



Ph.D. COMMON ENTRANCE TEST JANUARY 2024

SUBJECT –Zoology

PART B

Roll No:

Duration: 60 minutes

Maximum Marks: 50

Instructions:

1. This entrance test question paper is not to be taken out of the examination hall
2. Question paper consists of Section A and Section B
3. Section A consists of 30 MCQs carrying 1 Mark each. Write the Alphabet of the correct answer in the space given.
4. Section B consists of Descriptive questions carrying 5 marks each. Restrict your answer to 500 words. Additional plain sheets have been attached to the question paper to answer Section B

SECTION – A

Answer the following questions by writing the Alphabet of the correct answer in the Box given:

30 X 1 = 30

1. If a gene product in species A is 90% similar to gene product in species B, Such genes are called as _____
A. Orthologous
B. Paralogous
C. Allologous
D. perilogous
2. What is the function of the trans-Golgi network in the Golgi apparatus?
A. Sorting and packaging of proteins for secretion
B. Synthesis of lipids
C. Formation of ribosomal RNA
D. Breakdown of cellular waste
3. In the context of cellular signaling, what is the function of a kinase cascade?
A. Amplification of the signal
B. Termination of the signal
C. Translational activation
D. Ribosomal assembly
4. What is the term for a chart showing the genetic connections among individuals in a family?
A. Pedigree
B. Punnett square

- C. Codon chart
D. Karyotype
5. In pharmacogenomics, what is the term for an individual's ability to metabolize a drug at a normal rate with standard doses?
A. Ultra-rapid metabolizer
B. Poor metabolizer
C. Extensive metabolizer
D. Intermediate metabolizer
6. Which ethnic group is known to have a higher frequency of genetic variations affecting drug metabolism?
A. African Americans
B. Caucasians
C. Asians
D. Hispanics
7. What is the purpose of karyotyping in prenatal testing?
A. Determining the baby's gender
B. Assessing the risk of genetic disorders
C. Monitoring fetal movement
D. Estimating birth weight
8. In karyotyping, chromosomes are typically observed during which phase of the cell cycle?
A. G1 phase
B. S phase
C. M phase (Mitosis)
D. G2 phase
9. Which of the following is a component of the MAP kinase signaling pathway?
A. G protein
B. Tyrosine kinase
C. Kinase cascade
D. Intracellular receptor
10. Which type of cell signaling involves the release of signaling molecules that affect nearby target cells?
A. Endocrine signaling
B. Autocrine signaling
C. Paracrine signaling
D. Intracrine signaling

11 What is the significance of alternative splicing in eukaryotic gene expression?

- A. It enhances DNA replication efficiency
- B. It generates multiple mRNA isoforms from a single gene
- C. It regulates the activity of ribosomes
- D. It facilitates protein folding

12 Which structure connects the muscles to bones in the human body?

- A. Tendon
- B. Ligament
- C. Cartilage
- D. Synapse

13 In meiosis, what is the significance of crossing over?

- A. It ensures homologous chromosomes segregate properly
- B. It prevents chromosomal abnormalities
- C. It increases genetic diversity
- D. It regulates the length of the cell cycle

14 If a trait is controlled by multiple genes, it is known as

- A. Polygenic inheritance
- B. Multiple allelism
- C. Codominance
- D. Incomplete dominance

15 Which type of joint allows the greatest range of motion?

- A. Hinge joint
- B. Ball and socket joint
- C. Pivot joint
- D. Fixed joint

16 Which part of the brain is responsible for coordinating voluntary muscle movements and maintaining balance?

- A. Cerebrum
- B. Cerebellum
- C. Medulla oblongata
- D. Hypothalamus

17 In medicine, Mendelian genetics is used for

- A. Genetic counseling
- B. Herbal medicine
- C. Herbal medicine
- D. Alternative therapies

18 What is the primary function of the excretory system in animals?

- A. Regulation of body temperature
- B. Elimination of waste products
- C. Transport of nutrients
- D. Gas exchange

- 19 catalase enzyme destroys hydrogen peroxide in
A. nucleus
B. Golgi complex
C. peroxisomes
D. mitochondria
- 20 The organelle which is used in synthesis of Lipid
A. Golgi complex
B. Smooth Endoplasmic reticulum
C. nucleus
D. none of the above
- 21 A couple is heterozygous for albinism (Aa). What is the probability that 4 Out of 6 children born to them are normal? what probability distribution can be applied
A. Poisson distribution
B. Binomial distribution
C. Both A and B
D. None of the above
- 22 Phosphorylation, Acetylation is a process in
A. Transcription
B. post transcriptional modification
C. post translational modification
D. None of the above
- 23 The enzymes of the lysosomes are synthesized in
A. smooth endoplasmic reticulum
B. Golgi complex
C. Rough Endoplasmic reticulum
D. none of the above
- 24 Which of the following genes is expressed at the posterior margin of each parasegment
A. Engrailed
B. Hedgehog
C. Wingless
D. Bicoid

25 Syncytium is a layer of -----that have not been separated into individual cells

- A. Nuclei
- B. Mitochondria
- C. Cytoplasm
- D. Nuclei and cytoplasm

26 Where do P elements integrate into the genome

- A. At specifically defined sites
- B. Randomly
- C. Only at the ends of the genome
- D. Integration depends on reaction conditions

27 Which of these genes is responsible for the development of sex of drosophila

- A. Xce
- B. Xist
- C. XIC
- D. Sxl

28 The process by which a single species evolves into diverse forms that live in different ways is known as

- A. Convergent evolution
- B. Divergent evolution
- C. Coevolution
- D. Adaptive radiation

29 Which of the following will give a normal female drosophila

- A. AAA + XX
- B. AA + XY
- C. AA + XXX
- D. AA + XXY

30 Which mechanism of evolution involves the random change in allele frequencies over time?

- A. Natural Selection
- B. Genetic Drift
- C. Gene Flow
- D. Mutation

Section - B

Answer any four questions (Each question carries 5 marks)

4*5 = 20

1. Write a note on the various invasive techniques of prenatal diagnosis
2. Sketch and comment on the stages of Mitosis
3. Explain the functions of Golgi apparatus in human sperm.
4. Explain the importance of Mendelian inheritance in modern genetics.
5. Discuss early embryonic development in *Drosophila*.
6. Formation of Urine is a complex process in Humans. Explain.