

Department of Biotechnology
Class: F.Y. BSc.
Semester: I
Subject: Basic Biotechnology II
Year 2021-22
Sample Questions

1. During replication, Okazaki fragments elongate _____.
 - a. leading strand towards the replication fork
 - b. lagging strand towards the replication fork
 - c. leading strand away from the replication fork
 - d. lagging strand away from the replication fork
2. Which of the following organism is used in DNA replication studies?
 - a. *Neurospora crassa*
 - b. *Drosophila melanogaster*
 - c. *Escherichia coli*
 - d. *Pneumococcus*
3. Termination of replication is triggered by
 - a. DNA polymerase
 - b. Helicase
 - c. SSB
 - d. Tus protein
4. Which of the following helps in opening of DNA double helix in front of replication fork?
 - a. topoisomerase
 - b. DNA polymerase-I
 - c. DNA gyrase
 - d. DNA ligase
5. Association of histones H₁ with nucleosome shows
 - a. the occurrence of transcription
 - b. the occurrence of replication
 - c. exposed DNA double helix
 - d. the condensation of DNA into chromatin fibre
6. The 3' – 5' phosphodiester linkage joins
 - a. two DNA strands
 - b. two nucleotides
 - c. a nitrogenous base with pentose sugar
 - d. two nucleosides
7. Telomeres are usually rich in which nucleotide?
 - a. Adenine
 - b. Guanine
 - c. Cytosine

- d. Thymine
8. Meselson and Stahl model of replication was called
- a. conservative replication
 - b. semi-conservative replication
 - c. dispersive replication
 - d. Cri du Chat
9. DNA replication takes place in which direction?
- a. 3' to 5'
 - b. 5' to 3'
 - c. Randomly
 - d. Vary from organism to organism
10. DNA gyrase in *E. Coli*
- a. adds positive supercoils to chromosomal DNA
 - b. can be inhibited with antibiotics
 - c. is required only at the *Oric* site
 - d. performs the same function as helicase in eukaryotes
11. In DNA, there are
- a. five bases known as adenine, guanine, thymine, tryptophan and cytosine
 - b. four bases known as adenine, guanine, thymine and cytosine
 - c. three bases known as adenine, guanine and cytosine
 - d. only two bases known as adenine and cytosine
12. The overall conclusion of the Hershey-Chase experiment was that
- a. DNA was responsible for heredity
 - b. proteins and DNA were responsible for heredity
 - c. the ratio of Adenine to thymine was always the same
 - d. phage DNA was similar to bacterial DNA
13. Which of the following enzyme adds complementary bases during replication?
- a. Helicases
 - b. Synthesase
 - c. Polymerase
 - d. Replicase
14. Enzyme, responsible for proofreading base pairing is
- a. DNA polymerase
 - b. Telomerase
 - c. Primase
 - d. DNA ligase
15. Proteins involved in opening a replication bubble are
- a. DNA helicases
 - b. single stranded binding proteins
 - c. ligase
 - d. DNA topoisomerase
16. *E. coli* DNA polymerases II and III lack
- a. 5' → 3' exonuclease activity
 - b. 5' → 3' endonuclease activity

- c. partially 5' → 3' exonuclease activity
 - d. partially 5' → 3' endonuclease activity
17. Which of the following involves remarkable capacity of a short segment of DNA to move from one place to another?
- a. DNA transposition
 - b. DNA replication
 - c. Translation
 - d. Transcription
18. Which of the following reactions is required for proofreading during DNA replication by DNA polymerase III?
- a. 5' to 3' exonuclease activity
 - b. 3' to 5' exonuclease activity
 - c. 3' to 5' endonuclease activity
 - d. 5' to 3' endonuclease activity
19. Basic classification of polymerases includes how many types?
- a. 2
 - b. 3
 - c. 4
 - d. 5
20. At which end are the new DNA bases added?
- a. 5' triphosphate end
 - b. 3' triphosphate end
 - c. 5' OH end
 - d. 3' OH end
21. The 3' – 5' phosphodiester linkage joins _____.
- a. two DNA strands
 - b. two nucleotides
 - c. a nitrogenous base with pentose sugar
 - d. two nucleosides
22. Which type of DNA is connected by a holiday junction?
- a. Homologous DNA duplex
 - b. Heteroduplex DNA
 - c. Mutated DNA
 - d. Asymmetric DNA
23. Which of the following process generates a new copy of the transposable element at a new location of DNA?
- a. Homologous genetic recombination
 - b. Site specific recombination
 - c. Non-homologous recombination
 - d. Replicative recombination

24. Which of the following occurs between particular short sequences present on otherwise dissimilar parental molecules?
- Homologous genetic recombination
 - Site specific recombination
 - Non-homologous recombination
 - Replicative recombination
25. Homologous DNA recombination in prokaryotes take place for _____.
- Increasing variability
 - Repair
 - Incorporation of gene
 - Taking up a plasmid from media
26. If there are 2 strands of chromosomes that can pair with a single strand, and they are both paired to the same strand, their junction is called _____.
- Chimera
 - Chi
 - Double binding
 - Branch point
27. In single stranded nick _____.
- The 3'-OH end of the nick invades other complete strands
 - Both the strands undergo fork regression
 - The nick is treated like an okazaki fragment point
 - The nick is bypassed without repair
28. Rearrangement of DNA that involves the breakage and reunion of DNA is called
- Replication
 - Recombination
 - Translation
 - Transcription
29. Who proposed holiday model for homologous recombination?
- Gobind Khurana
 - Louis Pasteur
 - Robin Holiday
 - Niels Bohr
30. Which of the following is not recombination system?
- RecBCD
 - RecE
 - RecF
 - DnaF
31. Name the enzyme which is involved in homologous recombination in E.coli?
- Topoisomerase
 - Gyrase
 - Helicase
 - RecBCD enzyme
32. What is branch migration?
- Break and reformation of identical base pairs

- b. Formation of lesion
 - c. Formation of heteroduplex DNA
 - d. Dissolution occurs
33. Which of the following promotes strand exchange?
- a. DBS formation
 - b. Heteroduplex formation
 - c. Strand invasion protein
 - d. Branch migration
34. Mutation is _____.
- a. Change which affects the offspring's of F2 generation
 - b. Change that is inherited
 - c. Change in parents not inherited
 - d. Plant growth controlling factor
35. A base substitution that causes the regular codon to change into another codon that codes for different amino acid is said to be
- a. nonsense mutation
 - b. silent mutation
 - c. missense mutation
 - d. Point mutation
36. Mark the INCORRECT statement about mutation?
- a. Mutation is predestined
 - b. Major source of evaluation
 - c. Usually deleterious and recessive
 - d. It is a reversible process
37. Name the term given to the type of mutation which depends on the conditions of the environment?
- a. Forward mutation
 - b. Reverse mutation
 - c. Conditional lethal mutation
 - d. Gain of function mutation
38. Which of the following chemical mutagen affects only replicating DNA?
- a. Acridine dye
 - b. Alkylating agent
 - c. Deaminating agent
 - d. Base analogue
39. Inversions result in _____.
- a. The formation of many copies of specific region of the affected chromosome
 - b. The breakage and movement of chromosome fragments
 - c. More than one copy of each gene on a chromosome
 - d. Segments of DNA being released from a chromosome then reinserted in the opposite orientation
40. Gene mutation occurs at the time of _____
- a. DNA repair
 - b. DNA replication
 - c. Cell division
 - d. RNA transcription
41. X rays causes mutation by _____
- a. Deletion

- b. transition
 - c. transversion
 - d. base substitution
42. Any kind of radiations are come under _____
- a. Chemical mutagens
 - b. Biological mutagens
 - c. physical mutagens
 - d. thermal mutagens
43. By which process miss-incorporated base can change into a permanent mutation?
- a. Replication
 - b. Transcription
 - c. Translation
 - d. Transposition
44. How many steps are required to attain mismatch repair?
- a. 1
 - b. 3
 - c. 2
 - d. 4
45. Which base undergoes spontaneous damage under physiological conditions?
- a. Thymine
 - b. Cytosine
 - c. Uracil
 - d. Guanine
46. Which of the following has the self-repairing mechanisms?
- a. DNA and RNA
 - b. DNA, RNA and protein
 - c. Only DNA
 - d. DNA and proteins
47. What is the function of enzyme involved in base excision repair?
- a. Addition of correct base
 - b. Addition of correct nucleotide
 - c. Removal of incorrect base
 - d. Removal of phosphodiester bond
48. The DNA polymerase involved in base excision repair is _____
- a. DNA polymerase α
 - b. DNA polymerase β
 - c. DNA polymerase σ
 - d. DNA polymerase γ
49. A point mutation that replaces a purine with another purine, or a pyrimidine with another pyrimidine _____
- a. Nonsense mutation
 - b. Silent mutation
 - c. Transition mutation
 - d. Transversion
50. What is the correct definition of excision repair?
- a. Repair of a single damaged nucleotide
 - b. Repair of a damaged oligonucleotide
 - c. Removal of a single damaged nucleotide
 - d. Removal of a damaged oligonucleotide

51. In SOS repair system cleavage of LexA and UmuD is mediated by _____
- RecB
 - RecA
 - RecC
 - UvrA
52. Why recombinational repair system is called double strand break repair?
- Both strands are broken
 - One strand is broken
 - No strand is broken
 - Both strand act as template
53. Agent which bring about any change in nucleotide sequence is _____
- Mutagen
 - Carcinogen
 - Oncogene
 - Human papillomavirus(HPV)
54. The correction of changes in DNA by a set of process known as _____
- Replication
 - DNA repair
 - Translation
 - Transcription
55. Retroviruses are come under _____
- Chemical mutagens
 - biological mutagens
 - physical mutagens
 - thermal mutagens
56. Which of the following mechanisms will remove uracil and incorporate the correct base?
- Direct repair
 - Base excision repair
 - Mismatch repair
 - Nucleotide excision repair
57. Thymine dimer formation during replication of DNA is caused due to the
- Gamma radiation
 - UV radiation
 - X rays
 - IR radition
58. Which of the following changes to a DNA molecule is least likely to result in a deleterious mutation?
- Insertion of transposable element in a coding region
 - Deletion of a base pair in a coding region
 - Change of a base pair in the first codon of a coding region
 - Change of the third base pair of a codon
59. Which of the following chemical mutagen is likely to cause GC-AT transition?
- 5 bromouracil
 - 2 aminopurine
 - Acridine orange
 - Hydroxylamine
60. Which is an example of a simplest vector?
- Micron circle

- b. Bacteriophage
 - c. Plasmid
 - d. YAC
61. Size of pBR322 is _____
- a. 100 kb
 - b. 10 kb
 - c. 4.3 kb
 - d. 1 kb
62. If the plasmid and the foreign DNA are cut by the same restriction endonuclease, recombinant DNA can be formed by joining both by _____
- a. Polymerase III
 - b. Eco RI
 - c. Ligase
 - d. Taq polymerase
63. YAC is used to clone DNA. What is the size of the DNA that can be cloned?
- a. Large (upto megabases)
 - b. Small (upto few hundred bases)
 - c. No size restriction
 - d. Medium (upto kilobases)
64. Choose the incorrect statement for YAC vectors.
- a. The YAC molecule is approximately 10 kb in size
 - b. It contains both yeast origin of replication and prokaryotic origin of replication
 - c. It doesn't contain ampicillin resistant gene
 - d. It contains TEL sequence
65. Which of the statement is true for pBR322?
- a. It contains only an ampicillin resistance gene
 - b. It contains both ampicillin resistant and tetracycline resistant gene
 - c. The cloning site is present only in the ampicillin resistant gene
 - d. It is a natural vector
66. How many classes of restriction enzymes are there?
- a. 2
 - b. 1
 - c. 3
 - d. 4
67. Type II cuts the sequence in the following way _____
- a. Within the recognition sequence
 - b. At 100-1000 nucleotides away from the recognition sequence
 - c. At 27-30 nucleotides away from the recognition sequence
 - d. It cuts randomly
68. After cleaving the sequence, the nature of the ends created by the type II endonuclease is _____
- a. The ends created are always single stranded
 - b. The ends created are always double stranded
 - c. Either the ends are single stranded or they are double stranded
 - d. One end is single stranded and one end is double stranded
69. Which of the statements hold true for conjugation?
- a. Conjugation is the natural process of transferring DNA from one species to another
 - b. It is the artificial process in case the cells are not able to take them up naturally

- c. The plasmids are transferred from one cell to another by physical contact
 - d. The plasmids are transferred from one cell to another by chemical means
70. F plasmid is often used in conjugation. The correct statement is?
- a. The F plasmid encodes the factor which is transferred from one cell to another
 - b. The factor encoded by the F plasmid is called as Filamentous (F) factor
 - c. It is transferred from one cell to another by filament
 - d. The bacteria must belong to same species to carry out the conjugation
71. Transformation carried out using a particle gun is known as biolistic transformation. It falls under which category of transformation?
- a. Physical
 - b. Chemical
 - c. Electroporation
 - d. Natural
72. The particle gun method consists of which of the following steps?
- a. The DNA of interest is absorbed onto microprojectile beads
 - b. These beads are often made of aluminium
 - c. The explosion in a gun propels a macroprojectile forward which in turn propels microprojectile beads
 - d. The macroprojectiles and microprojectiles both cross the perforated plate and hit the target tissue behind it
73. Cell lysis is carried out by which substance?
- a. Lysozyme and detergents
 - b. Water
 - c. Sugar solution
 - d. Suphuric Acid
74. Chromosomal or genomic DNA is separated by _____
- a. Sedimentation
 - b. Dissolution in water
 - c. Centrifugation
 - d. Distillation
75. Nucleic acid precipitated constitutes of _____
- a. plasmid DNA
 - b. plasmid DNA, along with RNA and chromosomal DNA
 - c. RNA alone
 - d. chromosomal DNA only
76. Treatment with exonuclease leads to removal of _____
- a. remnants of chromosomal DNA
 - b. RNase
 - c. plasmid DNA which is circularized
 - d. proteins
77. Enzyme commonly used for carrying out ligation reaction is _____
- a. Transferase
 - b. Reverse transcriptase
 - c. Ligase
 - d. DNase
78. Bacteria protect themselves from viruses by fragmenting viral DNA with
- a. Ligase
 - b. Endonuclease
 - c. Exonuclease
 - d. Gyrase

79. Excision and insertion of a gene is called
- Biotechnology
 - Genetic engineering
 - Cytogenetics
 - Gene therapy
80. Genetic engineering means _____.
- Manipulation of cell content
 - Test tube babies
 - Manipulation of cytochrome
 - Manipulation of genes
81. Genetic engineering is the
- Formation of new gene artificially
 - Formation of RNA from DNA artificially
 - Modification of gene artificially
 - Formation of DNA from non DNA material
82. A vector should not have which of the following properties?
- MCS
 - Small size
 - Multiple ori
 - Low replication speed
83. Which of the following is not a restriction endonuclease?
- Eco RI
 - DNA ligase
 - Hind III
 - Bam H1
84. DNA has genetic properties was revealed for the first time by
- Chargaff
 - Griffith
 - Avery
 - Wilkins
85. The beginning of understanding genetic transformation in bacteria was made by
- Hershey and chase
 - Watson and crick
 - Frederick Griffith
 - T.H Morgan
86. Which of the following is a structural subunit of DNA?
- Nucleotides
 - Carbohydrate
 - Protein
 - RNA
87. On which medium were the viruses cultivated by Alfred Hershey and Martha Chase?
- A medium containing radioactive potassium (K)
 - A medium containing radioactive Uranium (U)
 - A medium containing radioactive phosphorous (P)
 - A medium containing potassium (K)
88. What will happen when the radioactive DNA is injected into the bacterium?
- Non-radioactive DNA components could be found
 - Radioactive DNA components could be found
 - Non-radioactive RNA components could be found
 - Radioactive RNA components could be found

89. Which of the following is not a characteristic of RNA?
- It has ribose sugar molecules in the nucleotides
 - It is a single stranded molecule
 - It is not stable under alkaline condition
 - All the 3 types of RNA are involved in protein synthesis
90. Which of the following statements is correct regarding DNA and RNA?
- DNA is highly reactive
 - RNA is not catalytic
 - RNA cannot be easily degraded
 - DNA is a better genetic material than RNA
91. Which of the following is responsible for the transmission of genetic information?
- DNA
 - RNA
 - Proteins
 - Mitochondrion
92. Which of the following is responsible for the storage of genetic material?
- DNA
 - RNA
 - Proteins
 - Ribosome
93. Which of the following statement is false about DNA?
- Located in chromosomes
 - Carries genetic information from parent to offspring
 - Abundantly found in cytoplasm
 - There is a precise correlation between the amount of DNA and number of sets of chromosome per cell
94. A molecule that acts as a genetic material must fulfil the following traits, except.
- It should be structurally and chemically unstable
 - It should have the ability to generate its replica
 - It should facilitate slow changes necessary for evolution.
 - It should be able to express itself in the form of Mendelian characters.
95. Which of the following is not a component of nucleic acids?
- Organic nitrogen bases
 - Sugar
 - Phosphate
 - Protein
96. The virus mediated gene transfer using genetically modified bacteriophages is called
- Transfection
 - Transduction
 - Transformation
 - Conjugation
97. The transformation method that uses tungsten or gold particle coated with DNA accelerated at high velocity is called
- Accelerated method
 - High velocity method
 - Particle gun delivery method
 - DNA particle delivery method
98. The injection of DNA into developing inflorescence using a hypodermic syringe is called.
- Macroinjection

- b. Micromanipulator mediated DNA delivery
 - c. Microfection
 - d. Microinjection
99. The method widely used for transforming in vitro cell cultures that uses lipid vesicles or liposomes
- a. Lipotransformation
 - b. Liposome mediated transformation
 - c. Lipofection
 - d. Lipid mediated DNA transfer
100. DNA solution injected directly into the cell using micromanipulation is called
- a. Macroinjection
 - b. Micromanipulator mediated DNA delivery
 - c. Microfection
 - d. Microinjection