than two optional forms of gene
(ii) Multiple alleles	b. Multiple effect of a single gene
(iii) Polygenic inheritance	c. Quantitative inheritance
(iv) Co-dominance	d. Both gene express independently

A) (i-c)(ii-d)(iii-a)(iv-b) B) (i-b) (ii-a)(iii-c)(iv-d)

C) (i-d)(ii-b)(iii-d)(iv-c) D) (i-a)(ii-c)(iii-b)(iv-d)

97. An allele for suppressor of night blindness produces an inactive enzyme would be classified as which kind of allele?

A) Dominant B) Recessive C) Gain of function D) Loss of function

98. Distinctive membrane molecules of TH lymphocytes can interact with antigen via

A) CD4 with MHC II B) CD4 with MHC I

C) CD8 with MHC I D) CD8 with MHCII

99. Bursa of Fabricius is the site of B-cell origin and development in

A) Human B) Mice C) Birds D) Primate

100. MHC I and MHC II have the molecular assembly as

A) $\alpha 1$, $\alpha 2$, $\alpha 3$ β and $\alpha 1$, $\alpha 2$, $\beta 1$, $\beta 2$ respectively

B) $\alpha 1$, $\alpha 2$, $\beta 1$, $\beta 2$ and $\alpha 1$, $\beta 1$, $\beta 2$, $\beta 3$ respectively

C) $\alpha 1$, $\alpha 2$, $\beta 1$, $\beta 2$ and $\alpha 1$, $\alpha 2$, $\beta 1$, $\beta 2$ respectively

D) $\alpha 1$, $\beta 1$, $\alpha 2$, $\beta 2$ and $\alpha 1$, $\beta 2$, $\alpha 2$, $\beta 1$ respectively