Sikkim Public Service Commission

Main Written Examination for the Post of Sikkim State Civil Service

OPTIONAL PAPER - ZOOLOGY

Time Allowed : 3.00 Hrs. | Maximum Marks : 300

INSTRUCTIONS TO CANDIDATES

Read the following instructions carefully before answering the questions :-

1. **IMMEDIATELY AFTER THE COMMENCEMENT OF THE EXAMINATION, YOU SHOULD CHECK THAT THIS TEST BOOKLET DOES NOT HAVE ANY UNPRINTED OR TORN OR MISSING PAGES OR ITEMS ETC. IF SO, GET IT REPLACED BY A COMPLETE TEST BOOKLET.**

2. Please note that it is the candidate's responsibility to fill in the Roll Number carefully and without any omission or discrepancy at the appropriate places in the **OMR ANSWER SHEET** as well as on **SEPERATE ANSWER SHEET** for MCQ / SUBJECTIVE PAPER. Any omission/discrepancy will render the Answer Sheet liable for rejection.

3. **Use only Black Ball Point Pen to fill the OMR sheet**

4. Do not write anything else on the OMR Answer Sheet except the required information.

5. **This Test Booklet contains 75 items (questions) in MCQ Mode in Part I to be marked in OMR Sheet and Part II Subjective Questions, which has to be written on seperate answer sheet provided to you.**

6. **All items from 1 to 75 carries 2 mark each .**

7. Before you proceed to mark in the Answer Sheet (OMR), you have to fill in some particulars in the Answer Sheet (OMR) as per given instructions.

8. After you have completed filling in all your responses on the Answer Sheet (OMR) and the examination has concluded, you should hand over the Answer Sheet (OMR) and Seperate answer sheet to the Invigilator only . You are permitted to take away with you the Test Booklet.

9. **Marking Scheme**

   THERE WILL BE NEGATIVE MARKING FOR WRONG ANSWERS MARKED BY A CANDI DATE IN THE OBJECTIVE TYPE QUESTION PAPERS.

   (i) There are four alternatives for the answer to every question. For each question for which a wrong answer has been given by the candidate, one-third of the marks assigned to that question will be deducted as penalty.

   (ii) If a candidate gives more than one answer, it will be treated as a wrong answer even if one of the given answers happens to be correct and there will be same penalty as above to the question.

   (iii) If a question is left blank. i.e., no answer is given by the candidate, there will be no penalty for that question.

DO NOT OPEN THIS TEST BOOKLET UNTIL YOU ARE ASKED TO DO SO

Paper - ZOOLOGY

PART – I : OBJECTIVE / MCQ

Each question carries 2 marks: **(75X2= 150 Marks)**

1. The human hind brain comprises three parts, one of which is
   a. Cerebellum
   b. Hypothalamus
   c. Olfactory
   d. Corpus callosum

2. The hormones that can easily pass through the cell membrane of the target cell and bind to a receptor (mostly in the nucleus)
   a. Somatostatin, oxytocin
   b. Cortisol, testosterone
   c. Insulin, Growth hormone
   d. Thyroxin, Insulin

3. The leydig cells are the secretory source of
   a. Glucagon
   b. Androgens
   c. Progesterone
   d. Thyroxin

4. Select the correct statement from the ones given below with respect to Periplaneta americana
   a. There are 16 very long Malpighian tubules present at the junctions of midgut and hindgut
   b. Grinding of food is carried out only by the mouth parts
   c. Nervous system located dorsally, segmented body and ganglia joined by a pair of longitudinal connective
   d. Males having a pair of short thread like anal styles

5. Cell eating can best be described as
   a. Pathocytosis
   b. Cytopathology
   c. Phagocytosis
   d. All of the above

6. Sexual cycle of malaria parasite
   a. Completed in vertebrate host
   b. Start in invertebrate host complete in mosquito

c. Start in mosquito completed in vertebrate host
d. None of the above

7. The drug which binds to receptor site and stops communication process of cell is called
   a. antagonists
   b. agonists
   c. target
   d. enzyme

8. Cell theory cannot be applicable to
   a. Protozoa
   b. Algae
   c. Virus
   d. Fungi

9. Semiautonomous organelle in the cell is represented by
   a. Golgi
   b. peroxisome
   c. Mitochondria
   d. Endoplasmic reticulumn

10. The subunits of prokaryotic ribosomes are
   a. 60S+40S
   b. 60S+30S
   c. 70S+30S
   d. 50S+30S

11. Smooth Endoplasmic reticulum is the site of
   a. Protein synthesis
   b. Carbohydrate synthesis
   c. Lipid Synthesis
   d. Amino acid synthesis

12. Nematocysts are found in which of the following phylum
   a. Cnidaria
   b. Mollusca
   c. Annelida
   d. Porifera

13. Hydra prevents self fertilization due
   a. Protogynous
   b. Hermaphrodite

c. Protandry
d. None

14. The most primitive invertebrate form possessing both musculoepithelial and nerve cells is represented by
    a. Sycon
    b. Hydra
    c. Fasciola
    d. Arthropoda

15. Blood flows through sinuses in
    a. Open circulation
    b. Close circulation
    c. Portal circulation
    d. All of the above

16. Which organ receives only oxygenated blood
    a. Liver
    b. Lung
    c. Spleen
    d. None

17. Implantation of blastocyst normally occurs on
    a. Day -5
    b. Day -6
    c. Day -9
    d. Day -4

18. Primary oocyte is considered as
    a. Diploid
    b. Haploid
    c. Polyploid
    d. None

19. MSH is secreted by
    a. Interior lobe of pituitary gland
    b. Posterior lobe of pituitary gland
    c. Endostyle
    d. Thymus gland

20. Which one of the following is not the secondary messenger of the cells
    a. C-AMP
    b. Calcium

c. C-GMP
d. Sodium

21. The gland which has odorous secretion in mammals?
    a. Bertholin
    b. Pituitary
    c. Thymus
    d. None

22. The most important requirement for evolution is
    a. Mutation
    b. Variation
    c. Natural selection
    d. Continuity of germplasm

23. Ducchene Mascular Dystrophy is a
    a. Dominant sex linked disorder
    b. Dominant autosomal disorder
    c. Recessive sex linked disorder
    d. Recessive autosomal disorder

24. Wobble hypothesis was proposed by
    a. Crick
    b. Watson
    c. Nirenberg
    d. Khorana

25. All are reducing sugars except
    a. Sucrose
    b. Glucose
    c. Maltose
    d. Lactose

26. Blood of Cockroach contains no pigment, it means that
    a. Respiration is anaerobic
    b. Cockroach does not respire
    c. O2 goes directly into tissue by diffusion
    d. O2 goes into tissue by intercellular capillary system

27. Protein found in eye lens is
    a. Crystalline
    b. Collagen

c. Opsin
d. Rhodopsin

28. The wish-bone or Merry-thought bone of birds is
    a. Sternum
    b. Scapula
    c. Coracoid
    d. Furcula

29. The largest gland of adult man is
    a. Thymus
    b. Liver
    c. Thyroid
    d. Pancreas

30. Bohr effect is related with
    a. Carbon level in lymph
    b. Oxygen and haemoglobin association
    c. Reduced oxygen level in arteries
    d. All of the above

31. Food web is constituted by
    a. Various interlinked food chain in a community
    b. Relationship between animals and plant
    c. Relationship between animals, plants and microbes
    d. None of the above

32. In Glycolysis glucose is converted into a compound which is
    a. PEP
    b. Pyruvic acid
    c. Citric acid
    d. Acetyl CoA

33. Dentine is secreted by which of following
    a. Odontoblast
    b. Osteochlast
    c. Osteoblast
    d. Chondroblast

34. Evolution of different species in a given area starting from a point and spreading to other geographical areas is known as
    a. Migration
    b. divergent evolution

c. Adaptive radiation
d. Natural selection

35. Which organelles group is involved in manufacturing the proteins needed by the cell?
    a. Mitochondria, vacuole, ribosome
    b. Ribosome, rough ER.
    c. Vacuole, lysosome, rough ER, smooth ER
    d. Smooth ER, ribosome.

36. Lysozyme cleave the bond linkage of
    a. Phosphoester bond
    b. Phosphodiester bond
    c. Glycosidic bond
    d. peptide bond

37. Serine proteases is inhibited by\
    a. chloromethylketone
    b. Diisopropylphosphofluoridate
    c. Triisopropylphosphofluoridate
    d. none of above

38. Which one is not a protein?
    a. Chymotrypsin
    b. Trypsin
    c. Ribozyme
    d. Elastase

39. Thiamine pyrophosphate is a cofactor of enzymes
    a. Lactate dehydrogenase
    b. Pyruvate dehydrogenase
    c. Glycogen phosphorylase
    d. Pyruvate carboxylase

40. V_{max} is decreases but Km remains unchanged in
    a. Noncompetitive Inhibitor
    b. Competitive Inhibitor
    c. Irreversible Inhibitor
    d. Uncompetitive Inhibitor

41. Which enzymes do not follow Michaelis-Menten Kinetics
    a. Inhibitor enzymes
    b. Regulatory enzymes

c. Catalytic enzymes
d. Allosteric Enzymes

42. Serum γ-glutamyl transferase activity is elevated in
a. Pancreatitis
b. Malaria
c. Alcohalism
d. Myocardial infarction

43. Which is the high energy compound
a. Phosphocreatine
b. Phosphocreatinine
c. Adenine diphosphate
d. Glucose 6-phosphate

44. Electron transport chain is operated in
a. Neuleus
b. Lysosome
c. Mitochondria
d. Ribosome

45. A negative sign of free energy indicates the reaction is
a. Entergonic
b. Exergonic
c. Nonspontaneous
d. Both a & b

46. The storage form of high energy compound in invertebrate is
a. Phosphotyrosine
b. Phospholysine
c. Phosphoarginine
d. Phosphotyptophan

47. Salivary α-amylase become inactive in stomach due to
a. Inactivation of low pH
b. Inactivation of gastric pepsin
c. Inhibition of Cl—
d. Inactivation of peptidase

48. The storage form of high energy compound in invertebrate is
a. Phosphotyrosine
b. Phospholysine
c. Phosphoarginine
d. Phosphotyptophan

49. Superoxide is converted into H_2O_2 by the enzymes is
    a. Catalase
    b. Superoxide dismutase
    c. Invertase
    d. Phosphatase

50. Transport of glucose from lumen to intestinal mucosal cell is coupled with the diffusion of
    a. Na+
    b. K+
    c. Cl—
    d. HCO3—

52. Most efficiently absorbed monosaccarides
    a. Glucose
    b. Galactose
    c. Fructose
    d. Mannose

53. Digestion of protein starts from
    a. Stomach
    b. Mouth
    c. Intestine
    d. Liver

54. Immunoglobulin is a
    a. Lipoprotein
    b. Phospholipid
    c. Glycolipid
    d. Glycoprotein

55. Sickle cell anemia is resistance to
    a. Filaria
    b. Diabeties
    c. Malaria
    d. Cancer

56. The compound that facilitates the release of oxygen from oxyhaemoglobin is
    a. 2,3-bisphophoglycerate
    b. H+

c. Cl—
d. All of them

57. Myelin Sheath of nerve cell made by
    a. Sphingomyelin
    b. Phosphotidylcholine
    c. phosphotidylinositol
    d. Glycerophospholipid

58. Which is a neurotransmitter?
    a. Acetyl glutamine
    b. Acetylcholine
    c. Acetyl ethanolamine
    d. Acetylserine

59. Which is correct for the concentration of Na+ and K+ across the membrane potential in the cell
    a. High concentration of K+ inside and high concentration of Na+ outside
    b. High concentration of K+ inside and low concentration of Na+ outside
    c. Low concentration of K+ inside and high concentration of Na+ outside
    d. Low concentration of K+ inside and Low concentration of Na+ outside

60. Tetradoxin block the channel of
    a. K+
    b. Cl—
    c. Na+
    d. Ca2+

61. Which of the following is not an ameboid movement theory?
    a. Contraction-hydrolic theory
    b. Surface tension theory
    c. Walking movement theory
    d. Wobbling theory

62. Obelia a colonial hydrozoa is found in
    a. Brackish water
    b. Marine water
    c. Fresh water
    d. All of above

63. Curved tail in Ascaris are normally
    a. Close to anus in female
    b. Close to Gonopore in female

c. Close to spicule in male
d. Close to excretory pore in female

64. The main function of centromere is
a. Osmoregulation
b. Secretion
c. Protein synthesis
d. Formation of spindle fibre

65. Evolution of different species in givin area starting from a point and spreading to other geographical areas is known as
a. Migration
b. Divergent evolution
c. Adaptive radiation
d. Natural Selection

66. Independent assortment is absent in case of
a. Gene located on same chromosome
b. Gene located on homologous chromosome
c. Gene located on non-homologous chromosome
d. All of the above

67. Lysosome are not present in the cell type
a. Muscle cells
b. Acinal Cells
c. Erythrocyte
d. Hepatocytes

68. Stem cells can be defined as
a. The first cells of mitosis in meristem region
b. Cells harvested in the brain stem
c. The cells found in the fluid of spinal chord
d. Embryonic cells with no predetermined developmental destiny

69. Cancer of the epithelial cells are called
a. Carcinoma
b. Sarcoma
c. Leukaemia
d. None of these

70. Fish is a poor source of ?
a. Iron
b. Phosphorous

c. Iodine
d. Vitamin A

71. Linked genes are
    a. Located on different chromosome of the same size and shape
    b. Rarely inherited together
    c. Located on same chromosome
    d. All of the above

72. Essential for tumour metastasis is?
    a. Angiogenesis
    b. Tumorogenesis
    c. Apoptosis
    d. All of the above

73. Which of the following is not a derivative of cholesterol?
    a. Vitamin D
    b. Vitamin E
    c. Bile Salt
    d. Steroid hormones

74. Turner syndrome is due to
    a. Trisomy of chromosome 21
    b. Trisomy of chromosome 18
    c. Autosomal recessive gene
    d. Absence of sex chromosome

75. Green house gases can be said as
    a. Absorber of long long wave heat radiation from earth
    b. Transparent to both solar radiation and long wave radiation from earth
    c. Absorber of solar radiation for warming the atmosphere of the earth
    d. All of the above

PART – II

Subjective / conventional : Marks: 150

This paper consists of : A - 10 question of 5 marks each.....50 Marks

B - 5 question of 10 marks each.....50 Marks

C - 2 question of 25 marks each.....50 Marks

A. Attempt only 10 questions, each question carries 5 marks.

1. Explain Fluid Mosaic Model of Plasma Membrane
2. Write a note on Meiotic prophase
3. Discuss the dihybrid ratio of Mendalism
4. Write a note on sexual reproduction in Paramicium
5. Explain Parasitic adaptations in Ascaris
6. Describe the histology of mammalian skin with the help of suitable diagram
7. Draw a well labelled diagram of urinogenital system of frog
8. How the carbohydrate is digested in a mammalian alimentary canal? Summarise
9. Explain Neoteny with suitable examples
10. Summarise the principles of Darwanism
11. What is cleavage? Explain its types in the development of various animal groups
12. Discuss the food chain in grass land ecosystem
13. Explain symbiosis with suitable examples
14. Describe the prospects of Sericulture in India?

B. Attempt only 5 questions, each question carries 10 marks.

1. Classify Phylum Porifera and its canal system
2. Explain the life cycle of Plasmodium
3. Summarise the structure and function of Golgi body
4. Briefly describe the sense organs in Cockroaches
5. Discuss the structure and affinities of balanolglossus
6. What do you understand by retrogressive metamorphosis
7. Write a note on chronobiology and circadian system?
8. What is Lac culture? Explain the methodology

C. Attempt only 2 questions, each question carries 25 marks.

1. Give a comparative account of the anatomy of vertebrate heart and circulatory system
2. Describe the events involved in mammalian oogenesis and hormonal involvements in ovulation
3. Explain the phenomenon of isolation and its role in evolution
4. Discuss environmental pollution and its possible preventive measures