

Roll No.

Question Booklet Number

O. M. R. Serial No.

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Question Booklet Number

M. Sc. (Fourth Semester)
(NEP) EXAMINATION, 2025-26

BOTANY

[Bioinformatics And Intellectual Property Rights (IPR)]

Paper Code							
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Questions Booklet
Series

D

Time : 1:30 Hours]

[Maximum 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.

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, तो उसे तुरन्त बदल लें।

(Remaining instructions on the last page)

(शेष निर्देश अन्तिम पृष्ठ पर)

(Only for Rough Work)

1. What is the main purpose of genome annotation ?
 - (A) Cutting DNA fragments
 - (B) Identifying genes and assigning functions
 - (C) Protein staining
 - (D) DNA amplification
2. Which of the following best describes a phylogenetic tree ?
 - (A) Diagram showing evolutionary relationships
 - (B) DNA extraction chart
 - (C) Protein structure diagram
 - (D) Chemical reaction map
3. What is the purpose of multiple sequence alignment ?
 - (A) To purify proteins
 - (B) To detect conserved regions among sequences
 - (C) To amplify DNA
 - (D) To break chromosomes
4. Which of the following is an example of a primary nucleotide database ?
 - (A) Pfam
 - (B) GenBank
 - (C) Swiss-Prot
 - (D) PDB
5. Which type of database stores raw nucleotide sequence submissions ?
 - (A) Literature database
 - (B) Secondary database
 - (C) Structural database
 - (D) Primary database
6. Which of the following is required for phylogenetic tree construction ?
 - (A) Sequence alignment
 - (B) Gel electrophoresis
 - (C) Staining solution
 - (D) PCR machine
7. What does ORF stand for in bioinformatics ?
 - (A) Open Reading Frame
 - (B) Original Replication Factor
 - (C) Ordered Restriction Fragment
 - (D) Open Replication Format
8. Which component is essential for primer designing ?
 - (A) GC content
 - (B) Amino acid sequence
 - (C) Protein folding
 - (D) Lipid composition
9. What is the primary function of FASTA tool ?
 - (A) Primer designing
 - (B) Sequence similarity search
 - (C) Protein purification
 - (D) Genome assembly

10. Which organization maintains the EMBL nucleotide database ?
- (A) NCBI
 - (B) European Bioinformatics Institute (EBI)
 - (C) DDBJ
 - (D) KEGG
11. “There is a plenty of room at the bottom.” This was stated by :
- (A) Issac Newton
 - (B) Albert Einstein
 - (C) Richard Feyman
 - (D) Eric Drexler
12. Which of the following best explains next-generation sequencing (NGS) data analysis ?
- (A) Manual counting of bases
 - (B) Computational processing of large-scale sequencing data
 - (C) Cutting DNA by enzymes
 - (D) Protein purification
13. Which database provides integrated access to multiple NCBI databases ?
- (A) Entrez
 - (B) Swiss-Prot
 - (C) Pfam
 - (D) KEGG
14. Which of the following best describes data mining in bioinformatics ?
- (A) Digging soil samples
 - (B) Amplifying RNA
 - (C) Cutting DNA
 - (D) Extracting useful patterns from biological data
15. Which of the following best explains comparative genomics ?
- (A) Study of protein purification
 - (B) Study of soil microbes
 - (C) Study of fossils
 - (D) Comparison of genomes from different organisms
16. Which of the following best explains genome assembly ?
- (A) Cutting DNA
 - (B) Designing primers
 - (C) Joining sequence reads to form longer sequences
 - (D) Amplifying DNA
17. Which of the following best explains E-value in BLAST ?
- (A) Expected number of random hits
 - (B) Energy value
 - (C) Enzyme value
 - (D) Expression value

18. Which BLAST program compares nucleotide sequence with nucleotide database ?
- (A) BLASTp
 - (B) BLASTn
 - (C) BLASTx
 - (D) tBLASTn
19. Which of the following best explains functional bioinformatics ?
- (A) Study of ecological systems
 - (B) Study of minerals
 - (C) Study of fossils
 - (D) Study of gene and protein functions using computational methods
20. Which of the following best explains contig ?
- (A) Single nucleotide
 - (B) Overlapping DNA fragments forming continuous sequence
 - (C) Protein domain
 - (D) Enzyme
21. Which of the following best explains motif ?
- (A) Random sequence
 - (B) Conserved sequence pattern
 - (C) Stop codon
 - (D) Intronic region
22. Which of the following best describes proteomics ?
- (A) Study of genes
 - (B) Study of RNA
 - (C) Study of proteins
 - (D) Study of chromosomes
23. Which type of alignment aligns sequences across entire length ?
- (A) Local alignment
 - (B) Partial alignment
 - (C) Random alignment
 - (D) Global alignment
24. Which database is maintained by NCBI ?
- (A) Swiss-Prot
 - (B) GenBank
 - (C) Pfam
 - (D) InterPro
25. Which of the following best explains gene prediction ?
- (A) Finding restriction sites
 - (B) Identifying possible genes in DNA sequence
 - (C) Designing primers
 - (D) Protein purification

26. Which tool is used to search protein domains and families ?
- (A) Pfam
 - (B) GenBank
 - (C) EMBL
 - (D) DDBJ
27. Which of the following is a stop codon ?
- (A) AUG
 - (B) UGG
 - (C) UGA
 - (D) GGU
28. The size of E-coli bacteria is :
- (A) 75000 nm
 - (B) 75 nm
 - (C) 7.5×10^{-5} nm
 - (D) 7.5×10^{-9} nm
29. Which software is commonly used for molecular visualization ?
- (A) BLAST
 - (B) MEGA
 - (C) PyMOL
 - (D) FASTA
30. Which of the following best defines a biological database ?
- (A) A place to store chemicals
 - (B) Organized collection of biological data
 - (C) A laboratory instrument
 - (D) A microscope
31. Which database mainly stores nucleotide sequences such as DNA and RNA ?
- (A) GenBank
 - (B) UniProt
 - (C) PDB
 - (D) Pfam
32. Which bioinformatics approach is used to study evolutionary relationships ?
- (A) Primer designing
 - (B) PCR
 - (C) Restriction digestion
 - (D) Phylogenetic analysis
33. Which database contains curated protein sequence information ?
- (A) Swiss-Prot
 - (B) GenBank
 - (C) EMBL
 - (D) DDBJ
34. Which software is used for phylogenetic tree construction ?
- (A) Primer3
 - (B) MEGA
 - (C) ORF Finder
 - (D) PubChem

35. Which BLAST program compares protein query sequence with protein database ?
- (A) BLASTn
 - (B) BLASTp
 - (C) BLASTx
 - (D) tBLASTn
36. Which file format is commonly used to store biological sequence data ?
- (A) PDF
 - (B) DOC
 - (C) FASTA
 - (D) JPG
37. Which tool is used for primer designing ?
- (A) ClustalW
 - (B) BLAST
 - (C) FASTA
 - (D) Primer3
38. Which database stores experimentally determined three-dimensional structures of proteins ?
- (A) GenBank
 - (B) UniProt
 - (C) Protein Data Bank (PDB)
 - (D) EMBL
39. Which bioinformatics software is used to identify Open Reading Frames (ORFs) ?
- (A) ORF Finder
 - (B) FASTA
 - (C) BLAST
 - (D) ClustalW
40. Which software is mainly used for multiple sequence alignment ?
- (A) BLAST
 - (B) FASTA
 - (C) ClustalW
 - (D) Primer3
41. Which bioinformatics tool is commonly used to compare a query sequence with sequences in databases ?
- (A) Primer3
 - (B) ORF Finder
 - (C) ClustalW
 - (D) BLAST
42. Which of the following is an advantage of bioinformatics ?
- (A) Increases experimental cost
 - (B) Destroys DNA
 - (C) Reduces time and labor
 - (D) Stops mutations

43. Which of the following best describes genome annotation ?
- (A) DNA extraction
 - (B) Identification of genes and functional elements in genome
 - (C) Protein purification
 - (D) Gel electrophoresis
44. Which bioinformatics field studies the complete set of proteins produced by a cell ?
- (A) Genomics
 - (B) Proteomics
 - (C) Cytology
 - (D) Ecology
45. Which area of bioinformatics focuses on the study of RNA transcripts ?
- (A) Proteomics
 - (B) Transcriptomics
 - (C) Metabolomics
 - (D) Structural biology
46. Which branch of bioinformatics deals with the study of complete DNA sequence organism ?
- (A) Proteomics
 - (B) Metabolomics
 - (C) Genomics
 - (D) Transcriptomics
47. Which biological data type is commonly analyzed using bioinformatic tools ?
- (A) Soil composition
 - (B) DNA and protein sequences
 - (C) Metal structure
 - (D) Rock samples
48. Which of the following is a major application of bioinformatics ?
- (A) Weather forecasting
 - (B) Road construction
 - (C) Drug discovery and development
 - (D) Textile design
49. Bioinformatics mainly involves the integration of :
- (A) Physics and Chemistry
 - (B) Zoology and Botany
 - (C) Biology and Computer Science
 - (D) Biology and Mathematics
50. Which of the following best defines the term 'Bioinformatics' ?
- (A) Study of plant morphology
 - (B) Application of computer technology to manage and analyse biological data
 - (C) Study of chemical reactions
 - (D) Study of microscope structure

51. World Intellectual Property Day is celebrated on :
- (A) April, 26
 - (B) June, 5
 - (C) December, 10
 - (D) January, 1
52. Which IPR covers inventions ?
- (A) Trademark
 - (B) Patent
 - (C) Copyright
 - (D) GI
53. Which filing establishes priority date ?
- (A) Grant
 - (B) Publication
 - (C) First Filing
 - (D) Examination
54. Which right protects artistic paintings ?
- (A) Patent
 - (B) Trademark
 - (C) Copyright
 - (D) Design
55. The Geographical and Identification (GI) tag is valid for how many years initially ?
- (A) 10 years
 - (B) 15 years
 - (C) 20 years
 - (D) 25 years
56. Who controls Indian Patent Office ?
- (A) Registrar
 - (B) Controller General of Patents
 - (C) Chief Justice
 - (D) Director WIPO
57. Patent specification must be :
- (A) Vague
 - (B) Secret
 - (C) Clear and complete
 - (D) Short
58. Which type of patent relates to machines and devices ?
- (A) Product Patent
 - (B) Process Patent
 - (C) Design Patent
 - (D) Utility Model

59. Discovery of natural living organism is :
- (A) Patentable
 - (B) Non-patentable
 - (C) Copyrightable
 - (D) Trademarkable
60. Which requirement ensures usefulness of invention ?
- (A) Novelty
 - (B) Inventive step
 - (C) Industrial applicability
 - (D) Publication
61. Which organization administers TRIPS Agreement ?
- (A) WIPO
 - (B) WTO
 - (C) WHO
 - (D) UNESCO
62. Which IPR has potentially unlimited validity if renewed ?
- (A) Patent
 - (B) Trademark
 - (C) Design
 - (D) GI
63. Which right protects performers and producers ?
- (A) Patent
 - (B) Copyright
 - (C) Related Rights
 - (D) Design
64. Which agreement relates to international trademark registration ?
- (A) Berne Convention
 - (B) Madrid Protocol
 - (C) TRIPS
 - (D) Paris Convention
65. Which step comes first in patent procedure ?
- (A) Grant
 - (B) Examination
 - (C) Filing
 - (D) Publication
66. Which patent document contains drawings ?
- (A) Claims
 - (B) Abstract
 - (C) Drawings Section
 - (D) Title

67. Which of the following cannot be protected by copyright ?
- (A) Book
 - (B) Song
 - (C) Idea
 - (D) Film
68. Copyright in literary works lasts for :
- (A) 20 years
 - (B) 50 years
 - (C) Life of author + 60 years
 - (D) Perpetual
69. Which IPR is mandatory to register for protection ?
- (A) Copyright
 - (B) Patent
 - (C) Trade Secret
 - (D) Know-how
70. Who is called “Person Skilled in the Art” ?
- (A) Inventor
 - (B) Average skilled technical person
 - (C) Artist
 - (D) Patent Agent
71. Which of the following is a ground for revocation of patent ?
- (A) High cost
 - (B) Low sales
 - (C) Lack of novelty
 - (D) Advertisement
72. Which IPR protects layout design of integrated circuits ?
- (A) Patent
 - (B) Copyright
 - (C) Layout Design
 - (D) Trademark
73. Before 2005, India followed which patent system for pharmaceuticals ?
- (A) Product Patent
 - (B) Process Patent
 - (C) Utility Patent
 - (D) Design Patent
74. Which IPR encourages disclosure of invention ?
- (A) Trade Secret
 - (B) Patent
 - (C) Trademark
 - (D) GI

75. Which city hosts GI Registry of India ?
- (A) Delhi
 - (B) Mumbai
 - (C) Chennai
 - (D) Kolkata
76. GI protection in India is valid for :
- (A) 5 years
 - (B) 10 years (renewable)
 - (C) 15 years
 - (D) 20 years
77. Which IPR protects Geographical Indications ?
- (A) Patent
 - (B) GI
 - (C) Design
 - (D) Trademark
78. Which Act governs trademarks in India ?
- (A) Patents Act, 1970
 - (B) Trademark Act, 1999
 - (C) Copyright Act, 1957
 - (D) Designs Act, 2000
79. Which Act governs patents in India ?
- (A) Copyright Act, 1957
 - (B) Patents Act, 1970
 - (C) IT Act, 2000
 - (D) GI Act, 1999
80. Which IPR protects computer software in India ?
- (A) Patent
 - (B) Trademark
 - (C) Copyright
 - (D) Design
81. Which symbol denotes an unregistered trademark ?
- (A) ®
 - (B) ©
 - (C) ™
 - (D) #
82. Trademark registration in India is valid for :
- (A) 5 years
 - (B) 7 years
 - (C) 10 years
 - (D) 20 years

83. Which IPR protects brand name and logo ?
(A) Patent
(B) Trademark
(C) Copyright
(D) GI
84. Protection period for Industrial Design in India is :
(A) 5 years
(B) 10 years (extendable by 5)
(C) 20 years
(D) Lifetime
85. What is the standard duration of protection for a patent ?
(A) 10 years
(B) 20 years
(C) 50 years
(D) Life of the creator
86. Who examines patent applications ?
(A) Controller
(B) Registrar
(C) Examiner
(D) Judge
87. Patent application in India is published in :
(A) Gazette of India
(B) Patent Journal
(C) Newspaper
(D) Official Website only
88. Which document describes scope of legal protection in a patent ?
(A) Abstract
(B) Description
(C) Claims
(D) Drawings
89. Headquarters of Indian Patent Office is located at :
(A) Delhi
(B) Mumbai
(C) Kolkata
(D) Chennai
90. The authority responsible for granting patents in India is :
(A) WIPO
(B) CSIR
(C) Indian Patent Office
(D) WTO
91. Who can file a patent application ?
(A) True and first inventor
(B) Assignee
(C) Legal representative
(D) All of the above
92. Which of the following is NOT patentable in India ?
(A) New machine
(B) Chemical compound
(C) Method of agriculture
(D) Pharmaceutical product

93. Patent protection in India is granted for a period of :
- (A) 10 years
 - (B) 15 years
 - (C) 20 years
 - (D) 25 years
94. Which condition ensures invention is not obvious ?
- (A) Novelty
 - (B) Utility
 - (C) Inventive Step
 - (D) Publication
95. An essential requirement for patentability is :
- (A) Popularity
 - (B) Novelty
 - (C) Low price
 - (D) Advertising
96. Which of the following is NOT an Intellectual Property Right ?
- (A) Patent
 - (B) Trademark
 - (C) Copyright
 - (D) Trade License
97. Which agreement prescribes minimum standards of IPR protection globally ?
- (A) Berne Convention
 - (B) Paris Convention
 - (C) TRIPS Agreement
 - (D) Madrid Protocol
98. The headquarters of WIPO is located at :
- (A) Paris
 - (B) London
 - (C) Geneva
 - (D) New York
99. Which organization is responsible for administering most international IPR treaties ?
- (A) WTO
 - (B) UNESCO
 - (C) WIPO
 - (D) IMF
100. Intellectual Property is primarily divided into which two broad categories ?
- (A) Industrial Property and Copyright
 - (B) Public Property and Private Property
 - (C) Tangible Property and Intangible Property
 - (D) National Property and International Property

(Only for Rough Work)

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 :

Example :

Question :

Q. 1 (A) ● (C) (D)

Q. 2 (A) (B) ● (D)

Q. 3 (A) ● (C) (D)

Illegible answers with cutting and over-writing or half filled circle will be cancelled.

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 and 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.

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 छँटना है। उत्तर को OMR आन्सर-शीट में सम्बन्धित प्रश्न संख्या में निम्न प्रकार भरना है :

उदाहरण :

प्रश्न :

प्रश्न 1 (A) ● (C) (D)

प्रश्न 2 (A) (B) ● (D)

प्रश्न 3 (A) ● (C) (D)

अपठनीय उत्तर या ऐसे उत्तर जिन्हें काटा या बदला गया है, या गोले में आधा भरकर दिया गया, उन्हें निरस्त कर दिया जाएगा।

5. प्रत्येक प्रश्न के अंक समान हैं। आपके जितने उत्तर सही होंगे, उन्हीं के अनुसार अंक प्रदान किये जायेंगे।
6. सभी उत्तर केवल ओ. एम. आर. 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. ओ. एम. आर. 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 के अन्त में, रफ-कार्य के लिए दिए खाली पेज पर ही किया जाना चाहिए।
11. परीक्षा-कक्ष में लॉग-बुक, कैलकुलेटर, 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 प्रश्न-पुस्तिका के सभी पृष्ठ भलीभाँति छपे हुए हैं। यदि प्रश्नपुस्तिका में कोई कमी हो, तो कक्षनिरीक्षक को दिखाकर उसी सिरीज की दूसरी प्रश्न-पुस्तिका प्राप्त कर लें।