

Department of Biotechnology
Class: T.Y.B.Sc.
Semester: VI (ATKT)
Subject: Molecular Biology & Bioinformatics
Sample Questions

Multiple Choice Questions

1. _____ vaccines are made from wild or disease causing viruses or bacteria that have been weakened under laboratory conditions.
 - a) Subunit vaccines
 - b) Peptide vaccines
 - c) Attenuated vaccines
 - d) Toxoid vaccines
2. _____ is a vaccine that uses a chemically weakened virus to transport pieces of pathogen in order to simulate an immune response.
 - a) Attenuated vaccines
 - b) Subunit vaccines
 - c) Vector vaccines
 - d) Peptide vaccines
3. Which of the following is the genetically engineered insulin?
 - a) Humulin
 - b) Rumulin
 - c) H-insulin
 - d) R-insulin
4. The subunit vaccine for hepatitis B is created against _____.
 - a) Surface protein
 - b) Core protein
 - c) Genome
 - d) Whole virus
5. Translation of mRNA into proteins takes place in the _____.
 - a) host cell nucleus
 - b) host cell cytoplasm
 - c) viral nucleus
 - d) viral cytoplasm
6. _____ are vaccines which contain DNA that code for specific antigen from pathogen.
 - a) DNA vaccines
 - b) Peptide vaccines
 - c) Toxoid vaccines
 - d) RNA vaccines
7. Reverse transcription PCR uses _____.
 - a) mRNA as a template to form cDNA
 - b) DNA as a template to form ssDNA
 - c) tRNA as a template to form DNA
 - d) Protein
8. Foot and mouth disease virus contain _____ genome.
 - a) ssRNA
 - b) dsRNA
 - c) ssDNA

- d) dsDNA
9. Who developed the chemical techniques to synthesize polynucleotides?
- Barbara McClintock
 - James Watson
 - Fredrick Sanger
 - H. Gobind Khorana
10. The first recombinant DNA molecule was synthesized in the year _____.
- 1962
 - 1972
 - 1982
 - 1992
11. Which of the following enzymes in bacteria are responsible for restricting the growth of viruses?
- Restriction Endonuclease
 - Topoisomerase
 - Gyrase
 - Protease
12. Which observation was made by Avery, Macleod, and McCarty?
- DNA is a duplex molecule
 - DNA can be taken up from medium
 - DNA can denature at high temperatures
 - DNA is more stable than RNA
13. Which enzyme is used to join together two different types of DNA molecules?
- Ligase
 - Endonuclease
 - Exonuclease
 - Protease
14. Recombinant plasmids are added to a bacterial culture that has been pretreated with _____ ions.
- Iodine
 - Magnesium
 - Calcium
 - Ferric
15. Polymerase chain reaction (PCR) was invented by _____.
- Kary Mullis
 - James Watson
 - John Hopkins
 - Hargobind Khorana
16. *Taq* DNA polymerase is a _____ polymerase.
- Heat-stable
 - Buffering
 - Denaturant
 - Large
17. Which enzyme is active at 72°C in the polymerase chain reaction?
- isomerase
 - exonuclease
 - polymerase
 - endonuclease
18. cDNA libraries are produced from _____.

- a) ribonucleic acids
 - b) messenger RNAs
 - c) transfer RNAs
 - d) ribosomal RNAs
19. What is chromosome walking?
- a) Hybridization technique
 - b) Sequencing technique
 - c) Genetic marker
 - d) Chemical degradation technique
20. The process of introducing DNA into cells is called _____.
- a) blotting
 - b) conjugation
 - c) transfection
 - d) conduction
21. What is the full form of RFLP?
- a) Restriction Fragment Length Polymorphisms
 - b) Random Fragment Length Polymorphism
 - c) Restriction Find in Length of DNA Polymer
 - d) Restriction Fragment Length Polymers
22. Subunit vaccine contains _____.
- a) Live component of the cell
 - b) Inactivated whole cell
 - c) Antigenic part of pathogen
 - d) Toxin produced by pathogen
23. Which of the following act as chain terminator?
- a) Exogenous
 - b) DNA
 - c) Deoxynucleotides
 - d) Dideoxynucleotides
24. Peptide vaccines are usually composed of _____ containing specific epitope of an antigen.
- a) Amino acids
 - b) Polysaccharides
 - c) Lipids
 - d) DNA
25. The vaccine in which peptide of the original pathogen is used to immunize an organism is called _____.
- a) Subunit vaccines
 - b) Peptide vaccines
 - c) Attenuated vaccines
 - d) Toxoid vaccines
26. Electroporation is also used for taking up the DNA by the cells. It constitutes of _____
- a) inserting the DNA into the cells via an electric shock
 - b) increased efficiency than both natural and chemical methods
 - c) causing the least amount of damage in comparison to other methods
 - d) decreased efficiency than both natural and chemical methods
27. Which of the following does not play any role in the infection of plant cell by the Ti plasmid of *A. tumefaciens*?
- a) T-DNA

- b) Virulence region
 - c) Host specificity region
 - d) 25 base pair repeats
28. How the host specificity is achieved by the specificity gene of the Ti plasmid?
- a) Opine released by a wounded plant
 - b) Acetosringone released by bacteria
 - c) Acetosringone released by a wounded part of the plant
 - d) Opine released by bacteria
29. Name the strategy where two-plasmid system is used for the introduction of the gene?
- a) Binary vector system
 - b) Co-integration vector strategy
 - c) Agrobacterium
 - d) Selectable marker strategy
30. What should be the voltage/cm for electroporation to work?
- a) 100 – 1000 V/cm
 - b) 10 – 100 V/cm
 - c) 10 – 50 V/cm
 - d) 10000 – 100000 V/cm
31. Which of the following will be a biological method for gene transfer?
- a) Electroporation
 - b) Microinjection
 - c) Particle bombardment
 - d) Baculoviral vector system
32. In Ti plasmid Vir region, Vir stands for _____.
- a) Variability
 - b) Variance
 - c) Virulence
 - d) versatile
33. Which of the following genes are constitutively expressed and control the plant induced activation of other vir genes?
- a) *vir* A and *vir* G
 - b) *vir* C and *vir* D
 - c) *vir* B and *vir* E
 - d) *vir* A and *vir* B
34. Liposome are _____.
- a) Naturally present structure made up of lipids and protein
 - b) Arrangement of multilamellar and unilamellar vacuoles
 - c) Required electrical impulse for DNA transformation
 - d) Artificial structure made up of lipids used to deliver the DNA into cells
35. Genes required to transfer a rice plant into “Golden rice” were obtained from
- a) Carrot
 - b) a plant called Daffodil and a bacterium called Erwinia
 - c) *E.coli* and Daffodil
 - d) unflower and cotton
36. Transgenic plants can be _____ from transformed plant cells.
- a) Inactivated
 - b) Regenerated

- c) Degenerated
 - d) Excised
37. Name the first transgenic virus resistant plant.
- a) Rice
 - b) Cotton
 - c) Tobacco
 - d) Tomato
38. The growth of plant tissue in artificial media is called _____.
- a) Gene expression
 - b) Trasgenesis
 - c) Plant tissue culture
 - d) Cell hybridisation
39. *Agrobacterium tumefaciens* is a soil bacterium that cause _____.
- a) Crown gall disease
 - b) Club root disease
 - c) Corn smut disease
 - d) Hairy root disease
40. Plasmid present in *Agrobacterium tumefaciens* is _____.
- a) Virulence plasmid
 - b) Ti plasmid
 - c) F plasmid
 - d) Col plasmid
41. A protoplasm lacks _____.
- a) Cell membrane
 - b) Vacuole
 - c) Cell membrane
 - d) Plasma membrane
42. Introduction of DNA into plant cell by exposing them for very brief periods into high voltage electric pulses, is called _____.
- a) Microinjection
 - b) Particle bombardment
 - c) Electroporation
 - d) Pressure
43. In which one of this method electric field is applied for gene transfer?
- a) Microinjection
 - b) Particle bombardment
 - c) Electroporation
 - d) Sonoporation
44. Which of the following are the characteristics of electroporation?
- a) Suspend the cells in an electroporation cuvette
 - b) Injecting the DNA into the cell
 - c) Also known as Biolistic
 - d) Usage of ultrasound
45. Which of the following are the characteristics of microinjection?
- a) Suspend the cells in an electroporation cuvette
 - b) Injecting the DNA into the cell
 - c) Also known as Biolistics
 - d) Usage of ultrasound

46. Which of the following are the characteristics of particle bombardment?
- Suspend the cells in an electroporation cuvette
 - Injecting the DNA into the cell
 - Also known as biolistics
 - Usage of ultrasound
47. Which is the direct gene transfer method?
- electroporation
 - agrobacterium mediated gene transfer
 - viral mediated gene transfer
 - biological method
48. Which of the following is considered as a visual marker?
- Antibiotic marker
 - Resistance marker
 - Selectable marker
 - Screenable marker
49. Transformation carried out using a particle gun is known as biolistic transformation. It falls under which category of transformation?
- Physical
 - Chemical
 - Electroporation
 - Natural
50. The particle gun method consists of which of the following steps?
- The DNA of interest is absorbed onto microprojectile beads
 - These beads are often made of aluminium
 - The explosion in a gun propels a macroprojectile forward which in turn propels microprojectile beads
 - The macroprojectiles and microprojectiles both cross the perforated plate and hit the target tissue behind it
51. For germline transformation of animal cells, DNA is introduced into _____ cells.
- Totipotent
 - Pluripotent
 - Germ
 - Somatic
52. Medaka fish is also called as _____.
- Japanese kill fish
 - Rohu fish
 - Salmon fish
 - Ocean pout fish
53. A portion of phage is removed and in place of it, the DNA of interest is inserted. This type of vector is called as _____.
- displacement vector
 - insertion vector
 - substitution vector
 - transposition vector
54. Luciferase genes are also used at times for detection. Choose the correct statement for them.
- They are obtained from fire flies only
 - The detection requires provision of substrate which produces light

- c) Enzymes such as beta-galactosidase requires substrate X-gluc to produce light
 - d) Luciferase genes are preferred over fluorescent proteins
55. Gene transfer technology in fish has lagged behind that in _____.
- a) Bacteria
 - b) Virus
 - c) Mammals
 - d) Plants
56. Which of the following virus is not used in gene therapy?
- a) Papillomavirus
 - b) Retrovirus
 - c) Adenovirus
 - d) Herpes simplex virus
57. Transgenic fish lines are created by _____ of DNA into the genome.
- a) Excision
 - b) Partial attachment
 - c) Inactivation
 - d) Integration
58. Fish, like frogs can be used for _____ assays.
- a) Integrative
 - b) Nonfunctional
 - c) Transient
 - d) Permanent
59. How does tyrosine recombinase acts?
- a) First join then cleave
 - b) First cleave then join
 - c) processes occur simultaneously
 - d) Cleaves and rejoin two DNA pairs one after another
60. What is the name of the site where Cre enzyme acts?
- a) COX
 - b) LOX
 - c) AOX
 - d) XOP
61. Which of these established cell lines originate from a mouse embryo?
- a) 3T3
 - b) BHK
 - c) HeLa
 - d) BTK
62. Vasectomized male are _____ male.
- a) can fertilized eggs
 - b) reproductive
 - c) fertile
 - d) sterile
63. ES cells are used in order to ensure that insertion is done at the required chromosomal location and it is called as _____.
- a) gene targeting
 - b) knocking out
 - c) knocking in
 - d) gene disruption

64. Choose the incorrect statement for cre-lox excision.
- a) The chromosomal copy of the target gene replaces the target gene flanked by loxP sites
 - b) The second step is supply of Cre recombinase
 - c) Integration of cre takes place under a controllable promoter followed by induction of the promoter
 - d) Induction results in expression of cre, recombination along loxP sites and excision of the sequence between
65. Which of the following vectors are used for the production of transgenic mice?
- a) BAC
 - b) Lambda phage
 - c) YAC
 - d) M13 phage
66. Genetically modified mice can be used to address various aspects of gene function and _____.
- a) Transcription
 - b) Regulation
 - c) Inactivity
 - d) Temperature gradient
67. Embryonic stem cells in mice are _____ cells.
- a) Germ
 - b) Somatic
 - c) Pluripotent
 - d) Totipotent
68. Pronuclear microinjection directly transfers DNA into _____.
- a) Female pronucleus
 - b) Membrane
 - c) Male pronucleus
 - d) Cytosol
69. Green fluorescent protein (GFP) is observed from which of the following organism?
- a) Octopus
 - b) Jellyfish
 - c) Drosophila
 - d) Mouse
70. The first transgenic fish carried transgenes driven by _____.
- a) Mammals
 - b) Xenopus
 - c) Virus
 - d) Bacteria
71. Transgenic fish lines are created by _____ of DNA into the genome.
- a) Excision
 - b) Partial attachment
 - c) Inactivation
 - d) Integration
72. ES cells are amenable to homologous recombination and hence can be used for _____.
- a) Recombinant protein production
 - b) Gene targeting
 - c) Cloning
 - d) Hybridization
73. The fragment inserted in the place of the central portion of the genome is known as _____.

- a) insertion fragment
 - b) substitution fragment
 - c) stuffer fragment
 - d) displacement fragment
74. Pathology of which of the following disease has been studied using transgenic mouse model?
- a) Alzheimer's
 - b) Jaundice
 - c) Prion
 - d) Tumor
75. Differentiated animal cells cannot _____.
- a) Grow further
 - b) Live longer
 - c) Be cloned
 - d) Dedifferentiate
76. The term Bioinformatics was coined by _____.
- a) J. D. Watson
 - b) Pauline Hogeweg
 - c) Margaret Dayhoff
 - d) Frederic Sanger
77. The computer simulation refers to _____.
- a) Dry lab
 - b) Invitro
 - c) In silico
 - d) Wet lab
78. The computational methodology that tries to find the best matching between two molecules, a receptor and ligand are called _____.
- a) Molecular fitting
 - b) Molecular matching
 - c) Molecular docking
 - d) Molecule affinity checking
79. The identification of drugs through the genomic study is called _____.
- a) Genomics
 - b) Pharmacogenomics
 - c) Pharmacogenetics
 - d) Cheminformatics
80. Which of the following tools is used for the identification of motifs?
- a) BLAST
 - b) COPIA
 - c) PROSPECT
 - d) Pattern hunter
81. Which of the following does not describe BLAST?
- a) It stands for Basic Local Alignment Search Tool
 - b) It uses word matching like FASTA
 - c) It is one of the tools of the NCBI
 - d) Even if no words are similar, there is an alignment to be considered
82. Which of the following is untrue regarding BLAST and FASTA?
- a) FASTA is faster than BLAST
 - b) FASTA is the most accurate

- c) BLAST has limited choices of databases
 - d) FASTA is more sensitive for DNA-DNA comparisons
83. URL stands for _____.
- a) unique reference label
 - b) uniform reference label
 - c) uniform resource locator
 - d) unique resource locator
84. Which of the following is not correct about FASTA?
- a) Its stands for FAST ALL
 - b) It was in fact the first database similarity search tool developed, preceding the development of BLAST
 - c) FASTA uses a 'hashing' strategy to find matches for a short stretch of identical residues with a length of k
 - d) The string of residues is known as blocks
85. Which of the following is not a variant of BLAST?
- a) BLASTN
 - b) BLASTP
 - c) BLASTX
 - d) TBLASTNX
86. Bioinformatics is also be regarded as a part of the _____.
- a) Computational biology
 - b) Computational biotechnology
 - c) Computer biology
 - d) Computer knowledge
87. Which of the following is an example of Homology and similarity tool?
- a) BLAST
 - b) RasMol
 - c) EMBOSS
 - d) PROSPECT
88. HTML is used to create _____.
- a) Machine language program
 - b) High level program
 - c) Web page
 - d) Web server
89. Stepwise method of solving problems in computer science is called _____.
- a) Flowchart
 - b) Sequential design
 - c) Procedure
 - d) Algorithm
90. Each record in database is called _____.
- a) Entry
 - b) File
 - c) Record
 - d) Ticket
91. Which of the following is a protein sequence database?
- a) DDBJ
 - b) EMBL
 - c) GenBank

- d) PIR
92. All the following are protein sequence database except _____.
- a) PIR
 - b) PSD
 - c) SWISSPROT
 - d) EMBL
93. The first secondary database developed was _____.
- a) PRINTS
 - b) PROSITE
 - c) PDB
 - d) PIR
94. What is the source of protein structures in SCOP and CATH?
- a) Uniprot
 - b) Protein Data Bank
 - c) Ensemble
 - d) InterPro
95. What is the length of a motif, in terms of amino acids residue?
- a) 30- 60
 - b) 10- 20
 - c) 70- 90
 - d) 1- 10
96. Which of the following is an example of Homology and similarity tool?
- a) BLAST
 - b) RasMol
 - c) EMBOSS
 - d) PROSPECT
97. In which year did the SWISSPROT protein sequence database begin?
- a) 1988
 - b) 1985
 - c) 1986
 - d) 1987
98. Which of the following scientists created the first Bioinformatics database?
- a) Dayhoff
 - b) Pearson
 - c) Richard Durbin
 - d) Michael.J.Dunn
99. The human genome contains approximately_____.
- a) 6 billion base pairs
 - b) 5 billion base pairs
 - c) 3 billion base pairs
 - d) 4 billion base pairs
100. The process of finding the relative location of genes on a chromosome is called _____.
- a) Gene tracking
 - b) Genome walking
 - c) Genome mapping
 - d) Chromosome walking