

# CET (PG)-2015

Sr. No. : 202083

## Question Booklet Series : A

**Important:** Please consult your Admit Card / Roll No. Slip before filling your Roll Number on the Test Booklet and Answer Sheet.

Roll No.

*In Figures*

*In Words*

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O.M.R. Answer Sheet Serial No.

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Signature of the Candidate : \_\_\_\_\_

**Subject : M.Sc. (Two Year Course)-(Bioinformatics)/(System Biology)**

Time : 90 minutes

Number of Questions : 75

Maximum Marks : 75

**DO NOT OPEN THE SEAL ON THE BOOKLET UNTIL ASKED TO DO SO**

### INSTRUCTIONS

1. Write your Roll No. on the Question Booklet and also on the OMR Answer Sheet in the space provided and nowhere else.
2. Enter the Subject and Series Code of Question Booklet on the OMR Answer Sheet. Darken the corresponding bubbles with **Black Ball Point / Black Gel pen.**
3. Do not make any identification mark on the Answer Sheet or Question Booklet.
4. To open the Question Booklet remove the paper seal gently when asked to do so.
5. Please check that this Question Booklet contains 75 questions. In case of any discrepancy, inform the Assistant Superintendent within 10 minutes of the start of test.
6. Each question has four alternative answers (A, B, C, D) of which only one is correct. For each question, darken only one bubble (A or B or C or D), whichever you think is the correct answer, on the Answer Sheet with **Black Ball Point / Black Gel pen.**
7. If you do not want to answer a question, leave all the bubbles corresponding to that question blank in the Answer Sheet. No marks will be deducted in such cases.
8. Darken the bubbles in the OMR Answer Sheet according to the Serial No. of the questions given in the Question Booklet.
9. Negative marking will be adopted for evaluation i.e., 1/4th of the marks of the question will be deducted for each wrong answer. A wrong answer means incorrect answer or wrong filling of bubble.
10. For calculations, use of simple log tables is permitted. Borrowing of log tables and any other material is not allowed.
11. For rough work only the sheets marked "Rough Work" at the end of the Question Booklet be used.
12. The Answer Sheet is designed for **computer evaluation**. Therefore, if you do not follow the instructions given on the Answer Sheet, it may make evaluation by the computer difficult. **Any resultant loss to the candidate on the above account, i.e., not following the instructions completely, shall be of the candidate only.**
13. After the test, hand over the Question Booklet and the Answer Sheet to the Assistant Superintendent on duty.
14. In no case the Answer Sheet, the Question Booklet, or its part or any material copied/noted from this Booklet is to be taken out of the examination hall. Any candidate found doing so, would be expelled from the examination.
15. A candidate who creates disturbance of any kind or changes his/her seat or is found in possession of any paper possibly of any assistance or found giving or receiving assistance or found using any other unfair means during the examination will be expelled from the examination by the Centre Superintendent/Observer whose decision shall be final.
16. **Telecommunication equipment such as pager, cellular phone, wireless, scanner, etc., is not permitted inside the examination hall. Use of calculator is not allowed.**

1. **The BLOSUM matrices are used for scoring substitutions in :**  
(A) Amino acid sequences (B) Carbohydrate sequences  
(C) Lipid sequences (D) Amino glycoside sequences
2. **Which of the following steps is blocked by Actinomycin D in prokaryotes and Eukaryotes ?**  
(A) Inhibiting initiation step of replication (B) Inhibiting terminating step of replication  
(C) Inhibiting elongation step of transcription (D) Inhibiting elongation step in transcription
3. **ASCII acronym in computers stands for :**  
(A) American Subscriber Code for Information Interchange  
(B) American Service Code for Information Interchange  
(C) American Standard Code for Information Interchange  
(D) American Standard Code for Interventional Interchange
4. **While scripting a programme in Perl language a statement ends in :**  
(A) Colon (B) Semicolon  
(C) No punctuation marks needed (D) Numeric characters
5. **The overall process of anaerobic glycolysis in muscle yields :**  
(A) Thirty six ATPs (B) Six ATPs  
(C) Four ATPs (D) Two ATPs
6. **All of the below mentioned radioactive isotopes emit  $\beta$ -type of radiations except :**  
(A)  $^3\text{H}$  (B)  $^{14}\text{C}$   
(C)  $^{125}\text{I}$  (D)  $^{32}\text{P}$
7. **Homologous proteins from different species that possess the same function are called :**  
(A) Orthologs (B) Paralogs  
(C) Metalogs (D) Analogs
8. **All of these are true for relational database except :**  
(A) It follows E.F. Codd's rules  
(B) It is a series of mathematical steps not necessarily in any logical order  
(C) The rows correspond to record, the columns correspond to attributes  
(D) These used structured query language for data definition
9. **The RNA molecule can be present in all of the following forms except :**  
(A) Ribozymes (B) snoRNA  
(C) miRNA (D) Ribonuclease

10. While making a gel for electrophoresis, the polymerization reaction of acrylamide to form polyacrylamide is :
- Initiated by bisacrylamide and catalyzed by persulphate
  - Initiated by persulphate radicals and catalyzed by TEMED
  - Initiated by Tris and catalyzed by persulphate radicals
  - Initiated by TEMED and catalyzed by bisacrylamide
11. Which of the following statements is not true for mucopolysaccharides ?
- Polysaccharides with viscous jelly like consistency
  - Present in connective tissue
  - Contain O-glycolipid linkages
  - Contain O-glycosidic linkages
12. Lysosomes contain which of the following enzymes ?
- Kinases
  - Lyases
  - Ligases
  - Hydrolases
13. All of the following statements are true for plasmids except :
- These are self replicating
  - These are extra-chromosomal DNA molecules in bacteria
  - They usually confer a specialized characteristic to bacteria
  - They are always found in association with plasma membrane
14. One complete round of citric acid cycle yields :
- Two molecules of  $\text{CO}_2$ , one NADH, three  $\text{FADH}_2$ , one high energy compound GTP
  - Two molecules of  $\text{CO}_2$ , three NADH, one  $\text{FADH}_2$ , one high energy compound GTP
  - Two molecules of  $\text{CO}_2$ , three NADH, one  $\text{FADH}_2$ , two high energy compound GTP
  - Two molecules of  $\text{CO}_2$ , one NADH, one  $\text{FADH}_2$ , two high energy compound GTP
15. The DNA double helix as described by Watson and Crick model is composed of :
- Two parallel complementary strands
  - Two antiparallel complementary strands
  - Two strands in parallel noncomplimentary alpha helix conformation
  - Two strands in antiparallel noncomplimentary alpha helix conformation
16. In the DNA replication process each okazaki fragment must be initiated by action of which of following enzymes ?
- Helicase
  - DNA gyrase
  - DNA polymerase I
  - Primase

17. As a part of the electromagnetic spectrum, which of the following has the highest energy ?
- (A) Infrared (B) Microwave  
(C) X-ray (D) Ultraviolet
18. Which of the following could be considered as the best method for ascertaining paternity ?
- (A) DNA quantification (B) DNA fingerprinting  
(C) RNA quantification (D) Protein fingerprinting
19. The First draft of human genome sequence was released in :
- (A) 1995 (B) 2000  
(C) 2001 (D) 2003
20. The first biological sequence database was a :
- (A) Nucleotide sequence database  
(B) Protein database  
(C) Database containing nucleotide as well as proteins  
(D) Database containing nucleotides, proteins and other biomacromolecules
21. Motif in a protein structure is :
- (A) Primary structure (B) Secondary structure  
(C) Super secondary structure (D) Tertiary structure
22. The proteins functioning as gene expression regulators do so by :
- (A) Influencing the DNA polymerase catalysis (B) Activation or repression of RNA polymerase activity  
(C) Binding to mRNA to synthesize it or destroy it (D) Binding to rRNA to synthesize it or destroy it
23. The first algorithm for comparison of protein and DNA sequences was published in 1970 by :
- (A) Needleman and Wunsch (B) Smith and Waterman  
(C) Altschul *et al* (D) Pearson and Lipman
24. The nucleotide sequence data retrieved from a database can be in all the following formats, except :
- (A) ASN.1 (B) FASTA  
(C) GenBank (D) PDB
25. The data presentation in a PDB file has :
- (A) Each line 60 columns wide and is terminated by a number  
(B) Each line 80 columns wide and is terminated by a number  
(C) Each line 60 columns wide and is terminated by an end-of-line indicator  
(D) Each line 80 columns wide and is terminated by an end-of-line indicator

26. The selection criteria of the PAM matrix construction algorithm variants will be governed according to :
- (A) PAM1 and PAM100 are both suitable for closely related sequences
  - (B) PAM1 and PAM100 are both suitable for distantly related sequences
  - (C) PAM1 and PAM100 are suitable for distantly and closely related sequences, respectively
  - (D) PAM1 and PAM100 are suitable for closely and distantly related sequences, respectively
27. Which of the following programming languages was used initially for scripting UNIX operating systems ?
- (A) Fortran
  - (B) Java
  - (C) Assembler
  - (D) Perl
28. Which of the following processes can be inhibited by rifampicin in *E. Coli* ?
- (A) Elongation of peptide chains
  - (B) Replication of deoxyribonucleotide sequences
  - (C) Transcription of RNA sequences
  - (D) Translation of RNA sequences
29. The small unstained specimen of living cells are best visible in :
- (A) Phase contrast microscope
  - (B) Fluorescence microscope
  - (C) Bright field microscope
  - (D) Electron microscope
30. Which of the following bioinformatics programs can be used for predicting the transmembrane domain of a receptor ?
- (A) TMHMM
  - (B) HMM
  - (C) IMM
  - (D) MM
31. Identify the Global alignment algorithm for database searching :
- (A) Needleman and Wunsch
  - (B) Smith and Waterman
  - (C) BLAST
  - (D) Fasta
32. Thiamine is a :
- (A) Water soluble vitamin
  - (B) Fat soluble vitamin
  - (C) Pyrimidine
  - (D) Purine
33. The database InterPro is an :
- (A) Integrated Resource of Protein sequence and classification
  - (B) Integrated Repository of Protein and DNA sequences
  - (C) Integrated Resource of Proteins classification only
  - (D) Integrated Repository of Protein and DNA classification

34. Identify the mismatch pair of functional group and amino acid :
- (A) Imidazole-Histidine (B) Guanidino-Arginine  
(C) Imino-Proline (D) Indole-Phenylalanine
35. What is the molar concentration of HOH species in pure water ?
- (A) 50.0 M (B) 50.5 M  
(C) 55.0 M (D) 55.5 M
36. Which of the following cannot be used for culturing embryonic organs ?
- (A) Plasma clots (B) Media modified with agar  
(C) Fluid media (D) Media modified with acryl amide
37. Which of the following was first published complete genome sequence ?
- (A) *H. Pylori* (B) *E.Coli*  
(C) *H. influenzae* (D) *S. cerevisiae*
38. Water as a nonlinear, polar molecule can serve directly all of the following functions in cells, except :
- (A) It is an effective solvent (B) It is a reactant molecule  
(C) It can generate H<sup>+</sup> or OH<sup>-</sup> ions (D) It can generate Hydride ions
39. Which of the following statements is not true for features of Protein Data Bank ?
- (A) It is the source of primary data  
(B) Provides efficient collection and curation of data  
(C) Provides crystallographic and NMR structural data  
(D) Does not provide any validation server
40. Multiple Sequence Alignment is very often used for the following except :
- (A) Detecting similarities between the sequences (B) Detecting conserved regions in the sequences  
(C) Inferring evolutionary trees (D) Predicting the quaternary structure of sequences
41. Hyperchromic shift observed in a DNA sample reflects which of the following ?
- (A) Denaturation (B) Renaturation  
(C) Destruction (D) Precipitation
42. Identify the true statement for eukaryotic RNA polymerases :
- (A) It can synthesize all types of RNAs  
(B) It can synthesize selective types of RNAs depending on cell types  
(C) There is a unique polymerase for each type of RNA  
(D) There is one enzyme with various functional domains

43. The Glimmer program for gene prediction is a :
- (A) UNIX program from DDBJ (B) WINDOWS program from DDBJ  
(C) UNIX program from TIGR (D) WINDOWS program from TIGR
44. The GenBank sequence format flat file contains :
- (A) All the information in three sections (B) All the information in two sections  
(C) All the information in one section only (D) All the information in variant number of sections
45. A computer program to convert a source code in a programming language into machine language would be :
- (A) Compiler (B) Controller  
(C) Coprocessor (D) Processor
46. Identify the group of databases which are exclusively specialized databases :
- (A) Flybase, GenBank, PubMed (B) Flybase, AceDB, TAIR  
(C) Flybase, GenBank, TrEMBL (D) Flybase, SWISS-PROT, PubMed
47. The Acronym of the networking specification language COBRA is :
- (A) Common Object Request Broker Architecture (B) Common Object Relational Broker Architecture  
(C) Common Object Request Based Architecture (D) Common Object Relational Based Architecture
48. The cytological maps are :
- (A) The banding patterns of stains coloring cytosols  
(B) The banding patterns of stains coloring chromosomes  
(C) The banding patterns of stains coloring cell membranes  
(D) The banding patterns of stains coloring centrosomes
49. The Acronym of WORM in a computer system is :
- (A) Write only Read Many (B) Write once Read Many  
(C) Write only Read Memory (D) Write once Read Must
50. The 'ktups' in FASTA database similarity search tool are :
- (A) Short stretches of identical residues with a length  $k$   
(B) Short stretches of identical residues with a length  $k - 1$   
(C) Short stretches of identical residues with a length  $k + 1$   
(D) The  $k$  number of stretches of identical residues
51. A cDNA library contains :
- (A) Some part of transcriptome information (B) Complete transcriptome information  
(C) Some genomic information (D) Complete genomic information

52. **The low complexity regions in protein sequences are :**
- (A) Segments represented by N-terminal amino acid residues
  - (B) Segments represented by C-terminal amino acid residues
  - (C) Segments overrepresented by a small number of amino acid residues
  - (D) Segments represented by variant types of amino acid residues
53. **The protein structures from secondary to quaternary are maintained primarily by :**
- (A) Metallic forces
  - (B) Coordinate forces
  - (C) Covalent forces
  - (D) Noncovalent forces
54. **Which of the following programs cannot be used for molecular structure visualization ?**
- (A) Rasmol
  - (B) Molscript
  - (C) Grasp
  - (D) CONPRO
55. **In the first trial of gene therapy, ADA therapy the patient was given :**
- (A) Lymphocyte transfected with ADA gene by simian viral vector
  - (B) Lymphocyte transfected with ADA gene by Adeno viral vector
  - (C) Lymphocyte transfected with ADA gene by retroviral vector
  - (D) Lymphocyte transfected with ADA gene without any vector
56. **Identify the false statement in the following :**
- (A) RAM is a type of volatile memory
  - (B) RAM requires a flow of electricity to retain data
  - (C) RAM is the most common type of memory found in devices such as printers
  - (D) RAM is a memory, modules of which cannot be later added to make the computer faster
57. **The graphical analysis of Phi-Psi angles for protein conformation is known as :**
- (A) Rajaraman plot
  - (B) Ramnujan plot
  - (C) Ramachandran plot
  - (D) Ramaswami plot
58. **Which of the following statements is not true for features of SWISS-PROT ?**
- (A) It provides core data
  - (B) It provides annotation of data
  - (C) It provides maximal redundant data
  - (D) Integration with other database collections
59. **The following types of repetitive sequences can be used for DNA fingerprinting, except :**
- (A) Variable Number Tandem repeats
  - (B) Short Tandem repeats
  - (C) Simple sequence repeats
  - (D) Oligopeptide repeats



60. Which of the following reactions is common to the biosynthesis of Alanine and Aspartate ?
- (A) Transamination (B) Deamination  
(C) Carboxylation (D) Decarboxylation
61. Apoenzyme is that part of the enzyme :
- (A) Polypeptide with prosthetic group or cofactors  
(B) Polypeptide without prosthetic group or cofactors  
(C) Prosthetic group or cofactors only without polypeptide  
(D) Prosthetic group only
62. Monod-Wyman-Changeux (MWC) concerted model are used to describe :
- (A) Action of enzymatic reactions  
(B) Action of regulatory molecules in modulating enzymatic action  
(C) Action of folding accessory proteins in folding of macromolecules  
(D) Action of regulatory molecules on folding accessory proteins
63. Shine Dalgarno Sequences are present in :
- (A) rRNA (B) tRNA  
(C) mRNA (D) snRNA
64. Amino acid substitution from normal haemoglobin to mutant Haemoglobin S is :
- (A) 6 Glu  $\rightarrow$  Lys (B) 6 Glu  $\rightarrow$  Val  
(C) 6 Glu  $\rightarrow$  Ala (D) 6 Glu  $\rightarrow$  Ile
65. Which of the following conditions prevail when denaturation of double stranded DNA occurs ?
- (A) Breakage into short double stranded fragments  
(B) Breakage of DNA backbone  
(C) Breakage of bases from sugar phosphate backbone  
(D) Breakage of hydrogen bonds between two strands to generate single stranded fragments
66. Identify which of the following hormones is not secreted by pancreas :
- (A) Insulin (B) Glucagon  
(C) Somatostatin (D) Glucocorticoids
67. In computational biology programmes, the logistic process of analyzing a string of symbols or text commonly called :
- (A) Priming (B) Parsing  
(C) Predicting (D) Pretexting

68. Edman degradation is the method to determine the sequence of :
- (A) Deoxyribonucleotides (B) Ribonucleotides  
(C) Polypeptides (D) Lipopolysaccharides
69. What is PERL ?
- (A) Practical Extraction and Report Learning (B) Practical Extraction and Report Language  
(C) Practice for Exclusive and Report Language (D) Practical Exclusive and Report Language
70. To resolve proteins on the basis of their molecular weight which of the following techniques can be used ?
- (A) Paper chromatography (B) Affinity chromatography  
(C) Adsorption chromatography (D) Gel filtration chromatography
71. Identify the epimeric pair of sugars from following :
- (A) Glucose and Fructose (B) Glucose and Galactose  
(C) Fructose and Mannose (D) Fructose and Galactose
72. The HAT selection media used for monoclonal antibody production would allow :
- (A) Hybrid Cells to grow in the presence of antibiotic  
(B) Hybrid Cells to grow in any other media  
(C) Hybrid Cells to grow that can use salvage pathway of nucleotide biosynthesis  
(D) Hybrid Cells to grow that cannot use salvage pathway of nucleotide biosynthesis
73. Which of the following proteins have light and heavy chains in their structures ?
- (A) Myoglobin (B) Albumin  
(C) Immunoglobulins (D) Insulin
74. Taxa on a phylogenetic tree that are descended from a single common ancestor :
- (A) Monophyletic (B) Monoplasty  
(C) Monomeric (D) Monotomy
75. What does the UPGMA mean ?
- (A) Unweighted Protein Group Method with Arithmetic Means  
(B) Unweighted Pair Group Method with Arithmetic Means  
(C) Unweighted Partial Group Method with Arithmetic Means  
(D) Unweighted Perfect Group Method with Arithmetic Means