

UNIVERSITY OF MYSORE

Ph.D. Entrance Examination, November - 2020



SUBJECT CODE :

69

QUESTION BOOKLET NO.

508102

Entrance Reg. No.

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QUESTION BOOKLET

(Read carefully the instructions given in the Question Booklet)

SUBJECT :

ZOOLOGY

MAXIMUM MARKS : 100

MAXIMUM TIME : THREE HOURS

(Including initial 10 minutes for filling O.M.R. Answer sheet)

INSTRUCTIONS TO THE CANDIDATES

1. The sealed questions booklet containing 50 questions enclosed with O.M.R. Answer Sheet is given to you.
2. Verify whether the given question booklet is of the same subject which you have opted for examination.
3. Open the question paper seal carefully and take out the enclosed O.M.R. Answer Sheet outside the question booklet and fill up the general information in the O.M.R. Answer sheet. If you fail to fill up the details in the form of alphabet and signs as instructed, you will be personally responsible for consequences arising during scoring of your Answer Sheet.
4. During the examination:
 - a) Read each question carefully.
 - b) Determine the Most appropriate/correct answer from the four available choices given under each question.
 - c) Completely darken the relevant circle against the Question in the O.M.R. Answer Sheet. For example, in the question paper if "C" is correct answer for Question No.8, then darken against Sl. No.8 of O.M.R. Answer Sheet using Blue/Black Ball Point Pen as follows:

Question No. 8. (A) (B) ● (D) (Only example) (Use Ball Pen only)

5. Rough work should be done only on the blank space provided in the Question Booklet. Rough work should not be done on the O.M.R. Answer Sheet.
6. If more than one circle is darkened for a given question, such answer is treated as wrong and no mark will be given. See the example in the O.M.R. Sheet.
7. The candidate and the Room Supervisor should sign in the O.M.R. Sheet at the specified place.
8. Candidate should return the original O.M.R. Answer Sheet and the university copy to the Room Supervisor after the examination.
9. Candidate can carry the question booklet and the candidate copy of the O.M.R. Sheet.
10. The calculator, pager and mobile phone are not allowed inside the examination hall.
11. **If a candidate is found committing malpractice, such a candidate shall not be considered for admission to the course and action against such candidate will be taken as per rules.**

INSTRUCTIONS TO FILL UP THE O.M.R. SHEET

1. There is only one most appropriate/correct answer for each question.
2. For each question, only one circle must be darkened with BLUE or BLACK ball point pen only. Do not try to alter it.
3. Circle should be darkened completely so that the alphabet inside it is not visible.
4. Do not make any stray marks on O.M.R. Sheet.

ಗಮನಿಸಿ : ಸೂಚನೆಗಳ ಕನ್ನಡ ಆವೃತ್ತಿಯು ಈ ಪುಸ್ತಕದ ಹಿಂಭಾಗದಲ್ಲಿ ಮುದ್ರಿಸಲ್ಪಟ್ಟಿದೆ.

PART-A

This part shall contains 50 multiple choice/objective type questions, each question carrying one mark. [50 × 1 = 50]

1. Name the organism which has flame-cell in its excretory system?
(A) Corals (B) Ctenophora
(C) Roundworm (D) Flatworm

2. Which of the following is known as scavengers in the marine ecosystem?
(A) Lamprey (B) Hagfish
(C) Scoliodon (D) Pristis

3. Most oxidation reactions in microbial bioenergetics involve the
(A) Removal of electrons and hydrogens
(B) Addition of electrons and hydrogens
(C) Addition of oxygen
(D) Removal of oxygen

4. Nullisomy is a condition where in every cell of the organism has;
(A) An additional chromosome
(B) One chromosome less than normal
(C) A complete set of chromosomes except one homologous pair
(D) A complete set of chromosomes with two non-homologous chromosomes less

5. Why must the lagging strand of DNA be replicated in short pieces?
(A) Because of limited space
(B) Otherwise, the helix will become distorted
(C) The DNA polymerase can synthesize in only one direction
(D) To make proofreading of code easier

6. A condition where one gene influences more than one trait is referred to as;
(A) Phenocopy (B) Pleiotropy
(C) Epistasis (D) Linkage
7. Which gene is incorporated into plasmids to detect recombinant cells?
(A) Restriction endonuclease
(B) Virus receptors
(C) A gene for antibiotic resistance
(D) Reverse transcriptase
8. The function of ligase is to
(A) Rejoin segments of DNA (B) Make longitudinal cuts in DNA
(C) Synthesize cDNA (D) Break down ligaments
9. The coding DNA strand that complements mRNA AUGCGCGAC is
(A) UACGCUCUG (B) GTCTCGCAT
(C) TACGCTCTG (D) DNA cannot complement mRNA
10. Which DNA fragment will be closed to the top (negative pole) of an electrophoretic gel?
(A) 450 bp (B) 3,560 bp
(C) 5 kb (D) 1,500 bp
11. Which of the following is a primary participant in cloning an isolated gene?
(A) Restriction endonuclease (B) Vector
(C) Host organism (D) All of these
12. For which of the following would a nucleic acid probe not be used?
(A) Locating a gene on a chromosome
(B) Developing a Southern blot
(C) Identifying a microorganism
(D) Constructing a recombinant plasmid

13. Microbial resistance to drugs is acquired through
(A) Conjugation (B) Transformation
(C) Transduction (D) All of these
14. R factors are _____ that contain a code for _____.
(A) Genes, replication (B) Plasmids, drug resistance
(C) Transposons, interferon (D) Plasmids, conjugation
15. The MIC is the _____ of a drug that is required to inhibit growth of a microbe.
(A) Largest concentration (B) Standard dose
(C) Smallest concentration (D) Lowest dilution
16. Caspases are involved in the process of
(A) DNA replication (B) Mutation and recombination
(C) Apoptosis (D) Antibody synthesis
17. Which of the following causes Poliomyelitis?
(A) Dengue virus (B) Enterovirus
(C) Mumps virus (D) Rhabdovirus
18. Other than spreading malaria, anopheles mosquitoes are also vectors of
(A) Dengue fever (B) Filariasis
(C) Encephalitis (D) Yellow fever
19. Static concept of species was put forward by
(A) de Candolle (B) Linnaeus
(C) Theophrastus (D) Darwin
20. Blastopore develops into anus in
(A) Proteostomes
(B) Deuterostomes
(C) Schizocoelomates
(D) Pseudocoelomates

21. Classification of organisms helps in
(A) Understanding diversity (B) Assigning systematic positions
(C) Knowing distribution (D) Knowing origin of life
22. Example for a gene which is responsible for establishing anterior-posterior polarity in *Drosophila*
(A) *oskar (osk)* gene (B) *Toll (Tl)* gene
(C) *Ubx* gene (D) *Fushitarazi (ftz)* gene
23. Molecular evolution is best explained by
(A) Natural selection theory (B) Synthetic evolution theory
(C) Adaptive evolution theory (D) Neutral evolution theory
24. Unit of distance in Linkage map is
(A) Centimeter (B) Centimendel
(C) Centimorgan (D) Centimuller
25. Schizocoelic phyla are
(A) Protozoa, Porifera, Cnidarians
(B) Platyhelminthes, Aschelminthes, Annelida
(C) Annelida, Arthropoda, Mollusca
(D) Arthropoda, Mollusca, Echinodermata
26. Migration of individual cells from the surface into the embryos interior is termed as
(A) Ingression (B) Involution
(C) Invagination (D) Delamination
27. Which of the following hormones are responsible for the “fight-or-flight” response?
(A) Epinephrine and norepinephrine (B) Insulin and glucagone
(C) Estrogen and progesterone (D) Thyroxin and melatonin

28. Bio-geo chemical cycles are also known as
- (A) Material cycling (B) Gaseous cycle
(C) Sedimentation cycle (D) None of the above
29. When is the world wild life week?
- (A) First week of September (B) Last week of September
(C) First week of October (D) Last week of October
30. Viable material of endangered species can be preserved by
- (A) Gene bank (B) Gene library
(C) Gene pool (D) Herbarium
31. The Bharathpur bird sanctuary is located at
- (A) Madhya Pradesh (B) Rajasthan
(C) Uttar Pradesh (D) Kerala
32. EIA stands for
- (A) Environmental Impact Assessment
(B) Ecological Impact Assessment
(C) Environmental Impact Area
(D) Environmental Impact Audit
33. Syncytium is a layer of _____ that have not been separated into individual cells.
- (A) Nuclei (B) Mitochondria
(C) Cytoplasm (D) Nuclei and cytoplasm
34. Which of the following cations is required for the conversion of Prothrombin into active thrombin by thromboplastin?
- (A) Ca^{2+} (B) Fe^{2+}
(C) Mg^{2+} (D) Mn^{2+}

35. The alternative source of energy for muscle contraction is
(A) ATP (B) Creatine Phosphate
(C) Glycolysis (D) All of these
36. The movement of chloride ions into erythrocytes from the plasma to maintain osmotic balance during transport of gases is known as
(A) Active transport
(B) CO₂ transport
(C) Hamburger phenomenon
(D) Passive transport
37. Which of the following type of restriction enzymes are used in restriction mapping and gene cloning?
(A) Type I (B) Type II
(C) Type IIs (D) Type III
38. The last common ancestor of humans is
(A) Pan troglodytes (B) Homo neanderthalensis
(C) Lemuroidea (D) Dromaeosaurus
39. Darwin's primary contribution to biological theory was the idea that
(A) An important mechanism of biological evolution is natural selection
(B) New alleles arise through mutation
(C) Evolution is the change in gene frequencies over time
(D) Genes are the units of inheritance
40. Multiple reproductive barriers can lead to
(A) Heterozygote advantage (B) Genetic drift
(C) Parsimony (D) Sympatric speciation

41. The endocrine gland responsible for the body's circadian rhythm is the:
- (A) Thymus gland (B) Pineal gland
(C) Parathyroid gland (D) Pituitary gland
42. How do hormones from the thyroid and parathyroid regulate the calcium concentration of the blood?
- (A) Calcitonin lowers blood calcium; parathyroid hormone raises blood calcium
(B) Parathyroid hormone lowers blood calcium; calcitonin raises blood calcium
(C) Thyroxine and triiodothyronine together regulate calcium levels, as needs dictate
(D) Both parathyroid hormone and the three thyroid hormones function to regulate blood calcium levels
43. Most accurate method to identify HIV
- (A) ELISA (B) MT-PCR
(C) RIA (D) RT-PCR
44. Certain proteins or mRNAs that are regionally localized within the fertilized egg regulate development are called
- (A) Gene regulators (B) Morphometric determinants
(C) Cytoplasmic determinants (D) Mosaic forming factors
45. Most hormones of the endocrine system are regulated by a:
- (A) Negative feedback mechanism
(B) Positive feedback mechanism
(C) Hormone-receptor complex
(D) Hormone-gene complex

46. The HOX genes in fruit flies, annelid worms, clams and humans show a high degree of sequence similarity. This is an example of:
- (A) Genetic homology
 - (B) Developmental homology
 - (C) Structural homology
 - (D) Analogy/convergent evolution
47. The eukaryotic genes are interrupted by non coding segment called
- (A) Exons
 - (B) Introns
 - (C) Linker dna
 - (D) Inter cistron
48. Which sequences are the best to evaluate the phylogeny of the closely related mammals?
- (A) Coding sequences
 - (B) Ribosomal proteins
 - (C) SINES and LINES
 - (D) Centromeric and telomeric regions
49. The bacterial transformation experiment was first conducted by
- (A) Griffith
 - (B) McCarthy
 - (C) Avery and Macleod
 - (D) All are correct
50. Sickle cell anemia disease is expressed for the genotype
- (A) β^S/β^A
 - (B) β^A/β^A
 - (C) β^S/β^S
 - (D) All of these

PART-B

This part shall contain five questions, each question carrying ten marks.
[5 × 10 = 50]

1. Describe the various genes involved in early embryogenesis and development of *Drosophila* and add a note on homeotic genes.
2. Explain the principles and applications of recombinant DNA technology.
3. Discuss the mechanism of action of endocrine organs.
4. Write an account on construction and types of phylogenetic trees.
5. Explain biodiversity hotspots and biodiversity profile of Karnataka.



Rough Work

ಅಭ್ಯರ್ಥಿಗಳಿಗೆ ಸೂಚನೆಗಳು

1. ಓ.ಎಂ.ಆರ್. ಉತ್ತರ ಹಾಳೆಯ ಜೊತೆಗೆ 50 ಪ್ರಶ್ನೆಗಳನ್ನು ಹೊಂದಿರುವ ಮೊಹರು ಮಾಡಿದ ಪ್ರಶ್ನೆ ಪುಸ್ತಕವನ್ನು ನಿಮಗೆ ನೀಡಲಾಗಿದೆ.
2. ಕೊಟ್ಟಿರುವ ಪ್ರಶ್ನೆ ಪುಸ್ತಕವು, ನೀವು ಪರೀಕ್ಷೆಗೆ ಆಯ್ಕೆ ಮಾಡಿಕೊಂಡಿರುವ ವಿಷಯಕ್ಕೆ ಸಂಬಂಧಿಸಿದ್ದೇ ಎಂಬುದನ್ನು ಪರಿಶೀಲಿಸಿರಿ.
3. ಪ್ರಶ್ನೆ ಪತ್ರಿಕೆಯ ಮೊಹರನ್ನು ಜಾಗ್ರತೆಯಿಂದ ತೆರೆಯಿರಿ ಮತ್ತು ಪ್ರಶ್ನೆಪತ್ರಿಕೆಯಿಂದ ಓ.ಎಂ.ಆರ್. ಉತ್ತರ ಹಾಳೆಯನ್ನು ಹೊರಗೆ ತೆಗೆದು, ಓ.ಎಂ.ಆರ್. ಉತ್ತರ ಹಾಳೆಯಲ್ಲಿ ಸಾಮಾನ್ಯ ಮಾಹಿತಿಯನ್ನು ತುಂಬಿರಿ. ಕೊಟ್ಟಿರುವ ಸೂಚನೆಯಂತೆ ನೀವು ನಮೂನೆಯಲ್ಲಿನ ವಿವರಗಳನ್ನು ತುಂಬಲು ವಿಫಲರಾದರೆ, ನಿಮ್ಮ ಉತ್ತರ ಹಾಳೆಯ ಮೌಲ್ಯಮಾಪನ ಸಮಯದಲ್ಲಿ ಉಂಟಾಗುವ ಪರಿಣಾಮಗಳಿಗೆ ವೈಯಕ್ತಿಕವಾಗಿ ನೀವೇ ಜವಾಬ್ದಾರಾಗಿರುತ್ತೀರಿ.
4. ಪರೀಕ್ಷೆಯ ಸಮಯದಲ್ಲಿ:
 - a) ಪ್ರತಿಯೊಂದು ಪ್ರಶ್ನೆಯನ್ನು ಜಾಗ್ರತೆಯಿಂದ ಓದಿರಿ.
 - b) ಪ್ರತಿ ಪ್ರಶ್ನೆಯ ಕೆಳಗೆ ನೀಡಿರುವ ನಾಲ್ಕು ಲಭ್ಯ ಆಯ್ಕೆಗಳಲ್ಲಿ ಅತ್ಯಂತ ಸರಿಯಾದ/ ಸೂಕ್ತವಾದ ಉತ್ತರವನ್ನು ನಿರ್ಧರಿಸಿ.
 - c) ಓ.ಎಂ.ಆರ್. ಹಾಳೆಯಲ್ಲಿನ ಸಂಬಂಧಿಸಿದ ಪ್ರಶ್ನೆಯ ವೃತ್ತಾಕಾರವನ್ನು ಸಂಪೂರ್ಣವಾಗಿ ತುಂಬಿರಿ. ಉದಾಹರಣೆಗೆ, ಪ್ರಶ್ನೆ ಪತ್ರಿಕೆಯಲ್ಲಿ ಪ್ರಶ್ನೆ ಸಂಖ್ಯೆ 8ಕ್ಕೆ "C" ಸರಿಯಾದ ಉತ್ತರವಾಗಿದ್ದರೆ, ನೀಲಿ/ಕಪ್ಪು ಬಾಲ್ ಪಾಯಿಂಟ್ ಪೆನ್ ಬಳಸಿ ಓ.ಎಂ.ಆರ್. ಉತ್ತರ ಹಾಳೆಯ ಕ್ರಮ ಸಂಖ್ಯೆ 8ರ ಮುಂದೆ ಈ ಕೆಳಗಿನಂತೆ ತುಂಬಿರಿ:

ಪ್ರಶ್ನೆ ಸಂಖ್ಯೆ 8(A) (B) (C) (D) (ಉದಾಹರಣೆ ಮಾತ್ರ) (ಬಾಲ್ ಪಾಯಿಂಟ್ ಪೆನ್ ಮಾತ್ರ ಉಪಯೋಗಿಸಿ) ಉತ್ತರದ ಪೂರ್ವಸಿದ್ಧತೆಯ ಬರವಣಿಗೆಯನ್ನು (ಚಿತ್ತು ಕೆಲಸ) ಪ್ರಶ್ನೆ ಪತ್ರಿಕೆಯಲ್ಲಿ ಒದಗಿಸಿದ ಖಾಲಿ ಜಾಗದಲ್ಲಿ ಮಾತ್ರವೇ ಮಾಡಬೇಕು (ಓ.ಎಂ.ಆರ್. ಉತ್ತರ ಹಾಳೆಯಲ್ಲಿ ಮಾಡಬಾರದು).

6. ಒಂದು ನಿರ್ದಿಷ್ಟ ಪ್ರಶ್ನೆಗೆ ಒಂದಕ್ಕಿಂತ ಹೆಚ್ಚು ವೃತ್ತಾಕಾರವನ್ನು ಗುರುತಿಸಲಾಗಿದ್ದರೆ, ಅಂತಹ ಉತ್ತರವನ್ನು ತಪ್ಪು ಎಂದು ಪರಿಗಣಿಸಲಾಗುತ್ತದೆ ಮತ್ತು ಯಾವುದೇ ಅಂಕವನ್ನು ನೀಡಲಾಗುವುದಿಲ್ಲ. ಓ.ಎಂ.ಆರ್. ಹಾಳೆಯಲ್ಲಿನ ಉದಾಹರಣೆ ನೋಡಿ.
7. ಅಭ್ಯರ್ಥಿ ಮತ್ತು ಕೊಠಡಿ ಮೇಲ್ವಿಚಾರಕರು ನಿರ್ದಿಷ್ಟಪಡಿಸಿದ ಸ್ಥಳದಲ್ಲಿ ಓ.ಎಂ.ಆರ್. ಹಾಳೆಯ ಮೇಲೆ ಸಹಿ ಮಾಡಬೇಕು.
8. ಅಭ್ಯರ್ಥಿಯು ಪರೀಕ್ಷೆಯ ನಂತರ ಕೊಠಡಿ ಮೇಲ್ವಿಚಾರಕರಿಗೆ ಮೂಲ ಓ.ಎಂ.ಆರ್. ಉತ್ತರ ಹಾಳೆ ಮತ್ತು ವಿಶ್ವವಿದ್ಯಾನಿಲಯದ ಪ್ರತಿಯನ್ನು ಹಿಂದಿರುಗಿಸಬೇಕು.
9. ಅಭ್ಯರ್ಥಿಯು ಪ್ರಶ್ನೆ ಪುಸ್ತಕವನ್ನು ಮತ್ತು ಓ.ಎಂ.ಆರ್. ಅಭ್ಯರ್ಥಿಯ ಪ್ರತಿಯನ್ನು ತಮ್ಮ ಜೊತೆ ತೆಗೆದುಕೊಂಡು ಹೋಗಬಹುದು.
10. ಕ್ಯಾಲ್ಕುಲೇಟರ್, ಪೇಜರ್ ಮತ್ತು ಮೊಬೈಲ್ ಫೋನ್‌ಗಳನ್ನು ಪರೀಕ್ಷಾ ಕೊಠಡಿಯ ಒಳಗೆ ಅನುಮತಿಸಲಾಗುವುದಿಲ್ಲ.
11. ಅಭ್ಯರ್ಥಿಯು ದುಷ್ಕೃತ್ಯದಲ್ಲಿ ತೊಡಗಿರುವುದು ಕಂಡುಬಂದರೆ, ಅಂತಹ ಅಭ್ಯರ್ಥಿಯನ್ನು ಕೋರ್ಸ್‌ಗೆ ಸರಿಗಣಿಸಲಾಗುವುದಿಲ್ಲ ಮತ್ತು ನಿಯಮಗಳ ಪ್ರಕಾರ ಇಂತಹ ಅಭ್ಯರ್ಥಿಯ ವಿರುದ್ಧ ಕ್ರಮ ಕೈಗೊಳ್ಳಲಾಗುವುದು. ಓ.ಎಂ.ಆರ್. ಹಾಳೆಯನ್ನು ತುಂಬಲು ಸೂಚನೆಗಳು

1. ಪ್ರತಿಯೊಂದು ಪ್ರಶ್ನೆಗೆ ಒಂದೇ ಒಂದು ಅತ್ಯಂತ ಸೂಕ್ತವಾದ/ಸರಿಯಾದ ಉತ್ತರವಿರುತ್ತದೆ.
2. ಪ್ರತಿ ಪ್ರಶ್ನೆಗೆ ಒಂದು ವೃತ್ತವನ್ನು ಮಾತ್ರ ನೀಲಿ ಅಥವಾ ಕಪ್ಪು ಬಾಲ್ ಪಾಯಿಂಟ್ ಪೆನ್ನಿನಿಂದ ಮಾತ್ರ ತುಂಬತಕ್ಕದ್ದು. ಉತ್ತರವನ್ನು ಮಾರ್ಪಡಿಸಲು ಪ್ರಯತ್ನಿಸಬೇಡಿ.
3. ವೃತ್ತದೊಳಗಿರುವ ಅಕ್ಷರವು ಕಾಣದಿರುವಂತೆ ವೃತ್ತವನ್ನು ಸಂಪೂರ್ಣವಾಗಿ ತುಂಬುವುದು.
4. ಓ.ಎಂ.ಆರ್. ಹಾಳೆಯಲ್ಲಿ ಯಾವುದೇ ಅನಾವಶ್ಯಕ ಗುರುತುಗಳನ್ನು ಮಾಡಬೇಡಿ.

Note : English version of the instructions is printed on the front cover of this booklet.