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Question Booklet Alpha Code

A

Question Booklet Sl. No.

Total Number of Questions : 100

Time : 90 Minutes

Maximum Marks : 100

INSTRUCTIONS TO CANDIDATES

1. The Question Paper will be given in the form of a Question Booklet. There will be four versions of Question Booklets with Question Booklet Alpha Code viz. **A, B, C & D**.
2. The Question Booklet Alpha Code will be printed on the top left margin of the facing sheet of the Question Booklet.
3. The Question Booklet Alpha Code allotted to you will be noted in your seating position in the Examination Hall.
4. If you get a Question Booklet where the alpha code does not match to the allotted alpha code in the seating position, please draw the attention of the Invigilator **IMMEDIATELY**.
5. The Question Booklet Serial Number is printed on the top right margin of the facing sheet. If your Question Booklet is un-numbered, please get it replaced by new Question Booklet with same alpha code.
6. The Question Booklet will be sealed at the middle of the right margin. Candidate should not open the Question Booklet, until the indication is given to start answering.
7. Immediately after the commencement of the examination, the candidate should check that the Question Booklet supplied to him/her contains all the 100 questions in serial order. The Question Booklet does not have unprinted or torn or missing pages and if so he/she should bring it to the notice of the Invigilator and get it replaced by a complete booklet with same alpha code. This is most important.
8. A blank sheet of paper is attached to the Question Booklet. This may be used for rough work.
9. **Please read carefully all the instructions on the reverse of the Answer Sheet before marking your answers.**
10. Each question is provided with four choices **(A), (B), (C)** and **(D)** having one correct answer. Choose the correct answer and darken the bubble corresponding to the question number using Blue or Black Ball Point Pen in the OMR Answer Sheet.
11. **Each correct answer carries 1 mark and for each wrong answer 1/3 mark will be deducted. No negative mark for unattended questions.**
12. No candidate will be allowed to leave the examination hall till the end of the session and without handing over his/her Answer Sheet to the Invigilator. Candidates should ensure that the Invigilator has verified all the entries in the Register Number Coding Sheet and that the Invigilator has affixed his/her signature in the space provided.
13. Strict compliance of instructions is essential. Any malpractice or attempt to commit any kind of malpractice in the Examination will result in the disqualification of the candidate.

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1. Who coined the term 'cline' to refer to a gradient of a phenotypic or genetic character within a single species ?
 - A) Carolus Linnaeus
 - B) John Lindley
 - C) Thomas Henry Huxley
 - D) Julian Huxley

2. In Zoological nomenclature, a hapantotype is
 - A) One or more preparations consisting of directly related individuals representing distinct stages in the life cycle, which together form the name-bearing type in an extant species of protistan
 - B) Each specimen of a former syntype series remaining after the designation of a lectotype
 - C) Specimen originating from the type locality of the species or subspecies to which it is thought to belong, whether or not the specimen is part of the type series
 - D) A syntype designated as the single name-bearing type specimen subsequent to the establishment of a nominal species or subspecies

3. In DNA barcoding, the barcode gap refers to
 - A) The physical separation between different DNA barcodes on a gel
 - B) The spatial gap between species occurrences in a geographical region
 - C) The unique pattern of DNA banding on an agarose gel
 - D) The discrepancy in sequence similarity between closely related species and within a species

4. Phylum Cnidaria is classified into 6 Classes. In the table given below, Column I shows the Classes and Column II shows one representative species from each Class. Select the correct combination.

Column I		Column II	
1.	Class Hydrozoa	a.	<i>Physalia</i>
2.	Class Scyphozoa	b.	<i>Aurelia</i>
3.	Class Staurozoa	c.	<i>Lucernaria</i>
4.	Class Cubozoa	d.	<i>Tripedalia</i>
5.	Class Myxozoa	e.	<i>Buddenbrockia</i>
6.	Class Anthozoa	f.	<i>Tubipora</i>

- A) 1 – a, 2 – b, 3 – c, 4 – d, 5 – e, 6 – f
 B) 1 – c, 2 – d, 3 – a, 4 – b, 5 – e, 6 – f
 C) 1 – b, 2 – a, 3 – c, 4 – d, 5 – e, 6 – f
 D) 1 – d, 2 – e, 3 – f, 4 – a, 5 – b, 6 – c
5. Which molluscan family is commonly referred to as tusk shells ?
 A) Polyplacophora
 B) Scaphopoda
 C) Solenogastres
 D) Caudofoveata
6. According to the “mandibulate hypothesis” which of the following arthropod lineages are closely related to each other ?
 A) Crustacea, Myriapoda and Chelicerata
 B) Hexapoda, Crustacea and Chelicerata
 C) Myriapoda, Crustacea and Hexapoda
 D) Myriapoda, Hexapoda and Chelicerata

7. Paedomorphosis, the displacement of ancestral larval or juvenile features into a descendant adult, can be produced by

- A) Neoteny
 B) Progenesis
 C) Postdisplacement
 D) All of the above

8. In the table given below, Column I shows 6 mammalian Orders and Column II shows one representative species from each Order. Select the correct combination.

Column I		Column II	
1.	Order Cingulata	a.	<i>Shrews</i>
2.	Order Soricomorpha	b.	<i>Armadillo</i>
3.	Order Perissodactyla	c.	<i>Hippopotamus</i>
4.	Order Artiodactyla	d.	<i>Rhinoceros</i>
5.	Order Lagomorpha	e.	<i>Rabbit</i>
6.	Order Cetacea	f.	<i>Whale</i>

- A) 1 – a, 2 – b, 3 – c, 4 – d, 5 – e, 6 – f
 B) 1 – b, 2 – a, 3 – d, 4 – c, 5 – e, 6 – f
 C) 1 – b, 2 – a, 3 – c, 4 – d, 5 – e, 6 – f
 D) 1 – d, 2 – e, 3 – f, 4 – a, 5 – b, 6 – c

9. Which of the following is not an 'archosaur' ?

- A) Snake
 B) Dinosaur
 C) Crocodile
 D) Bird

10. Which of the following is referred to as simple associative learning ?

- A) Sensitization
 B) Operant Conditioning
 C) Insight Learning
 D) Latent Learning

11. Some important events in the history of life on earth are listed below

- 1) Appearance of first vertebrates
- 2) Dominance of mammals and birds
- 3) Development of coniferous plants
- 4) Appearance of first birds
- 5) Development of insects
- 6) Appearance of first flowering plants

Match the above with the geological time periods and select the correct combination.

- A) 1 – Tertiary, 2 – Carboniferous, 3 – Ordovician, 4 – Cretaceous, 5 – Triassic, 6 – Jurassic
 - B) 1 – Carboniferous, 2 – Tertiary, 3 – Triassic, 4 – Jurassic, 5 – Ordovician, 6 – Cretaceous
 - C) 1 – Ordovician, 2 – Tertiary, 3 – Triassic, 4 – Jurassic, 5 – Carboniferous, 6 – Cretaceous
 - D) 1 – Ordovician, 2 – Carboniferous, 3 – Tertiary, 4 – Jurassic, 5 – Triassic, 6 – Cretaceous
12. Red Queen Hypothesis (RQH) of evolution was proposed by
- A) JBS Haldane
 - B) Leigh Van Valen
 - C) John Gulick
 - D) H B D Kettlewell

13. The genus *Australopithecus*, which is ancestral to *Homo* and modern humans, existed in Africa during the Pliocene and Early Pleistocene. In the table given below, Column I shows different species of *Australopithecus* and Column II shows the places of fossil discovery. Select the correct combination.

Column I		Column II	
1.	<i>Australopithecus robustus</i>	a.	Tanzania
2.	<i>Australopithecus aethiopicus</i>	b.	East Africa
3.	<i>Australopithecus afarensis</i>	c.	South Africa
4.	<i>Australopithecus boisei</i>	d.	Kenya

- A) 1 – a, 2 – b, 3 – c, 4 – d
 B) 1 – b, 2 – c, 3 – d, 4 – a
 C) 1 – c, 2 – d, 3 – a, 4 – b
 D) 1 – d, 2 – a, 3 – c, 4 – b
14. Which biogeographical zone in India is characterized by a mix of dry deciduous forests and scrublands, with diverse wildlife including tigers, leopards and sloth bears ?
- A) Desert Biogeographical Zone
 B) Deccan Peninsula Biogeographical Zone
 C) Western Ghats Biogeographical Zone
 D) Gangetic Plain Biogeographical Zone
15. According to Fick's law, the rate of diffusion across biological membranes is inversely proportional to which of the following factors ?
- A) Molecular weight and membrane thickness
 B) Temperature and solubility
 C) Permeability and concentration gradient
 D) Surface area and diffusion coefficient

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16. Which unit is equivalent to one radioactive disintegration per second ?
A) Curie (Ci) B) Rutherford (Rd)
C) Sievert (Sv) D) Gray (Gy)
17. Which type of radiation is most likely to cause direct damage to nucleic acids within cells ?
A) Alpha particles B) Beta particles
C) X-rays D) Gamma rays
18. Which radioactive tracer is commonly used in Positron Emission Tomography (PET) scans to diagnose specific diseases and disorders by means of identifying metabolic deviations ?
A) Technetium-99m B) Iodine-131
C) Cobalt-60 D) Fluorine-18
19. What type of probe is commonly used in atomic force microscopy ?
A) Optical fibre B) Electron beam
C) Scanning probe D) Cantilever
20. Which of the following aspects of NMR imaging could cause potential health hazards ?
A) Heating due to the rf power
B) Static magnetic field
C) Electric current induction due to rapid change in magnetic field
D) All of the above
21. Widening and distortion of the QRS complex on ECG is indicative of
A) AV-block B) Atrial flutter
C) Right bundle branch block D) SA-block
22. Which of the following nanoparticle antioxidants can act as a mitochondrial protectant ?
A) Platinum B) Gold
C) Fullerene D) Cerium oxide

23. Which of the following is true with respect to gastro intestinal contraction ?
- i) Rhythm of gastro intestinal contraction is determined mainly by the slow undulating changes in the resting membrane potential.
 - ii) Slow waves might result from slow undulations of the pumping activity of Sodium Potassium pump.
 - iii) Slow waves by themselves cause muscle contraction in most parts of gastro intestinal tract.
- A) i and iii only B) ii and iii only
C) i and ii only D) All the above
24. Which of the following are true with DNA vaccines ?
- i) no risk of vaccines becoming fatal
 - ii) provide both humoral and cellular immunity
 - iii) stability of vaccines for storage and shipping
 - iv) limited to protein immunogens
- A) i, ii and iii B) ii, iii and iv
C) i, ii and iv D) All the above
25. Which of the following pairs do not match ?
- A) Grave's disease : TSH receptor
 - B) Myasthenia gravis : A Ch receptor
 - C) Systemic lupus erythematosus : DNA, histone
 - D) Multiple sclerosis : Rh antigen
26. The criteria for selecting a marker to measure glomerular filtration rate is
- i) Should be of low molecular weight and freely filtered
 - ii) Shouldn't be produced by the body
 - iii) Shouldn't be reabsorbed by the renal tubule
 - iv) Should be secreted by the renal tubule
- A) i and ii B) iii and iv
C) All the above D) i, ii and iii

27. Pain of heart is most often experienced as pain of arm, back and neck. This is attributed to

- i) Dermatomal principle
- ii) According to convergence-projection theory
- iii) Prolonged visceral stimulus facilitates somatic nociceptors, which in turn stimulate secondary neurons and brain is unable to determine whether the pain comes from heart or from area of referral.

- A) iii only
- B) i and ii only
- C) All the above
- D) None of the above

28. Aminopterin used during the production of hybridoma cells

- A) Blocks *de novo* synthesis of DNA
- B) Prevents the growth of B cells
- C) Prevents the growth of myeloma cells
- D) Blocks synthesis of Ig by B cells

29. Which of the following is a mismatching pair ?

- i) IgG : can cross placenta
- ii) IgE : binds to mast cells
- iii) IgA : binds to macrophages

- A) i and ii
- B) ii and iii
- C) iii only
- D) i only

30. Which of the following is true about vagus nerve ?

- A) Eighth cranial nerve, sensory in nature, arises from forebrain
- B) Tenth cranial nerve, mixed in nature, arise from hindbrain
- C) Tenth cranial nerve, sensory in nature, arise from forebrain
- D) Tenth cranial nerve, motor in nature, arise from midbrain

31. When the surface tension of the alveoli in the lungs of a baby is doubled, the pressure in the alveoli
- A) is doubled
B) becomes half
C) increases four times
D) becomes one fourth
32. Which of the following is true for a histogram ?
- i) it is a two dimensional graph
ii) total area of rectangles represent the frequency
iii) It is used to represent discrete frequency distribution
- A) i and ii
B) ii and iii
C) i, ii and iii
D) None of the above
33. Myasthenia gravis can be ameliorated for several hours by administering neostigmine, where it act as a
- A) Choline esterase drug
B) Blocks action of acetyl choline at acetyl choline receptor sites
C) Anti-choline esterase activity
D) Acetyl choline like action
34. Lengths (mean \pm standard deviation), of two species of fish A and B is given below.
- Species A = 67 ± 2.5 ; Species B = 64 ± 2.4
Length of which species is more variable ?
- A) Both species A and B has same variability
B) Length of species A is more variable than that of species B
C) Length of species B is more variable than that of species A
D) Data is not sufficient to conclude

35. Which of the following hormones are stored in vesicles until needed ?
- A) cortisol, aldosterone, progesterone
 - B) testosterone, estrogen, 1,25-dihydroxy cholecalciferol
 - C) testosterone, estrogen, progesterone
 - D) insulin, glucagon, prolactin
36. The titer of which of the following hormones are increasing to enable parturition ?
- A) estrogen, oxytocin, progesterone
 - B) estrogen, cortisol, prostaglandin
 - C) oxytocin, progesterone, cortisol
 - D) prostaglandin, progesterone, cortisol
37. The n^{th} root of the product of the 'n' items in an ungrouped data is called
- A) harmonic mean
 - B) geometric mean
 - C) arithmetic mean
 - D) weighted average
38. An intellectual property protection granted under Indian Law to the creators of original work is known as
- A) patent
 - B) trademark
 - C) copyright
 - D) copyleft
39. What of the following are common about hyaluronic acid, heparin and keratan sulphate ?
- i) unique to animals and bacteria
 - ii) all are glycosaminoglycans
 - iii) they are found covalently attached to protein
- A) i and ii
 - B) i and iii
 - C) i, ii and iii
 - D) iii only

40. In samples of DNA isolated from two unidentified species of bacteria P and Q thymine makes up 32% and 17% respectively. Which of the following statement is correct ?
- A) P is more thermophilic than Q
 - B) Q is more thermophilic than P
 - C) Both P and Q are equally thermophilic
 - D) Both P and Q are not thermophilic
41. Which of the following are the software for checking plagiarism ?
- i) turnitin
 - ii) urkund
 - iii) Quillbot
- A) ii and iii
 - B) i and ii
 - C) All the above
 - D) None of the above
42. The number of possible secondary conformation of a protein is limited by
- i) Restriction of rotation about alpha carbonyl carbon and alpha amide nitrogen
 - ii) Restriction of rotation about alpha carbon and alpha amide nitrogen
 - iii) Steric hindrance imposed by shapes and sizes of the amino acid side chains
- A) i and ii
 - B) i and iii
 - C) ii and iii
 - D) i, ii, and iii
43. Which of the following statements is true about competitive inhibition ?
- A) K_m and V_{max} decreases
 - B) K_m decreases and V_{max} not changes
 - C) V_{max} decreases and K_m not changes
 - D) K_m increases and V_{max} not changes

49. The first successful vaccine against cancer was prepared for
- A) Breast cancer
 - B) Colon cancer
 - C) Cervical cancer
 - D) Oral cancer
50. Which one of the following is not a G-protein coupled receptor ?
- A) Transferrin receptor
 - B) Thyroid stimulating hormone receptor
 - C) Glucagon receptor
 - D) Epinephrine receptor
51. The pore-like connections between adjacent cells is an example for
- A) Desmosomes
 - B) Gap junctions
 - C) Tight junctions
 - D) Cell junctions
52. Origin of replication usually contains
- A) GC rich sequences
 - B) AT rich sequences
 - C) Both GC and AT rich sequences
 - D) No specific stretch of sequences
53. Which eukaryotic RNA polymerase transcribes t-RNA genes ?
- A) RNA polymerase I
 - B) RNA polymerase II
 - C) RNA polymerase III
 - D) DNA polymerase I
54. A DNA sequence that has been modified in such a way that it is unable to produce a functional protein is termed as
- A) Satellite DNA
 - B) Interrupted genes
 - C) Junk genes
 - D) Selfish DNA

55. Which of the following statements about pseudogenes is false ?
- A) The broadest definition of a pseudogene is any gene that has received inactivating mutations and can no longer make a functional product
 - B) A retro-pseudogene is a non-functional cDNA copy of a processed RNA that has integrated elsewhere into the genome
 - C) A non-processed pseudogene is an inactive copy of a gene that has arisen by some type of gene duplication
 - D) An estimated 14,000 pseudogenes are found in the human genome
56. Membrane-bound and free ribosomes are structurally identical, but differ only at a given time in terms of association with
- A) Phospholipids
 - B) Acetylated proteins
 - C) Glycosylated proteins
 - D) Nascent proteins
57. The type of mutation that is imposed by transposons is
- A) Silent mutation
 - B) Reverse mutation
 - C) Polar mutation
 - D) Frame shift mutation
58. The information retrieval tool of NCBI GenBank is
- A) STAG
 - B) Entrez
 - C) TextSearch
 - D) Sequin
59. The alignment procedure that tries to align regions with high levels of matches without considering the alignment of rest of the sequences is
- A) Local alignment
 - B) Global alignment
 - C) Multiple sequence alignment
 - D) Pair-wise alignment

60. Which of the following may be considered as the biggest disadvantage of sexual reproduction against asexual reproduction ?
- A) Lot of energy and time is consumed in locating the mate
 - B) Only half of the genetic material is passed on to the offspring from each parent
 - C) In many cases, after fertilization, zygote fails to develop
 - D) Sexual reproduction brings unnecessary variations
61. The group of cells of amphibian blastula capable of inducing the organizer is called
- A) Hypoblast
 - B) Hensen's node
 - C) Nieuwkoop centre
 - D) Dorsal blastopore lip
62. Limb bud of a tetrapod is specified by
- A) Retinoic acid only
 - B) Hox genes only
 - C) Both Retinoic acid and Hox genes
 - D) Fibroblast growth factor
63. The first organ system to develop during organogenesis is
- A) Excretory system
 - B) Cardiovascular system
 - C) Integumentary system
 - D) Respiratory system
64. During *In Vitro* Fertilization, what method is used for implantation of a blastocyst with more than 8 cells ?
- A) Intra uterine transfer
 - B) Zygote intra fallopian transfer
 - C) Zygote inter fallopian transfer
 - D) Inter uterine transfer

71. In human females, there is inactivation of one X-chromosome for dosage compensation due to
- A) Formylation
 - B) Acetylation
 - C) Phosphorylation
 - D) Methylation
72. Which of the following statement about Pampas is correct ?
- A) Treeless grassland found in North America
 - B) They have rough grass and shrubs in spring and arid deserts in summer
 - C) Temperate grasslands found in South America
 - D) None of these
73. Which of the following is/are the possible consequence/s of heavy sand mining in river beds ?
- a. Decreased salinity in water
 - b. Pollution of ground water
 - c. Lowering of the water table
 - d. None of these
- Select the correct answer
- A) a only
 - B) b and c only
 - C) a & c only
 - D) a, b & c
74. Which segment of GPS consists of satellite ?
- A) Control
 - B) Space
 - C) User
 - D) Navigation
75. Which of the following is the range of environmental conditions in which each of the species survives ?
- A) Real niche
 - B) Optimal niche
 - C) Habitary niche
 - D) Fundamental niche

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76. When did the Ramsar Convention treaty came into force in India ?

- A) 15 Jan. 1982
- B) 17 March 1989
- C) 23 July 1979
- D) 01 Feb. 1982

77. There occurs the diminishing along the food chain in the amount of

- A) Energy
- B) Heat
- C) Food
- D) Temperature

78. Scientific names of some organisms are as below

- a) *Sardiella longiceps* Valenciennes
- b) *Wallago attu* Bloch & Schneider
- c) *Corvus splendens* Vieillot
- d) *Passer domesticus* (Linnaeus)

Author name of the last one is in brackets. It is because

- A) Its genus name has been changed after Linnaeus named this species
- B) Its specific name has been changed after its original discovery
- C) Linnaeus was a prominent figure
- D) None of these

79. When did the Wildlife Protection Act, 1972, come into force ?

- A) 01 April 1972
- B) 01 March 1973
- C) 09 September 1972
- D) 23 April 1972

80. World's largest conservation programme is

- A) Food and Agriculture Organization
- B) World Health Organization
- C) World Food Programme
- D) World Wild Life Fund

81. Which one of the following is not a cultivable fish in Kerala ?

- A) *Oreochromis mossambicus*
- B) *Pangasianodon hypothalmus*
- C) *Labeo rohitha*
- D) *Labeo filiferus*

A

82. Which group of vertebrates comprises the highest number of endangered species ?
- A) Birds
B) Reptiles
C) Mammals
D) Fishes
83. A disease which may result from Down syndrome is
- A) Cancer
B) Cellulitis
C) Celiac disease
D) None of these
84. Which of the following caterpillar species affects the coconut ?
- A) *Prodenia litura*
B) *Calandra oryza*
C) *Pectinophora gossypiella*
D) *Nephantis serenopa*
85. Scientists from which country discovered a new giant carnivorous dinosaur species 'Meraxes gigas' ?
- A) USA
B) Argentina
C) China
D) Australia
86. 'Peacock softshell turtles' or 'Nilssonina Formosa' are found in which country ?
- A) Myanmar
B) India
C) Indonesia
D) Sri Lanka
87. Which of the following causes Poliomyelitis ?
- A) Dengue virus
B) Enterovirus
C) Mumps virus
D) None of the above
88. Night blindness is caused by the deficiency of
- A) Vitamin A
B) Vitamin B
C) Vitamin C
D) Vitamin D

89. Method widely used for transforming in vitro animal cell cultures that uses lipid vesicles or liposomes
- A) Lipotransformation
 - B) Liposome mediated transformation
 - C) Lipofection
 - D) Lipid mediated DNA transfer
90. Chemicals used for gene transfer methods include
- A) Polyethylene glycol
 - B) CaCl_2
 - C) Dextran
 - D) All of the above
91. Chocolates can be bad for health because of high content of
- A) Cobalt
 - B) Nickel
 - C) Zinc
 - D) Lead
92. The human genome project was launched in the year
- A) 1980
 - B) 1973
 - C) 1990
 - D) 1989
93. The covalent bond which links the cell walls of gram-positive bacteria containing two modified sugars – N – acetylmuramic acid (NAM) and N-acetyl glucosamine (NAG) is
- A) Glycosidic bond
 - B) 1,4-glycosidic bond
 - C) 1,6-glycosidic bond
 - D) None of the above
94. The term biotechnology was coined by
- A) Hargobind Khurana
 - B) Saran Narang
 - C) Karl Ereky
 - D) William Hays
95. HIV parasitizes
- A) Y-helper cells
 - B) T-helper cells
 - C) K-helper cells
 - D) None of the above

96. 'Black stinging catfish' ('*Karee*', '*Kadu*' in Malayalam) is not an uncommon freshwater fish in Kerala, especially in central Travancore; but it obtained its scientific name only recently in 2021. Its scientific name is
- A) *Clarias dussumieri* B) *Heteropneustes fossilis*
C) *Clarias batrachus* D) *Heteropneustes fuscus*
97. Human protein Alpha-I antitrypsin is used for which of the following disease ?
- A) Cholera B) Emphysema
C) Small pox D) Gout
98. A virus is made up of
- A) Protein coat and nucleic acid
B) Nucleic acid and cell membrane
C) Nucleic acid, cell wall and cell membrane
D) None of the above
99. Which of the following statements are true about the capsomeres ?
- A) It is an individual unit of the capsid
B) It is a viral protein for replication
C) It is a unit of nucleic acid in viruses
D) All of the above
100. Which of the following virus has the smallest genome ?
- A) Rabies virus B) Circovirus
C) Mimi virus D) None of the above
-

Space for Rough Work