

Roll. No.

Question Booklet Number

O.M.R. Serial No.

--	--	--	--	--	--	--	--

M.Sc. (SEM.-III) (NEP) (SUPPLE.) EXAMINATION, 2024-25

ZOOLOGY

(Molecular Biology, Immunology & Bioinformatics)

Paper Code							
B	0	5	0	9	0	2	T

Question Booklet
Series

A

Time : 1 : 30 Hours

Max. Marks : 75

Instructions to the Examinee :

1. Do not open the booklet unless you are asked to do so.
2. The booklet contains 100 questions. Examinee is required to answer 75 questions in the OMR Answer-Sheet provided and not in the question booklet. All questions carry equal marks.
3. Examine the Booklet and the OMR Answer-Sheet very carefully before you proceed. Faulty question booklet due to missing or duplicate pages/questions or having any other discrepancy should be got immediately replaced.
4. Four alternative answers are mentioned for each question as - A, B, C & D in the booklet. The candidate has to choose the correct / answer and mark the same in the OMR Answer-Sheet as per the direction :

(Remaining instructions on last page)

परीक्षार्थियों के लिए निर्देश :

1. प्रश्न-पुस्तिका को तब तक न खोलें जब तक आपसे कहा न जाए।
2. प्रश्न-पुस्तिका में 100 प्रश्न हैं। परीक्षार्थी को 75 प्रश्नों को केवल दी गई OMR आन्सर-शीट पर ही हल करना है, प्रश्न-पुस्तिका पर नहीं। सभी प्रश्नों के अंक समान हैं।
3. प्रश्नों के उत्तर अंकित करने से पूर्व प्रश्न-पुस्तिका तथा OMR आन्सर-शीट को सावधानीपूर्वक देख लें। दोषपूर्ण प्रश्न-पुस्तिका जिसमें कुछ भाग छपने से छूट गए हों या प्रश्न एक से अधिक बार छप गए हों या उसमें किसी अन्य प्रकार की कमी हो, उसे तुरन्त बदल लें।
4. प्रश्न-पुस्तिका में प्रत्येक प्रश्न के चार सम्भावित उत्तर- A, B, C एवं D हैं। परीक्षार्थी को उन चारों विकल्पों में से सही उत्तर छानना है। उत्तर को OMR उत्तर-पत्रक में सम्बन्धित प्रश्न संख्या में निम्न प्रकार भरना है :

(शेष निर्देश अन्तिम पृष्ठ पर)

1. Sarcoma is the metastatic cancerous tumor when it develops in:
 - (A) Circulatory system
 - (B) Epithelial cells
 - (C) Immune system
 - (D) Fibroblast
2. The first convertase formed in complement system is
 - (A) C5 convertase
 - (B) C3 convertase
 - (C) C4 convertase
 - (D) C6 convertase
3. Which of the following immunoglobulin is present normally in plasma at the highest concentration?
 - (A) IgG
 - (B) IgM
 - (C) IgE
 - (D) IgA
4. Which of the following Immunity is called the first line of Immunity?
 - (A) Acquired immunity
 - (B) Innate immunity
 - (C) Active immunity
 - (D) Passive immunity
5. Which food component helps in protecting the body from infections?
 - (A) Carbohydrates
 - (B) Fats
 - (C) Vitamins and minerals
 - (D) Proteins
6. Apoptosis is characterized by
 - (A) Necrosis
 - (B) Programmed cell death
 - (C) Membrane leaky syndrome
 - (D) Cell cycle arrest process
7. A self-replicating DNA molecule used as a carrier of DNA fragment
 - (A) Ligase enzyme
 - (B) Linkers
 - (C) Foreign DNA
 - (D) Vector
8. BCL-2 and Bax proteins involved in apoptosis are :
 - (A) Both Proapoptotic and antiapoptotic
 - (B) Both Proapoptotic
 - (C) Both Antiapoptotic
 - (D) Either Antiapoptotic and proapoptotic
9. The cells used in hybridoma technology are:
 - (A) Myeloma and Lymphocytes
 - (B) Myeloma and RBC
 - (C) RBC and Lymphocytes
 - (D) Lymphocytes and Monocytes
10. MHC I is present at :
 - (A) B cell and T cell
 - (B) Antigen presenting cell
 - (C) All nucleated cell
 - (D) Immunoglobins

11. Restriction Endonuclease :
 - (A) Synthesizes DNA
 - (B) Cuts the DNA molecule randomly
 - (C) Cuts the DNA molecule at specific site
 - (D) Restricts the synthesis of DNA inside nucleus
12. Which of the following proteins is involved in promoter recognition in eukaryotes?
 - (A) TFIIF
 - (B) TFIIB
 - (C) TFIID
 - (D) TFIIE
13. 5' Cap of RNA is required for the :
 - (A) Stability of RNA only
 - (B) Stability and transport of RNA
 - (C) Transport of RNA only
 - (D) Methylation of RNA
14. Nucleolus is involved in the biosynthesis of:
 - (A) rRNA
 - (B) iRNA
 - (C) DNA
 - (D) mRNA
15. Which of the following represents immunoglobins ?
 - (A) Antibodies
 - (B) Antigens
 - (C) MHC
 - (D) Haptens
16. Griffith's experiment to show :
 - (A) Transmission
 - (B) Transformation
 - (C) Conjugation
 - (D) Transduction
17. The start point for transcription in prokaryotes is :
 - (A) Always 100 bases downstream
 - (B) 100 bases upstream (mostly)
 - (C) 10 bases upstream
 - (D) 10 bases downstream
18. Pribnow box (TATAAT) is found in all :
 - (A) Eukaryotic promoters
 - (B) Eukaryotes
 - (C) Repressors
 - (D) Prokaryotic promoters
19. What does proteomics refers to ?
 - (A) Set of protein in specific region of cell
 - (B) Biomolecules
 - (C) Set of proteins
 - (D) The entire set of expressed proteins in the cell
20. Which programming language is widely used in bioinformatics?
 - (A) Python
 - (B) Hindi
 - (C) French
 - (D) Latin
21. Which of the following group represents the termination codons ?
 - (A) UGA, UAA, UAT
 - (B) UGA, UAG, UAA
 - (C) UAG, UAT, UUU
 - (D) AUG, UGA, UAG

22. B Cells are activated by :
- Complement
 - Antibody
 - Interferon
 - Antigen
23. Fusion between a plasma cell and a tumor cell creates a :
- Myeloma
 - Natural killer cell
 - Lymphoblast
 - Hybridoma
24. 7-methyl guanosine cap is found in :
- mRNA at 3' end
 - mRNA at both 5' and 3' ends
 - mRNA at 5' end
 - tRNA at 5' end
25. Which type of cloning vector is derived from bacterial chromosomes and can carry very large DNA inserts?
- Plasmids
 - Bacterial artificial chromosomes (BACs)
 - Yeast artificial chromosomes (YACs)
 - Bacteriophages
26. What does PCR stand for in the context of genetic analysis techniques?
- Polymerase Chain Reaction
 - Protein Coding Region
 - Pre-Cellular Replication
 - Protein Cellular Reaction
27. What is the primary purpose of selectable markers in cloning vectors?
- Facilitating gene expression studies
 - Identifying and selecting cells containing the vector
 - Inhibiting the replication of cloning vectors
 - Introducing specific mutations in DNA sequences
28. Which one of the following are pentamer ?
- IgA
 - IgE
 - IgG
 - IgM
29. What is a carcinogen?
- A substance that is allergen to skin
 - A chemical substance that can induce cancer
 - A normal cell component
 - Malignant tumor
30. Bioinformatics mainly deals with:
- Plant physiology
 - Data storage and analysis of biological information
 - Human anatomy
 - Soil microbiology
31. Cell-mediated immunity is carried out by while humoral immunity is mainly carried out by
- B cells/T cells
 - Epitopes/Antigens
 - T cells/B cells
 - Antibodies/Antigens

32. The interpretation of genetic data can be complex and requires expertise in:
- (A) Epidemiology
 - (B) Psychology
 - (C) Bioinformatics
 - (D) Anatomy
33. The correct order of steps in polymerase chain reaction(PCR) is :
- (A) Extention, Denaturation, Annealing
 - (B) Annealing, Extention, Denaturation
 - (C) Denaturation, Annealing, Extention
 - (D) None of the above
34. _____ is the product of biotechnology.
- (A) Vaccine
 - (B) Bacteria
 - (C) Plants
 - (D) Skin
35. In bioinformatics, FASTA refers to:
- (A) A protein
 - (B) A database and file format for sequences
 - (C) A DNA replication process
 - (D) A type of enzyme
36. All of the following are true of antigen EXCEPT which one of the following?
- (A) They contain epitopes.
 - (B) They will react with antibodies.
 - (C) They contain antigen binding region
 - (D) They can elicit an immune response
37. Which of the following histone protein is not the part of core octamer but binds to the linker DNA?
- (A) H4
 - (B) H1
 - (C) H3
 - (D) H2A
38. Translation is the process of:
- (A) Synthesizing DNA from RNA
 - (B) Synthesizing RNA from DNA
 - (C) Synthesizing protein from mRNA
 - (D) Replicating DNA
39. A tumor that is not cancerous and does not spread to other parts of body:
- (A) Malignant tumor
 - (B) Carcinoma
 - (C) Benign tumor
 - (D) Invasive tumor
40. The HIV virus infects :
- (A) Cytotoxic T cells
 - (B) Helper T cells
 - (C) Natural killer cells
 - (D) Memory cells
41. The immunoglobulin that result in histamine release :
- (A) IgG
 - (B) IgM
 - (C) IgD
 - (D) IgE

42. The site of translation in eukaryotic cells is:
- Nucleus
 - Ribosome
 - Golgi apparatus
 - Lysosome
43. The start codon for translation is:
- UAA
 - AUG
 - UGA
 - UAG
44. A transformed cell is one that:
- Undergoes apoptosis
 - Has normal growth and division
 - Exhibits uncontrolled growth and loss of contact inhibition
 - Differentiates into a specialized cell
45. Reverse transcriptase was discovered by which of:
- Wilkins
 - Luc Montagnier
 - Jerne
 - Temin and Baltimore
46. Which of the following tumor is found in AIDS patient ?
- Lymphosarcoma
 - Carcinoma
 - Kaposi sarcoma
 - Melanoma
47. Which enzyme is responsible for synthesizing RNA from DNA template ?
- Helicase
 - RNA polymerase
 - Ligase
 - DNA polymerase
48. MHC II is :
- CD 8 restricted
 - CD 4 restricted
 - Interleukin restricted
 - Interferon restricted
49. Which RNA type is involved in the removal of introns from pre-mRNA?
- tRNA
 - snRNA
 - rRNA
 - mRNA
50. Less than 200/ml count of CD4+ cells is indicative which of the following disease ?
- Malaria
 - AIDS
 - Filaria
 - Tuberculosis
51. In acquired immunodeficiency syndrome the clinical deterioration is because of loss of which of the following ?
- Microphages
 - Macrophages
 - CD4 cells
 - B-cells

52. Transformation in cells can be caused by:
- (A) Viral infection
 - (B) Chemical carcinogens
 - (C) Radiation
 - (D) All of the above
53. A hallmark of transformed cells is:
- (A) Reduced cell division
 - (B) Loss of anchorage dependence
 - (C) Normal morphology
 - (D) Increased apoptosis
54. Which of the following is a protein sequence database?
- (A) Swiss-Prot
 - (B) GenBank
 - (C) EMBL
 - (D) DDBJ
55. In translation, peptide bonds are formed between:
- (A) Sugar and phosphate groups
 - (B) Amino acids
 - (C) Nucleotides
 - (D) Ribosomal proteins
56. The ribosome has three sites: A, P, and E. The P site is responsible for:
- (A) Entry of aminoacyl-tRNA
 - (B) Exit of tRNA
 - (C) Holding the tRNA with the growing polypeptide chain
 - (D) Binding mRNA
57. Which virus is known to induce transformation in mammalian cells?
- (A) Adenovirus
 - (B) HIV
 - (C) Influenza virus
 - (D) Rhinovirus
58. The ability of the immune system to recognize self-antigens versus non-self antigen is an example of:
- (A) Specific immunity
 - (B) Tolerance
 - (C) Cell-mediated immunity
 - (D) Antigenic immunity
59. Transformed cells in culture often form:
- (A) Monolayer sheets with contact inhibition
 - (B) Foci or clumps of cells
 - (C) Fibrous connective tissue
 - (D) Necrotic zones
60. The intrinsic pathway of apoptosis is primarily regulated by which organelle?
- (A) Nucleus
 - (B) Mitochondria
 - (C) Golgi apparatus
 - (D) Lysosome

61. The enzyme that stitches the broken DNA strands or replicating DNA as in Okazaki fragments is :
- DNA Pol I
 - DNA Pol II
 - DNA Ligase
 - DNA Primase
62. DNA synthesis on leading and lagging strand follows a direction of
- 5'-3' and 3'-5'
 - 3'-5' on Both strands
 - 3'-5' and 5'-3'
 - 5'-3' on both strands
63. The DNA repair is a/an
- Autocatalytic system
 - Heterocatalytic system
 - Allocatalytic system
 - Non-catalytic system
64. Transformation in bacteria usually refers to:
- Cell division
 - Uptake of foreign DNA from the environment
 - Protein synthesis
 - Cell death
65. The method of phylogenetic analysis in bioinformatics is:
- Sampling method
 - Pie chart
 - Distance method
 - None of the above
66. Damages in the DNA are essentially to be repaired because they :
- Are harmful to the cell
 - Are deleterious and may cause mutation or death
 - Regulate speedy synthesis of proteins
 - Regulate DNA replication at a very high speed where chances of error are very high
67. Oncogenes in transformed cells are responsible for :
- DNA repair
 - Stimulating uncontrolled cell proliferation
 - Inhibiting cell division
 - Programmed cell death
68. PERL stands for :
- Practical extraction and report language
 - Provisional extraction and research language
 - Practical export and report language
 - Practical export and research language
69. Characteristics of transformed animal cells include:
- Immortality in culture
 - Loss of contact inhibition
 - Tumorigenicity in vivo
 - All of the above

70. Which molecule acts as a catalyst during translation?
- (A) DNA polymerase
 - (B) tRNA
 - (C) rRNA
 - (D) Aminoacyl-tRNA synthetase
71. Translation in prokaryotes can begin before transcription is complete. This is called:
- (A) Coupled transcription-translation
 - (B) Post-translational modification
 - (C) Reverse transcription
 - (D) Polysome formation
72. Naturally acquired active immunity would be most likely acquired through which of the following processes?
- (A) Vaccination
 - (B) Drinking colostrum
 - (C) Natural birth
 - (D) Infection with disease causing organism followed by recovery
73. Approximately how many base pairs does human genome contain?
- (A) 6 billion base pairs
 - (B) 5 billion base pairs
 - (C) 3 billion base pairs
 - (D) 4 billion base pairs
74. What type of bond holds together complimentary base pairs in DNA ?
- (A) Ionic bond
 - (B) Hydrogen bond
 - (C) Covalent bond
 - (D) Peptide bond
75. The backbone of DNA double helix is made up of:
- (A) Nucleotides
 - (B) Amino acids
 - (C) Sugar and Phosphate
 - (D) Lipids
76. What is process of depositing cDNA into an inert structure called?
- (A) DNA probes
 - (B) DNA Polymerase
 - (C) DNA Microarrays
 - (D) DNA fingerprinting
77. In the lac operon, which gene codes for repressor protein?
- (A) Lac A
 - (B) Lac Y
 - (C) Lac Z
 - (D) Lac I
78. The genetic code is described as degenerate because:
- (A) One codon codes for multiple amino acids
 - (B) One amino acid can be coded by multiple codons
 - (C) Each codon codes for only one amino acid
 - (D) Stop codons have multiple functions

79. Which of the following conditions would result in the highest level of transcription of the lac operon?
- (A) High glucose, high lactose
 - (B) High glucose, low lactose
 - (C) Low glucose, high lactose
 - (D) Low glucose, low lactose
80. The primary database for storing nucleotide sequences is:
- (A) PDB
 - (B) GenBank
 - (C) Swiss-Prot
 - (D) KEGG
81. Who is often considered as founder of bioinformatics?
- (A) J.D. Watson
 - (B) Richard Durben
 - (C) Margaret Dayhoff
 - (D) Frederic Sanger
82. Which of the following codons is a stop codon?
- (A) AUG
 - (B) UAA
 - (C) GUG
 - (D) CUG
83. The full form of PDB is:
- (A) Protein Data Bank
 - (B) Protein Development Board
 - (C) Plant Data Base
 - (D) Pathogen Data Book
84. What is the term for identification through genomic study ?
- (A) Genomics
 - (B) Pharmacogenomics
 - (C) Pharmacogenetics
 - (D) Cheminformatics
85. In DNA ,the complementary base pair is between :
- (A) Thymine and Cytosine
 - (B) Adenine and Thymine
 - (C) Cytosine and Guanine
 - (D) Adenine and Guanine
86. The process of RNA interference (RNAi) is a mechanism that primarily regulates gene expression at which level?
- (A) Transcriptional level
 - (B) Post-transcriptional level
 - (C) Post-translational level
 - (D) Translational level
87. Which of the following is a function of an enhancer in eukaryotic gene regulation?
- (A) It binds to repressor proteins to inhibit transcription
 - (B) It increases the rate of transcription of a gene
 - (C) It is a binding site for RNA polymerase
 - (D) It removes introns from the pre-mRNA transcript

88. Major difference between purines and pyrimidine is that:
- (A) Former is a single ring compound while the later is a double ring compound
 - (B) Former is a double ring compound and the later is a single ring compound
 - (C) Purines are found in DNA and pyrimidines in RNA
 - (D) All of the above
89. In eukaryotes, the regulation of gene expression can occur at all of the following levels except:
- (A) Transcriptional level
 - (B) Processing level
 - (C) The level of DNA replication
 - (D) Translational level
90. In prokaryotic transcription, the sigma (σ) factor is primarily responsible for:
- (A) The elongation of the RNA strand
 - (B) The termination of transcription
 - (C) Recognizing and binding to the promoter region
 - (D) Repairing the DNA
91. What is the function of the CAP protein in the lac operon?
- (A) It acts as a repressor when glucose levels are low
 - (B) It acts as an activator when glucose levels are low
 - (C) It acts as a corepressor when lactose levels are low
 - (D) It binds to the operator to block transcription
92. The conversion of heterochromatin to euchromatin is generally associated with:
- (A) Increased gene expression
 - (B) Decreased gene expression
 - (C) No change in gene expression
 - (D) Inactivation of the promoter
93. Lysozyme present in saliva and tears destroys:
- (A) Viruses
 - (B) Bacteria
 - (C) Fungi
 - (D) Protozoa
94. Which of the following is NOT a part of innate immunity?
- (A) Skin
 - (B) Macrophages
 - (C) B cells
 - (D) Inflammation

95. The process that removes non-coding regions (introns) from the primary RNA transcript and joins the coding regions (exons) is called:
- (A) Capping
 - (B) Splicing
 - (C) Tailing
 - (D) Translation
96. B and T cells are produced by stem cells that are formed in:
- (A) Bone marrow
 - (B) The liver
 - (C) The circulatory system
 - (D) The spleen
97. In the context of a repressible operon like the trp operon, the corepressor is typically the:
- (A) Repressor protein itself
 - (B) End-product of the metabolic pathway
 - (C) Substrate for the metabolic pathway
 - (D) RNA polymerase
98. In Rho-independent termination of transcription in prokaryotes, what causes the RNA polymerase to fall off?
- (A) The binding of the Rho factor
 - (B) The formation of a hairpin loop in the RNA
 - (C) The binding of a repressor protein
 - (D) The addition of a poly-A
99. Which immunoglobulin is the principal one found in secretions such as milk?
- (A) IgG
 - (B) IgM
 - (C) IgA
 - (D) IgD
100. In eukaryotes, the primary transcript produced by RNA polymerase II is called:
- (A) Mature mRNA
 - (B) Heterogeneous nuclear RNA (hnRNA)
 - (C) Transfer RNA (tRNA)
 - (D) Ribosomal RNA (rRNA)

Rough Work

Rough Work

Example :

Question :

Q.1 (A) ● (C) (D)

Q.2 (A) (B) ● (D)

Q.3 (A) ● (C) (D)

5. Each question carries equal marks. Marks will be awarded according to the number of correct answers you have.
6. All answers are to be given on OMR Answer Sheet only. Answers given anywhere other than the place specified in the answer sheet will not be considered valid.
7. Before writing anything on the OMR Answer Sheet, all the instructions given in it should be read carefully.
8. After the completion of the examination, candidates should leave the examination hall only after providing their OMR Answer Sheet to the invigilator. Candidate can carry their Question Booklet.
9. There will be no negative marking.
10. Rough work, if any, should be done on the blank pages provided for the purpose in the booklet.
11. To bring and use of log-book, calculator, pager & cellular phone in examination hall is prohibited.
12. In case of any difference found in English and Hindi version of the question, the English version of the question will be held authentic.

Impt. On opening the question booklet, first check that all the pages of the question booklet are printed properly. If there is any discrepancy in the question Booklet, then after showing it to the invigilator, get another question Booklet of the same series.

उदाहरण :

प्रश्न :

प्रश्न 1 (A) ● (C) (D)

प्रश्न 2 (A) (B) ● (D)

प्रश्न 3 (A) ● (C) (D)

5. प्रत्येक प्रश्न के अंक समान हैं। आपके जितने उत्तर सही होंगे, उन्हीं के अनुसार अंक प्रदान किये जायेंगे।
6. सभी उत्तर केवल ओ०एम०आर० उत्तर-पत्रक (OMR Answer Sheet) पर ही दिये जाने हैं। उत्तर-पत्रक में निर्धारित स्थान के अलावा अन्यत्र कहीं पर दिया गया उत्तर मान्य नहीं होगा।
7. ओ०एम०आर० उत्तर-पत्रक (OMR Answer Sheet) पर कुछ भी लिखने से पूर्व उसमें दिये गये सभी अनुदेशों को सावधानीपूर्वक पढ़ लिया जाये।
8. परीक्षा समाप्ति के उपरान्त परीक्षार्थी कक्ष निरीक्षक को अपनी OMR Answer Sheet उपलब्ध कराने के बाद ही परीक्षा कक्ष से प्रस्थान करें। परीक्षार्थी अपने साथ प्रश्न-पुस्तिका ले जा सकते हैं।
9. निगेटिव मार्किंग नहीं है।
10. कोई भी रफ कार्य, प्रश्न-पुस्तिका में, रफ-कार्य के लिए दिए खाली पेज पर ही किया जाना चाहिए।
11. परीक्षा-कक्ष में लॉग-बुक, कैल्कुलेटर, पेजर तथा सेल्युलर फोन ले जाना तथा उसका उपयोग करना वर्जित है।
12. प्रश्न के हिन्दी एवं अंग्रेजी रूपान्तरण में भिन्नता होने की दशा में प्रश्न का अंग्रेजी रूपान्तरण ही मान्य होगा।

महत्वपूर्ण: प्रश्नपुस्तिका खोलने पर प्रथमतः जाँच कर देख लें कि प्रश्नपुस्तिका के सभी पृष्ठ भलीभाँति छपे हुए हैं। यदि प्रश्नपुस्तिका में कोई कमी हो, तो कक्षनिरीक्षक को दिखाकर उसी सिरिज की दूसरी प्रश्नपुस्तिका प्राप्त कर लें।