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TEST BOOKLET

Sl. No. 1203

Subject Code : 28

Subject : Zoology

LECTURERS FOR NON-GOVT. AIDED COLLEGES 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 23 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 answers. You have to select the correct answer which you want to mark (darken) on the **Answer Sheet (OMR Sheet)**. In any case choose ONLY ONE answer for each question. If more than one answer is darkened, it will be considered as 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 Answer Sheet.

5. All questions carry equal marks i.e. of one and half mark for each correct answer and 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 Answer Sheet as per the instructions in your Admit Card.

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

Candidate's full signature

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2021

SEAL

1. *Each of the following* statements concerning **Giardia lamblia** is correct except :

(A) **G. lamblia** has both a trophozoite and cyst stage in its life cycle

(B) **G. lamblia** is transmitted by the fecal-oral route from both the human and animal sources

(C) **G. lamblia** causes hemolytic anemia

(D) **G. lamblia** can be diagnosed by the string test

2. Pigs or dogs are the sources of human infection by each of the following parasites except :

(A) **Echinococcus granulosus**

(B) **Taenia solium**

(C) **Ascaris lumbricoides**

(D) **Trichinella spiralis**

3. Which one of the following parasites does not cause lymphatic filariasis ?

(A) **Brugia malayi**

(B) **Brugia timori**

(C) **Wuchereria bancrofti**

(D) **Mansonella streptocera**

4. In which of the following hosts, the parasite enters, does not undergo any development or reproduction, but remains infective to the definitive host ?

(A) Definitive host

(B) Intermediate host

(C) Paratenic host

(D) Reservoir host

5. **Entamoeba histolytica**, an intestinal parasite resides in the isotonic environment of intestine and other tissues in human body and does not posses contractile vacuoles. If this parasite is placed in fresh water, it will :

(A) Survive for longtime, until they re-enter the host environment

(B) Die due to hypoosmotic shock

(C) Not survive in water as they require high salt content

(D) Die due to hyperosmotic shock

6. Which of the following animals make use of their tube feet to perform respiration ?

(A) Silverfish

(B) Jellyfish

(C) Cuttle fish

(D) Star fish

7. What is the organ of Bojanus ?

(A) Excretory organs of lamellidens

(B) Excretory organs of Palaemon

(C) Excretory organs of Echinoderms

(D) Excretory organs of Arachnids

8. Animals belonging to the sub-phyla urochordata and cephalochordata are closer to phylum Echinodermata than other invertebrate phyla. Which one of the following reasons can account for this relatedness ?

(A) Highly evolved nervous system

(B) Radially symmetric body plan

(C) Deuterostomic development

(D) Well developed muscles

9. Which one of the following amphibian species exhibit parental care by developing their young ones (tadpoles) inside the stomach of the mother (the female parent) ?

(A) **Rheobatrachus silus**

(B) **Assa darlington**

(C) **Rhinoderma darwinii**

(D) **Alytes obstetricans**

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

(A) Uncinate process of the thoracic ribs

(B) Formation of the pygostyle

(C) Fusion of pelvis with the lumbar and sacral vertebrae

(D) Short, stout and peg like beak

11. Whale is an air breather but can live under water for a long time because it possesses :

(A) Large lungs

(B) Small lungs

(C) Blubber

(D) **Retia mirabilia**

12. Ductus caroticus a portion of the embryonic dorsal aorta located between points of junction with the third and fourth aortic arch arteries, usually disappears in early embryonic development except in one of the following group of animals. Select the correct one, where ductus caroticus persists in the adult :

(A) Turtles

(B) Lizards

(C) Crocodiles

(D) Alligators

13. Which of the following is the only vegetarian aquatic mammal ?

(A) Manatee

(B) Humpback whale

(C) Walrus

(D) Sea otter

14. Which one of the following is not an aquatic adaptation in marine mammals ?

(A) Presence of a layer of blubber beneath epidermis

(B) Highly elastic and non-lobular lungs

(C) Hindlimbs are modified into flippers

(D) Presence of dorsal fin

15. The ureters of opisthonephric kidneys represent :

(A) Wolffian ducts in male

(B) Mullerian ducts in female

(C) Wolffian duct in both the sexes

(D) Mullerian duct in both the sexes

16. In which of these animals green glands function as excretory organ ?

(A) Spiders

(B) Moth

(C) Scorpions

(D) Prawn

17. Which of the following is the common ancestral larval form of echinoderms, hemichordates and chordates ?

(A) Tornaria

(B) Dipleurula

(C) Bipinnaria

(D) Trochophore

18. Which one of the following statements about the origin of tetrapods is not true ?

(A) It is universally accepted that the tetrapods have evolved from fishes

(B) The ancestral tetrapods have originated in a specialized situation during the carboniferous period

(C) The ancestral tetrapods lived in shallow marshy locations and already possessed lungs for respiration and lobed fins to support their bodies

(D) It is now believed that labyrinthodonts were ancestors of all tetrapods and they had evolved from crossoptenygian fishes

19. Which of the following is called as "sea squirt" ?

(A) Herdmania

(B) Branchiostoma

(C) Balanoglossus

(D) Saccoglossus

20. Which one of the following statements about the heart is false ?

(A) The mitral valve separates the left ventricle from the left atrium

(B) Blood travels through the bicuspid valve to the left atrium

(C) Both the aortic and pulmonary valves are semilunar valves

(D) The mitral valve is an atrioventricular valve

21. Which junction tether cytoskeletal filaments inside the cell ?

(A) Anchoring junctions

(B) Occluding junctions

(C) Channel-forming junctions

(D) Signal-relaying junctions

22. Among the following cell structure – function pairs, identify the correctly paired one :

(A) Microvilli – engulfment of foreign bodies

(B) Cytoskeleton – cell migration

(C) Peroxisomes – cellular respiration

(D) Nucleolus – mRNA transcription

23. The organelles that function to get rid the cell of toxic substances such as hydrogen peroxide or other metabolites are known as :

(A) Lysosomes

(B) Peroxisomes

(C) Glyoxysomes

(D) Hydrogenosomes

24. Mitotic cyclin – CDK activity peaks in M phase. This is because :

(A) Mitotic cyclin is synthesized only in M phase

(B) Threshold level of mitotic cyclin accumulates only in late G_2

(C) Cyclin subunit is activated by prosphorylation only in M phase

(D) The kinase subunit is activated by dephosphorylation only in M phase

25. Which one of the following statements about meiosis is not true ?

(A) Kinetochores of sister chromatids attach to the opposite poles in meiosis – I

(B) Kinetochores of sister chromatids attach to the opposite poles in meiosis – II

(C) Chiasma is formed in prophase – I

(D) Homologous chromosomes are segregated in meiosis – I

26. In male **Drosophila melanogaster**, homologous chromosomes pair and segregate during meiosis but crossing over does not occur. At which stage of meiosis does segregation of two alleles of a gene take place in these flies ?

(A) Zygotene

(B) Diakinesis

(C) Anaphase – I

(D) Anaphase – II

27. Which of the following is an extracellular messenger of apoptosis ?

(A) Serine

(B) Tumor necrosis factor

(C) Ribozyme

(D) Translation inhibitor

28. Where does microsatellite DNA present in the chromosome ?

(A) Dispersed throughout the chromosome

(B) At the telomere end

(C) At the centromere

(D) Mainly at the metacentric region

29. 5-Bromouracil is a base analog that can cause mutation when incorporated into DNA. Which one of the following is the most likely change that 5-Bromouracil induces ?

(A) T : A to C : G

(B) T : A to A : T

(C) G : C to T : A

(D) C : G to A : T

30. A chromosomal aberration leads to change in the order of genes in a genetic map but does not alter its linkage group. This is due to :

(A) Translocation

(B) Recombination

(C) Transposition

(D) Inversion

31. Chirality of DNA is due to :

(A) The bases

(B) Base stacking

(C) Deoxyribose

(D) Hydrogen bonds between bases

32. 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

33. The TATA box is found in the vicinity of the transcription start site. The role of this box is to :

(A) Serve as a ribosome recruitment site

(B) Serve as RNA polymerase binding site

(C) Provide 3-D structural integrity to a DNA molecule

(D) Act as a terminator sequence

34. Which of the following is not the step involved during mRNA processing ?

(A) 5′ capping

(B) Splicing of introns

(C) Polyadenylation

(D) RNA silencing

35. In which of the following cases the first base of anticodon can not pair with two codons coding for same amino acid ?

(A) When the first base of anticodon is A

(B) When the first base of anticodon is G

(C) When the first base of anticodon is Inosine

(D) When the first base of anticodon is U

36. Which of the following is an example of head-and-tail bacteriophage ?

(A) M_{13}

(B) Lambda phage

(C) Pbr 322

(D) M_{16}

37. Which infection cycle is characterized by retention of the phage DNA molecule in the host bacterium for many thousands of cell division ?

(A) Lysogenic cycle

(B) Lytic cycle

(C) Integrative phase

(D) Protein synthesis

38. At what stage in the control of gene expression does histone acetylation occur ?

(A) Pre-transcription

(B) Post-transcription

(C) Pre-translation

(D) Post-translation

39. The region where bacterial genome resides is known as :

(A) Nucleus

(B) Nucleosome

(C) Necleoid

(D) Ribosome free region

40. The partial diploids formed as a result of sexual reproduction in bacteria is termed as :

(A) Zygotes

(B) Haplozygotes

(C) Prozygotes

(D) Merozygotes

41. During the transport of carbon dioxide in the blood, HCO_3^- diffuses from erythrocytes to plasma and in turn effects the ionic equilibrium momentarily. In order to keep the ionic balance, an equal number of chloride ions pass into the erythrocytes from plasma. This process is known as :

(A) Hamburger phenomenon

(B) Bicarbonate shift

(C) Ionic transport

(D) Bohr effect

42. During the process of blood coagulation which of the following factors are activated by thrombin ?

(A) Factors XI, VIII and V

(B) Factors XI, IX and X

(C) Factors VIII, X and V

(D) Factors IX, VIII and X

43. Which one of the following cells in the renal corpuscle can influence glomerular filtration by its contraction ?

(A) Podocytes

(B) Endothelial cells of glomerular capillaries

(C) Parietal epithelial cells of Bowman's Capsule

(D) Mesangial cells

44. The opening of axon membrane voltage-gated potassium channels is responsible for which part of the action potential ?

(A) Depolarisation of the membrane

(B) Repolarisation of the membrane

(C) Contraction of the post synaptic muscle fibre

(D) Signalling vesicular release of neurotransmitters

45. Which one of the following neurotransmitters is secreted by the preganglionic neurons of sympathetic nervous system ?

(A) Epinephrine

(B) Dopamine

(C) Acetylcholine

(D) Norepinephrine

46. Which one of the following amino acid change (mutation) would most adversely affect the structure of an α-helix ?

(A) A valine residue changed to an isoleucine residue

(B) A methionine residue changed to a proline residue

(C) An aspartic acid residue changed to a glutamic acid residue

(D) A histidine residue changed to an arginine residue

47. Which of the following is an example of storage protein ?

(A) Dehydrogenase

(B) Myoglobin

(C) Hemoglobin

(D) Immunoglobin

48. Which of the following pair of amino acids are both glucogenic and ketogenic in nature ?

(A) Glycine and Alanine

(B) Lysine and Leucine

(C) Tyrosine and Tryptophan

(D) Aspartate and Glutamate

49. Which one of the following mucopolysaccharides does not contain glucuronic acid ?

(A) Chondroitin sulfate

(B) Hyaluronic acid

(C) Keratan sulfate

(D) Heparan sulfate

50. The first step in glycogen breakdown releases glucose units as :

(A) Glucose-6-phosphate

(B) Glucose-1-phosphate

(C) Glucose

(D) Glucose and glucose-6-phosphate

51. The energy-rich fuel molecules produced in the citric acid cycle are :

(A) 2 GTP, 2 NADH and 1 $FADH_2$

(B) 1 GTP, 2 NADH and 2 $FADH_2$

(C) 1 GTP, 3 NADH and 1 $FADH_2$

(D) 2 GTP and 3 NADH

52. Which of the following acts as the starting material for purine biosynthesis ?

(A) 5-methyl thymidine

(B) Ribose 5-phosphate

(C) 5-Fluoro uracil

(D) Phosphoribosyl pyrophosphate (PRPP)

53. Which one of the following hormones is responsible for mobilizing calcium from bone and increasing urinary excretion of phosphate ?

(A) Calcitonin

(B) Angiotensin II

(C) Parathormone

(D) Vasopressin

54. Which one of the following is not a second messenger ?

(A) Cyclic GMP

(B) Diacylglycerol

(C) Inositol triphosphate

(D) Phosphatidyl inositol

55. Which one of the following human serum immunoglobulins takes part in classical complement fixation pathway ?

(A) IgD

(B) IgE

(C) IgA

(D) IgG

56. Which of the following class of immunoglobulin is pentameric in structure ?

(A) IgA

(B) IgD

(C) IgH

(D) IgM

57. Artificially acquired passive immunity refers to immunity from :

(A) Transfer of antibodies from mother to foetus across the placenta

(B) Recognition of an antigen by B Cells

(C) Injection of the antigen in a vaccination

(D) Intra-venous injection of immunoglobulins

58. Which one of the following is responsible for importing diversity of antibodies ?

(A) CDR

(B) Hinge region

(C) Epitope

(D) Agretope

59. Which of the following is not the commonly used adjuvant present in a vaccine ?

(A) Formaldehyde

(B) Aluminum phosphate

(C) Potassium aluminum sulfate

(D) Aluminum hydroxide

60. Recombinant plasmids encoding antigenic protein from a pathogen that is directly injected into the cells where they express, constitute :

(A) Protein Vaccines

(B) Nucleotide vaccines

(C) DNA vaccines

(D) Recombined vaccines

61. Which one of the following statements explains about Neo-Darwinism ?

(A) Without mutation there can be no evolution

(B) Natural force is the only and supreme force in evolution

(C) Evolution occurs because there is struggle for existence leading to the survival of the fittest

(D) Natural selection, Mendelism and mutations work in tandem for evolution

62. The speciation in which a population splits into two geographically isolated populations experience dissimilar selective pressure and genetic drift is known as :

(A) Sympatric speciation

(B) Allopatric speciation

(C) Parapatric speciation

(D) Peripatric speciation

63. Which one of the following is used for knowing whether or not a population is evolving ?

(A) Genetic drift

(B) Hardy-Weinberg equation

(C) Degree of evolution

(D) Proportion between acquired variations

64. Photochemical smog is a resultant of the reaction among :

(A) NO_2, O_3 and peroxyacetyl nitrate in the presence of sunlight

(B) CO, O_2 and peroxyacetyl nitrate in the presence of sunlight

(C) CO, CO_2 and NO_2 at low temperature

(D) High concentration of NO_2, O_3 and CO in the evening

65. Why does the oxygen concentration in the water decrease when sewage is discharged into a river ?

(A) Decrease in the number plants

(B) Increase in the number of fish

(C) Rapid growth of bacteria

(D) Less oxygen absorbed from the air

66. Fly ash is an environmental pollutant produced by :

(A) Thermal power plant

(B) Oil refinery

(C) Fertilizer plant

(D) Strip mining

67. Small geographic areas with significant varieties of fauna and flora, high concentrations of endemic species and a large number of endangered and threatened species are known as :

(A) Endemic sinks

(B) Critical communities

(C) Biodiversity hotspots

(D) Endemic metapopulations

68. Which of these programs is not used to conserve a species facing extinction ?

(A) **Ex-situ** conservation

(B) **In-situ** conservation

(C) Development of germplasm bank

(D) Hybridization

69. Which one of the following is not used for induced breeding in Carps ?

(A) Ovaprim

(B) Ovatide

(C) Wova-FH

(D) Methyltestosterone

70. Which layer of the mantle of Pearl Oyster is known as the mother of the pearl ?

(A) Periostracum

(B) Nacreous

(C) Prismatic layer

(D) Mantle epithelium

71. 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

72. Which of the following substance is released by the human sperm to dissolve the egg membrane and aids the penetration of sperm into the layers surrounding the egg, thus allowing fertilization ?

(A) Hyaluronic acid

(B) Hyaluronidase

(C) Fertilizin

(D) Antifertilizin

73. The part of the embryo from which the ectoderm, mesoderm and endoderm are formed in chick is known as :

(A) Primitive streak

(B) Hypoblast

(C) Epiblast

(D) Cytotrophoblast

74. The group of cells of amphibian blastula capable of inducing the organizer is called as :

(A) Hensen's node

(B) Nieuwkoop centre

(C) Dorsal blastopore lip

(D) Hypoblast

75. The process of limb regeneration in Salamander is known as :

(A) Epimorphosis

(B) Morphallaxis

(C) Heteromorphosis

(D) Compensatory regeneration

76. The cells of inner cell mass of a blastocyst stage of mammalian embryo are :

(A) Totipotent

(B) Pluripotent

(C) Multipotent

(D) Unipotent

77. Morphologically similar species on interbreeding produce viable fertile offsprings. According to which concept, they are considered as single species ?

(A) Morphological species concept

(B) Evolutionary species concept

(C) Biological species concept

(D) Genetic species concept

78. The most commonly used molecular tool for phylogenetic analysis involves sequencing of :

(A) Mitochondrial DNA

(B) Mitochondrial RNA

(C) Ribosomal RNA

(D) Nuclear DNA

79. Among the following statements, which is the correct one that refers to a holotype ?

(A) Specimens collected from different locations and designated as type specimens by the author

(B) A single specimen or illustration upon which description and name is based and designed as nomenclature type by the author

(C) Specimens collected from different places and designed as type specimen

(D) A single specimen designated to serve as nomenclatural type when all of the materials on which the name of the taxon was based is missing

80. Which one of the following is an incorrect statement about Binomial nomenclature ?

(A) Bionomial nomenclature has two parts, namely generic epithet and specific epithet and also some descriptive information along with them

(B) Bionomial nomenclature helps you to identify the relationship between animals

(C) The rules for binomial monenclature are set by IUCN

(D) Binomial nomenclature is introduced in order to avoid ambiguity that arises due to the different names for the same animal in different places and different languages

81. Which one of the following statement regarding restriction / modifying endonuclease enzymes used in recombinant DNA technology is correct ?

(A) Endonucleases remove nucleotides, one at a time, from the end of a sequence

(B) Type – II class of restriction enzymes do not recognise palindromic sequences

(C) Enzyme nuclease acts on double stranded DNA or RNA termini

(D) Type – II class of restriction enzymes can generate either "sticky" (staggered) or "blunt" cuts

82. Which cloning technique is used to clone the whole organism ?

(A) DNA cloning

(B) Therapeutic cloning

(C) Gene cloning

(D) Reproductive cloning

83. Orientation of a cloned DNA fragment (gene) in a plasmid vector can be checked by :

(A) PCR using two gene-specific primers

(B) Restriction digestion with an enzyme that has a single restriction site within the cloned gene and none in the vector

(C) PCR using a combination of one gene-specific primer and one vector-specific primer

(D) Restriction digestion with an enzyme that has two restriction sites within the vector sequence and none in the cloned gene

84. Which one of the following is just the cloning plasmid but not an expression plasmid ?

(A) PBAD-18-Cam

(B) PBCSK

(C) PUC-18

(D) PET

85. You are inserting your gene of interest into the lac Z gene in a plasmid also containing a tetracycline resistant gene. You plate your transformed bacteria on a medium containing tetracyclin and X-gal. Which of the following results would indicate a clone with recombinant plasmids with gene of interest inserted into Lac Z gene ?

(A) A clone which did not grow on the tetracycline plates

(B) A white colony on the tetracycline plates

(C) A blue colony on the tetracycline plates

(D) A red colony on the tetracycline plates

86. Select the particular type from the following methods in which the cloned gene is directly transferred into the tissues of patients :

(A) Virus mediated gene transfer

(B) In-vitro gene transfer

(C) Ex-vivo gene transfer

(D) In-vivo gene transfer

87. Interferon Type – I mediate the early innate immune response to virus. Which of the following viral antigens activates production of Type – I interferon ?

(A) Capsid protein

(B) Double-stranded RNA

(C) Double-stranded DNA

(D) Single-stranded DNA

88. Transgenic goats have been used to produce which of the following proteins that is used for dissolving blood clots ?

(A) Amyloid precursor protein

(B) Alpha 1 (α_1) – anti trypsin (AAT)

(C) Casein

(D) A variant of human tissue-type plasminogen activator

89. Which of the following is used for Reverse Transcription – Polymerase Chain Reaction (RT – PCR) ?

(A) mRNA as a template to form cDNA

(B) RNA as a template to form DNA

(C) DNA as a template to form SS DNA

(D) SS DNA as a template to form RNA

90. In electron microscopy, to detect specific macromolecule or structure such as Spindle Pole Body (SPB), the frequently used procedure is to couple secondary antibody with :

(A) Alexa 568

(B) CY 5

(C) Gold particle

(D) Osmium tetraoxide

91. The bands obtained by gel electrophoresis during DNA separation are stained with :

(A) Methyl blue

(B) Ethidium bromide

(C) Potassium chlorate

(D) Chloral hydrate

92. Beer-Lambert's law gives the relation between which of the following ?

(A) Energy absorption and concentration

(B) Energy absorption and reflected radiation

(C) Reflected radiation and concentration

(D) Scattered radiation and concentration

93. Which of the following technique does not involve electrophoresis for the separation of biomolecules ?

(A) Dot blotting

(B) Southern blotting

(C) Northern blotting

(D) Western blotting

94. Which of the following chemical is the most commonly used as a fixative for pathological specimens ?

(A) Picric acid

(B) Mercuric chloride

(C) Ethanol

(D) Formaldehyde

95. A researcher asked 963 people what their favourite type of TV programme was : news, documentary, cinema or sports. As such, the researcher had the number of people who chose each category of programme. How should she analyse these data ?

(A) By t-test

(B) By one-way analysis of variance

(C) By Chi-square test

(D) By regression

96. When two regression coefficients bear the same algebraic signs, then correlation coefficient is :

(A) Positive

(B) Negative

(C) According to two signs

(D) Zero

97. What is the chemical nature of bombycol, a sex attractant produced by female silk moths ?

(A) Hormone

(B) Pheromone

(C) Crinotoxin

(D) Enzyme

98. What is called as the endogenous component of rhythmic behaviours in animals ?

(A) Entrainer

(B) Zeitgeber

(C) Biological clock

(D) Rhythmicity

99. An animal's ability to escape from a predator by using the explored knowledge of home area is an example of :

(A) Insight learning

(B) Latent learning

(C) Mimicry

(D) Imprinting

100. A honeybee performs a "dance" when it returns to the hive after finding a source of food. The dance "tells" the other bees where to find the food. What is this behaviour called ?

(A) Innate behaviour

(B) Learning behaviour

(C) Acquired behaviour

(D) Motivational behaviour

SEAL

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