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TEST BOOKLET

Sl. No: 0928

Subject Code: 25

Subject: ZOOLOGY

WRITTEN TEST FOR RECRUITMENT OF POST GRADUATE TEACHERS FOR NON-GOVT. AIDED HIGHER SECONDARY SCHOOLS OF ODISHA

Time Allowed : 2 Hours

Maximum Marks: 150

: INSTRUCTIONS TO CANDIDATES:

1. **IMMEDIATELY AFTER THE COMMENCEMENT OF THE EXAMINATION, YOU SHOULD CHECK THAT THIS TEST BOOKLET CONTAINS 20 PAGES AND DOES NOT HAVE ANY UNPRINTED OR TORN OR MISSING PAGES OR ITEMS ETC. IF SO, GET IT REPLACED BY A COMPLETE TEST BOOKLET.**

2. You have to enter your **Roll No.** on the Test Booklet in the Box provided alongside. **DO NOT** write anything else on the Test Booklet.

3. The Test Booklet contains **100** questions. Each question comprises four options. You have to select the correct answer which you want to mark (darken) on the OMR Answer Sheet. In any case, choose ONLY ONE answer for each question. If more than one answer is darkened, it will be considered wrong.

4. You have to mark (darken) all your answers only on the **OMR Answer Sheet using BLACK BALL POINT PEN** provided by the State Selection Board. You have to do rough work only in the space provided at the end of the Test Booklet. See instructions in the OMR Answer Sheet.

5. All questions carry equal marks. While **1.5** marks will be awarded for each correct answer, each wrong answer will result in negative marking of **0.50** mark.

6. Before you proceed to mark (darken) the answers in the OMR Answer Sheet to the questions in the Test Booklet, you have to fill in some particulars in the OMR Answer Sheet as per the instructions in your Admit Card.

7. On completion of the Examination, you should hand over the **original copy of OMR Answer Sheet** issued to you to the Invigilator before leaving the Examination Hall. You are allowed to take with you the candidate's copy (second copy) of the OMR Answer Sheet along with the Test Booklet for your reference.

Candidate's full signature

Invigilator's signature

P.T.O.

1. Echinoplutes larva is found in the develpment of:

(A) Sea lily (B) Sea cucumber

(C) Sea urchin (D) Sea star

2. What is the function of dactylozoid in the polymorphic colony of a coelenterata ?

(A) Nutrition (B) Reproduction

(C) Locomotion (D) Offence and defence

3. Which of the following coelom originates from the splitting of mesoderm is present in annelids ?

(A) Schizocoelom (B) Enterocoelom

(C) Pseudocoelom (D) Protocoelom

4. Internal buds in sponges that are formed during ubfavourable conditions are known as:

(A) Buds (B) Gemmules

(C) Gastrulae (D) Reduction bodies

5. Limulus Amoebocyte Lysate (LAL) is used for the test of:

(A) Toxic substances (B) Pyrogens

(C) Solid residues (D) Foreign partcles

6. Which of the following organisms uses the "Jet-Siphon System" of locomotion ?

(A) Unio (B) Aplysia

(C) Pinctada (D) Octopus

7. Which of the following are the excretory organs of Crustacean (Prawn)?

(A) Nephridia (B) Green glands

(C) Coxal glands (D) Malpighian tubules

8. Through mosaic vision, a cockroach can receive:

(A) Several images of an object with higher sensitivity but low resolution

(B) Several images of an object with low sensitivity but higher resolution

(C) Only one image of an object with low sensitivity but higher resolution

(D) Only one image of an object with low sensitivity and low resolution

9. Which one of the following human protozoan parasite primarily affects the macrophages ?

(A) *Plasmodium Vivax* (B) *Leishmania donovani*

(C) *Trypanosoma brucei* (D) *Trichomonas vaginalis*

10. What is the infective stage of schistosoma to man ?

(A) Hydatid cyst (B) Embryonated ova

(C) Cercaria (D) Filari form larva

11. Which of the following characters is not correct about Dipnoi ?

(A) Persistent unconstricted notochord

(B) Diphycercal tail

(C) Respiration by lungs in addition to gill respiration

(D) Cartilaginous skull with amphistylic jaw suspension

12. Select the correct group/set of Australian Marsupials exhibiting adaptive radiation:

(A) Numbat, Spotted cuscus, Flying phalanger

(B) Mole, Flying squirrel, Tasmanian tiger cat

(C) Lemur, Anteater, Wolf

(D) Tasmanian wolf, Bobcat, Marsupial male

13. The migration of fishes from one location to another location within the marine water for reproduction is called as :

(A) Protamodromous (B) Anadromous

(C) Oceanodromous (D) Catadromous

14. Which of the following larva is a common ancestral form among the echinoderms, hemichordates and chordates ?

(A) Tornaria (B) Dipleurula

(C) Trochophore (D) Bipinnaria

15. Which of the following describes the identification features of non-poisonous snakes ?

(A) Cylindrical tail and small belly scales

(B) Cylindrical tail, broad transverse belly scales and 4th infralabial scale is the largest

(C) Flat tail, broad transverse belly scales and 3rd supralabial scale touches eye and nostril

(D) Cylindrical tail, broad transverse belly scales and a loreal pit between eye and nostril

16. Identify the correct statement on the aquatic adaptation of whale :

(A) Presence of non-valvular nostril

(B) Hindlimbs are modified into flippers

(C) Non-elastic, large, lobules lungs

(D) Presence of high concentration of myoglobin

17. Which of the following represents the correct dental formula of a five year human child ?

(A) $2\left[i\frac{2}{2}\ C\frac{1}{1}\ Pm\ \frac{2}{2}\ m\frac{O}{O}\right]$

(B) $2\left[i\frac{2}{2}\ C\frac{1}{1}\ Pm\ \frac{O}{O}\ m\frac{2}{2}\right]$

(C) $2\left[i\frac{2}{2}\ C\frac{1}{1}\ Pm\ \frac{2}{2}\ m\frac{2}{2}\right]$

(D) $2\left[i\frac{2}{2}\ C\frac{1}{1}\ Pm\ \frac{1}{1}\ m\frac{1}{1}\right]$

18. Which of the following organisms possesses 'Wheel organ' ?

(A) Branchiostoma

(B) Herdmania

(C) Balanoglossus

(D) Doliolum

19. Which of the following is not a flight adaptation in birds?

(A) Bones are hollow and air filled

(B) Distensible lungs facilitating bi-directional air flow

(C) Forelimbs are modified into wings

(D) Formation of broad sternum

20. Metamorphosis of amphibians is triggered by enviromental cues that act on the :

(A) thyroid (B) pituitary

(C) hypothalamus (D) eye

21. Which of the following is not a characteristic of population ?

(A) Stratification (B) Natality

(C) Mortality (D) Sex ratio

22. Which of the followin statements is correct regarding the effect of the Keystone predator in a community ?

(A) Competitively exclude other predators from the community

(B) Maintain species diversity by preying on the prey species that is the dominant competitor

(C) Increase the relative abundance of the most competitive prey species

(D) Encourage the coevolution of predator and prey adaptations.

23. Which of the following is not a greenhouse gas ?

(A) Nitrous oxide (B) Nitic oxide

(C) Methane (D) Carbon dioxide

24. "Tropical wet evergreen-type forest of western ghats extends to over 600 sq.km and providing a habitat for tiger, leopard, lion-tailed macaque and several other species. This place is also the origin of three rivers-the Nethravathi, the Tunga and the Bhadra river". The above description refers to which of the national park ?

(A) Rajiv Gandhi National Park (Nagarhole)

(B) Bannerghatta National Park

(C) Bandipur National Park

(D) Kudermukh National Park

25. Which of the following standard probability density functions is applicable to discrete Random variables ?

(A) Gaussian distribution
(B) Poisson distribution
(C) Rayleigh distribution
(D) Exponential distribution

26. When conducting an ANOVA, F_{DATA} will always fall within what range ?

(A) Between negative infinity and infinity
(B) Between zero and one
(C) Between zero and infinity
(D) Between one and infinity

27. When the regression line passes through the origin then..... what ?

(A) The intercept is zero
(B) The regression coefficient is zero
(C) The correlation is zero
(D) The association is zero

28. Among the following statements, which is the correct one, that refers to a Lactotype ?

(A) It is a duplicate of holotype
(B) A specimen described along with holotype
(C) Primary specimen cited by the author and upon which the name is based
(D) A specimen later selected from a group of syntypes to serve as the type specimen for a species, after its original description was published.

29. Which species concept utilizes the morphological and/or molecular characters to distinguish between species ?

(A) Evolutionary
(B) Ecological
(C) Biological
(D) Phylogenetic

30. Acid rain is due to increase in atmospheric concentration of :

(A) Ozone and dust
(B) CO_2 and CO
(C) SO_2 and CO
(D) SO_2 and NO_2

31. Which one of the following is an example of Gametic isolation ?

(A) Post mating and prezygotic isolation (B) Premating isolation

(C) Post zygotic isolation (D) Ethological isolation

32. Micro-evolution is the term used for changes in allele frequencies that occur over time. This occurs:

(P) Within a population at species level

(Q) Within a community at genus level

(R) Due to appearance of new genes from infections

(S) Due to mutation, natural selection, gene flow and genetic drift

Which of the following combinations is appropriate ?

(A) 'P' and 'R' (B) 'Q' and 'R'

(C) 'P' and 'S' (B) 'Q' and 'S'

33. The 'Biological clock' in higher vertebrates is regulated by :

(A) The Pituitary gland

(B) Cerebral Contex

(C) Supra-chiasmatic nucleus in hypothalamus

(D) Thymus

34. The pheromone which produces an immediate motor response, such as the initiation of a mounting sequence is known as :

(A) Priming pheromone (B) General pheromone

(C) Specific pheromone (D) Signaling pheromone

35. Which of the following is not a necessary condition for Hardy-weinberg Equilibrium?

(A) Large population size (B) Random mating

(C) Migration of individuals (D) No mutation

36. Which of the following statements best characteries natural selection?

(A) Natural selection is the mechanism by which predetermined adaptations are passed to offsprings from parents.

(B) Natural selection is the different survivorship and reproduction of organisms that have favourable adaptations.

(C) The natural environment is not involved with the process of natural selection, the haritability of traits is what drives evolution.

(D) For natural selection to occur, mutations have to be embedded in the genome.

37. Which among the following is the most primitive ancestor of *Homo sapiens* ?

(A) *Homo erectus* (B) *Australopithecus*

(C) *Ramapithecus* (D) *Homo habilis*

38. Mutation is essential for genetic variation, which one of the following events can lead to variation amongst the gametes produced by males of *Drosophila melanogaster*?

(A) Segregation (B) Imprinting

(C) Recombination (D) Independent Assortmnet

39. Male baboons establish higher or lower ranking among themselves through confrontations, this determines their :

(A) Altruism (B) Dominance hierarchy

(C) Fixed action pattern (D) Territoriality

40. Which of the following statements are not true about the Neutral theory of molecular evolution as proposed by Motoo Kimura ?

(A) The rate of evolution for most genes will be equal to the neutral mutation rate.

(B) Except for advantageous mutations, most alleles are under neutral selection.

(C) Advantageous mutations are exceedingly rare.

(D) At the level of DNA sequences, genetic drift dominates the evolution.

41. The pebrine disease of silkworm is caused by :

(A) *Nosema bombycis* (B) *Exorista bombycis*

(C) *Labia arachidis* (D) *Nosema cerranae*

42. Which of the following is the major component of honey ?

(A) Dextrose (B) Levulose

(C) water (D) Maltose

43. Which one of the following is detrimental to Pearl industry ?

(A) Cliona (B) Chelonia

(C) Pinctada (D) Euspongia

44. Following statements are concerning to the surface structure of bacteria :

1. Peptidoglycan is thinner in Gram negative than in Gram positive bacteria.
2. Lipopolysaccharides are found in both Gram positive and Gram negetive bacteria.
3. Pili mediate interaction of bacteria with mucosal epithelium.
4. Bacterial flagella are non antigenic as they have same chemical composition

Select the correct option :

(A) 1, 2 and 3 (B) 1 and 3

(C) 2 and 4 (D) 1, 2, 3 and 4

45. What is a prophage ? Select the correct one of the following :

(A) DNA of lysogenic phage, integrated into the host chromosome

(B) It is a stage of cell cycle

(C) Lambda phage DNA

(D) A plasmid

46. Which of the following methods is useful for the isolation and detection of organisms having the ability to produce antibiotics ?

(A) Auxanographic technique (B) Enrichment culture technique

(C) Crowded plate technique (D) Indicator dye technique

47. Which of the following phages do not cause lysogeny ?

(A) T_2 (B) T_1

(C) Lambda (D) P_1

48. Which of the following is not used for induced breeding in carps ?

(A) Ovaprim (B) Ovatide

(C) Wova – FH (D) Methyltestosterone

49. The process of direct uptake and absorption of fragments of bacterial DNA by the recipient is known as:

(A) Transformation (B) Transduction

(C) Conjugation (D) Transposition

50. Which of the following proteins has been produced generating a transgenic sheep, that is used for replacement therapy for individuals at risk from emphysema ?

(A) A varient of human tissue type plasminogen activator

(B) $\alpha - 1$ – antitrypsin (AAT)

(C) Casein

(D) Amyloid precursor protein

51. Cytoskeleton that bears compression as well as tension is know as :

(A) actin filament (B) intermediate filament

(C) microtubule (D) microfilament

52. Which of the following is the most likely explanation for a high percentage of crossing over between two genes ?

(A) Genes are located at different locations on the same genome

(B) Genes are located on non-homologous chromosomes

(C) Genes are located very close to each other, near the centromere on the same chromosome

(D) Genes are located far apart from each other on the same choromosome

53. Which of the following family of proteins regulates the intrinsic pathway of apoptosis ?

(A) Bcl – 2 (B) Bcl – 4

(C) Caspase – 2 (D) Caspase – 8

54. Symporters are cotransporters that transport across cell membrane. Select the correct answer for the symporter transport across the cell membrane.

(A) Small molecules and gasses in the same direction

(B) Cations and anions in the opposite direction

(C) Na+ ions and glucose against concentration gradient

(D) Glucose against its concentration gradient

55. In a Robertsonian translocation, fusion occurs at the :

(A) telomeres (B) centromeres

(C) long terminal repeats (D) end of long arms

56. At which stage of cell division, the mammalian secondary Oocyte gets arrested prior to the entry of sperm ?

(A) Prophase of Mitosis (B) Prophase of Meiosis – I

(C) G_1 Phase of mitotic cell cycle (D) Metaphase of Meiosis – II

57. In a dihybrid in F2, instead of the usual mendelian ratio of 9 : 3 : 3 :1 often ratio of 9 : 7 is obtained in some of the crosses. This is possibly due to which type of gene interactions ?

(A) Complementary genes (B) Supplementary genes

(C) Duplicate genes (D) Inhibitory genes

58. Gene mapping refers to the process of:

(A) identifying genes in a genome

(B) determining the physical location of genes on a chromosome or genome

(C) modifying genes to alter their function

(D) transferring genes between different organisms

59. Human polydactyly traits having extra fingers or toes are caused by dominant alleles. In a screening it was found that out of 42 individuals having an allele for polydactyly, only 38 of them are polydactylus. Which of the following is the correct interpretation of the above observation ?

(A) The penetrance of polydactyly is estimated to be 90%

(B) The expressivity of polydactyly is 90%

(C) This is an example of variable expressivity

(D) The polydactyly trait is showing complete penetrance

60. In which phase of cell cycle DNA becomes 2C from 4C ?

(A) S (B) G_1

(C) Metaphase (D) Anaphase

61. Which of the following functions as an enzyme as well as a procoagulant in blood coagulation ?

(A) Prothrombin (B) Calcium

(C) Thromtin (D) Fibrinogen

62. Which one of the following does not decrease the affinity between the oxygen and hemoglobin ?

(A) Rise in PCo_2

(B) Rise in Blood pH

(C) Rise in the level of intraerythrocytic 2,3 – bisphospho – glycerate (BPG)

(D) Rise in body temperature

63. Which of the following neurotransmitters would you expect to find in the synapse during fast inhibitory synaptic transmission ?

(A) GABA (B) Acetylcholine

(C) Noradrenaline (D) Glutamate

64. Which of the following parts of a nephron is impermeable to water ?

(A) Proximal convoluted tubule
(B) Distal convoluted tubule
(C) Asending limb of loop of Henle
(D) Desending limb of loop of Henle

65. Which of the following statements is correct for the fresh water fishes to maintain osmoregulation ?

(A) By taking both water and salt from the environment
(B) Continuously taking in water and eliminating excess of salt
(C) By eliminating excess of water and taking up salts from the environment
(D) By eliminating both salt and water into the environment

66. Secretion of which hormone from pars distails is under an inhibitory control of hypothalamus ?

(A) TSH
(B) Prolactin
(C) FSH
(D) ACTH

67. Which of the following enzymes mediates the final and ratelimiting step of testosterone biosynthesis in the testis ?

(A) CYP 11 A1
(B) CYP 17 A1
(C) 17β hydroxysteroid dehydrogenase (17β – HSD)
(D) 3β hydro-xysteroid dehydrogenase (3β – HSD)

68. Which one of the following is secondary messenger ?

(A) ATP
(B) GTP
(C) Inositol triphosphate
(D) Sodium

69. Which hormones are produced only during pregnancy ? Select the correct one :

(A) Estrogen and Progesteron
(B) Relaxin and Oxytocin
(C) Human chorionic gonadotropin and Human placental lactogen
(D) Luteinizing hormone and Prolactin

70. Which one of the following controls the secretion of Adrenocorticotropic hormone (ACTH) ?

(A) Epinephrine (B) Testosterone

(C) Aldosterone (D) Cortisol

71. What is the effect of 2, 4 - Dinitrophenol on mitochondria ?

(A) It blocks ATP synthesis without inhibiting electron transport by dissipating the proton gradient

(B) It blocks electron transport and ATP synthesis by inhibiting ATP - ADP exchange across the inner mitochondrial membrance

(C) It blocks elctron transport and poton pumping at complex I, II and III

(D) It interacts directly with ATP systhase and inhibits its activity

72. Which of the following steps is not involved in mRNA processing ?

(A) 5^1 capping (B) Splicing of introns

(C) Polyadenylation (D) RNA silencing

73. In eukaryotic chromatin organization, which one of the histones seals off the nucleosome at the location at which linker DNA enters and leaves the nucleosome ?

(A) H_1 (B) $H_{2A} - H_{2B}$

(C) H_3 (D) H_4

74. What is the effect of sudden increase in the levels of ATP and Citrate on an erythrocyte undergoing glycolysis ?

(A) It stimulates glycolysis

(B) It inhibits glycolysis

(C) The rate of glycolysis remains unaltered

(D) The rate of glycolysis increases gradually

75. Which of the following heat shock proteins prevent the misfolding of protein and maintain polypeptide chain in the unfolded state?

(A) Hsp 60 (B) Hsp 28

(C) Hsp 70 (D) Hsp 32

76. Each cycle of β – oxidation produces:

(A) 1 $FADH_2$, 1NAD^+ and 1 acetyl-CoA

(B) 1 $FADH_2$, 1$NADH+H^+$ and 1 acetyl-CoA

(C) 1 $FADH_2$, 1$NADH^+$ and 2 molecules of Co_2

(D) 1 FAD, 1$NADH^+$ and 2 molecules of Co_2

77. Which of the following factors is responsible for final detachment of polypeptide chain from Ribosome during translation termination ?

(A) RF_1 (B) RF_2

(C) RF_3 (D) RRF

78. In the 'Genetic Code' which of the following is considered to be the 'Wobble base'?

(A) 1st base of the Codon (B) 2nd base of the Codon

(C) 3rd base of the Codon (D) 2nd and 3rd base of the Codon

79. The kinetic pattern of an enzyme, in the presence of increasing concentration of an inhibitor shows no change in K_m but declined V_{max} value. Identify the nature of the inhibitor used :

(A) Uncompetitive (B) Non-competitive

(C) Competitive (D) Mixed-type

80. Which of the following techniques is used in DNA fingerprinting ?

(A) Western blotting (B) Eastern blotting

(C) Southern blotting (D) Northern bloting

81. Which of the following antibodies can provide naturally acquired passive immunity for the new born baby ?

(A) IgA (B) IgG

(C) IgE (D) IgM

82. Antigenic processing and presentation are required for :

(A) Cell-mediated immunity (B) Humoral immunity

(C) Innate immunity (D) Complement system

83. Which type of stem cells can be derived from the inner cell mass of a blastocyst of mammalian embryo ?

(A) Totipotent (B) Pluripotent

(C) Multipotent (D) Unipotent

84. Which of the following exhibits delayed type of hypersensitivity in human being ?

(A) Penicillin allergy (B) Contact dermatities

(C) Arthus reaction (D) Myasthenia gravis

85. The dorsal most vegetal cells of blastula which are capable of inducing the organizer are called :

(A) Primitive groove (B) Grey crescent

(C) Nieuwkoop center (D) Hensen's mode

86. Which of the following type of vaccines authorized by the Food and Drug administration, USA (FDA) and WHO are proven to be effective and safe against COVID-19?

(A) Live attenuated Vaccine (B) mRNA vaccine

(C) Conjugated vaccine (D) Toxoid vaccine

87. The process of regeneration of limb in Salamander is an example of:

(A) Morphallaxis (B) Epimorphosis

(C) Compensatory hypertrophy (D) Autotomy

88. The test that is usually done prior to transplantation surgery to determine the competibility of MHC proteins between the donor and the recipient is called:

(A) MHC matching (B) MHC typing

(C) Tissue typing (D) Blood HLA test

89. Each individual antigenic determinanat of the variable region of antibody is referred to as:

(A) Paratope (B) Epitope

(C) Agretope (D) Idiotope

90. Assisted reproductive technology, IVF involves transfer of :

(A) ovam into the fallopian tube.

(B) embryo up to 8–cell stage into the fallopian tube.

(C) embryo up to 8–cell stage into the uterus.

(D) embryo with 16 blastomeres into the fallopian tube.

91. The resolution power of transmission electron microscope is of the sub nanometer level. This is because:

(A) The focal length of the electron microscope is significantly larger

(B) The contrast is enhanced by staining with atoms of heavy onetal.

(C) The lectron beams used in electron microscope have much shorter wavelength than visible light.

(D) The electron microscope has a much greater ratio of image size to real size.

92. Which of the following forces is not used in centrifugation?

(A) Electrostatic force (B) Gravitational force

(C) Centripetal force (D) Centrifugal force

93. In agarose gel electrophoresis the DNA fragments migrate towards:

(A) Cathode

(B) Anode

(C) Does not move from the origin

(D) Partly move towards cathode and partly towards anode

94. How absorbance is related to the transmittance in Beer-Lambert's law? Select the correct option:

(A) Absorbance is the logarithm of transmittance.

(B) Absorbance is the reciprocal of transmittance.

(C) Absorbance is the negative logarithm of transmittance.

(D) Absorbance is a multiple of transmittance.

95. Which of the following is used as a carrier gas in gas chromatography ?

(A) Carbon dioxide (B) Oxygen

(C) Helium (D) Methane

96. Which of the following primers are utilized in the procedure of polymerase chain reaction (PCR) ?

(A) Single - stranded DNA oligonucleotide

(B) Double - stranded DNA oligonucleotide

(C) Double - stranded RNA oligonucleotide

(D) Single - stranded RNA oligonucleotide

97. In liquid scintillation counter, which of the following is used to convert light into electrical signals?

(A) Photo multiplier tube (B) Photo emissive tube

(C) Photo Voltaic cell (D) Photo reflector

98. Which of the following bands show only Intercalary Bands and Linear differentiation in the human Chromosome's Karyotype ?

(A) G – Bands (B) Q – Bands

(C) C – Bands (D) F – Bands

99. You have been asked to choose a fixative to fix the tissues by making the methylene bridge in proteins. Which one would you choose ?

(A) Glacial acetic acid (B) Formalin

(C) Picric acid (D) Osmium tetraoxide

100. Histochemical localization of proteins is performed by using:

(A) Sudan black

(B) Mercuric Bromophenol blue

(C) Periodic acid schiffs (PAS) reagent

(D) Iodine potassium iodide (IKI) solution