CBSE

BIOTECHNOLOGY PRINCIPLES AND PROCESSES WS 1

Class 12 - Biology

1. Which of the following steps are catalyzed by Taq DNA polymerase in a PCR reaction? **[1]**

   a) Denaturation of template DNA
   b) Extension of primer end on the template DNA
   c) All of these
   d) Annealing of primers to template DNA

2. Polyethylene glycol method is used for: **[1]**

   a) Seedless fruit production
   b) Energy production from sewage
   c) Gene transfer without a vector
   d) Biodiesel production

3. The cutting of DNA at specific locations became possible with the discovery of : **[1]**

   a) Ligases
   b) Restriction enzymes
   c) Probes
   d) Selectable markers

4. Restriction endonucleases **[1]**

   a) Are synthesised by bacteria as part of their defense mechanism.
   b) Are used in genetic engineering for ligation of two DNA molecules.
   c) Are used for in vitro DNA synthesis.
   d) Are present in mammalian cells for degradation of DNA when the cell dies.

5. Which one of the following is commonly used in transfer of foreign DNA into crop plants? **[1]**

   a) Agrobacterium tumefaciens
   b) Penicillium expansum
   c) Meloidogyne incognita
   d) Trichoderma harzianum

6. Automated DNA seuqences, work on the principle of the method developed by: **[1]**

   a) Maurice Wilkins
   b) Frederick Sanger
   c) Francis Crick
   d) Erwin Chargaff

7. What is the source of Ti (tumour inducing) plasmid, which is modified and used as a cloning vector to deliver the desirable genes into plant cells? **[1]**

   a) Thermophilus aquaticus
   b) Aedes aegypti
   c) Polycoccus furiosus.
   d) Agrobacterium tumefaciens

8. The first restriction endonuclease discovered was: **[1]**

   a) HindIII
   b) Hind II
   c) PuvI
   d) EcoRI

9. Elution can be done by using the enzyme: **[1]**

   a) Cellulase
   b) Agarase

c) Chitinase
d) Pectinase

10. The polyacrylamide gel is used to separate proteins as: **[1]**

a) Proteins cannot be run in agarose gel
b) Agarose gel reacts with protein
c) Proteins are small as compared to DNA
d) Proteins are big as compared to DNA

11. The length of a double helical DNA is 1.7 metres. The number of base pairs present in the DNA is: **[1]**

a) 5×10^9
b) 3.4×10^9
c) 1.7×10^5
d) 1.7×10^9

12. During the process of isolation of DNA, chilled ethanol is added to: **[1]**

a) Precipitate DNA
b) Remove proteins such as histones
c) Facilitate action of restriction enzymes
d) Break open the cell to release DNA

13. Which enzyme cuts DNA at specific sites? **[1]**

a) Taq-polymerase
b) DNA polymerase
c) Restriction endonuclease
d) Topoisomerase

14. First genetically modified plant commercially released in India is: **[1]**

a) Slow ripening tomato
b) Bt-cotton
c) Golden rice
d) Bt-brinjal

15. Which of the following is not required in the preparation of a recombinant DNA molecule? **[1]**

a) DNA ligase
b) E.coli
c) Restriction endonuclease
d) DNA fragments

16. Nematode-specific genes were introduced into the tobacco host plant by using the vector. **[1]**

a) Agrobacterium
b) pBR 322
c) Plasmid
d) Bacteriophage

17. What modification in the Ti plasmid of *Agrobacterium tumefaciens* is done to use it as a cloning vector which is not pathogenic? **[1]**

a) Promoter is removed
b) Antibiotic resistant gene is introduced
c) Rop genes are removed
d) Ti genes are removed

18. DNA element with ability to change its position is called: **[1]**

a) Cistron
b) Transposon
c) Recon
d) Intron

19. During amplification of gene using PCR, Taq polymerase is used between: **[1]**

a) Restriction enzymes
b) Annealing and extension
c) Denaturation and annealing
d) Extension and amplification

20. Transgenic plants are produced by: **[1]**

a) Deleting sex chromosomes
b) Introduction of foreign genes

c) Arresting spindle fibre formation
d) Inducing gene mutation

21. Penicillin has inhibitory effect on bacteria through: **[1]**

a) Stopping entrance of antibody.
b) By causing death by destruction of nucleus.
c) Inhibition of cell wall formation.
d) Running entrance of antibody

22. The thermostable enzymes **Taq** and **pfu** isolated from thermophilic bacteria are: **[1]**

a) DNA ligases
b) Restriction endonucleases
c) RNA polymerase
d) DNA polymerases

23. If DNA is digested by EcoRI, it will lead to: **[1]**

a) Multiple ori
b) Sticky ends
c) No antibiotic resistance
d) Blunt ends

24. Which antibiotic inhibits interaction between tRNA and mRNA during bacterial protein synthesis? **[1]**

a) Streptomycin
b) Neomycin
c) Erythromycin
d) Tetracycline

25. **YAC** refers to: **[1]**

a) Yeast artificial chromosome
b) Yeast normal colony
c) Yeast artificial cell
d) Yeast artificial colony

26. Variable number of tandem repeats (VTNRs) in the DNA molecule are highly useful in: **[1]**

a) DNA fingerprinting
b) Stem cell culture
c) Monoclonal antibody production
d) Recombinant DNA technology

27. If a *goi* is inserted at the Bam HI site in Pbr322, the plasmid: **[1]**

a) Will lose both ampicillin and tetracycline resistance
b) Will lose ampicillin resistance
c) Will not replicate
d) Will lose tetracycline resistance

28. Monoclonal antibodies are produced from hybrid cells, called hybridomas. The cells employed to obtain these hybridoma cells are: **[1]**

a) B-lymphocytes and myeloma cells.
b) B-lymphocytes and carcinoma cells.
c) T-lymphocytes and myeloma cells
d) Lymphoma cells and bone marrow cell.

29. Polymerase chain reaction is most useful in: **[1]**

a) Protein synthesis
b) Amino acid synthesis
c) DNA synthesis
d) DNA amplification

30. Proteins can be digested by: **[1]**

a) Pectinase
b) Protease
c) Nuclease
d) Chitinase

31. DNA is amplified by PCR as it can be used for: **[1]**

a) It requires primers
b) It requires dNTP’s

c) To produce multiple copies of the fragment DNA

d) It requires Mg^{2+}

32. The X-gal will be converted into a coloured product when: **[1]**

a) When lactose is available.

b) Gene coding for β-galactosidase is cleaved.

c) When goi is inserted in the vector at the site coding for β-galactosidase.

d) β–galactosidase acts on it.

33. EcoRI acting on goi and vector will produce: **[1]**

a) Blunt ends in both

b) Blunt and sticky ends respectively

c) Sticky and blunt ends respectively

d) Sticky ends in both

34. The smallest bands in the agarose gel will be towards: **[1]**

a) Middle of the gel

b) Wells

c) Cathode

d) Anode

35. Cloning does not provide: **[1]**

a) Same genetic character

b) Variation

c) Same morphological character

d) Golden rice

36. This method of finding a gene is used when researchers know very little about the gene they are trying to find. This process results in a complete gene library : a collection of copies of DNA fragments that represent the entire genome of an organism: **[1]**

a) Gene synthesis cloning

b) PCR

c) Shotgun cloning

d) Cloning

37. Restriction enzymes: **[1]**

a) Restrict elongation of DNA.

b) Restrict DNA replication.

c) Cut DNA at specific locations.

d) Link together two pieces of DNA.

38. The particles used to coat with DNA in Biolistic gun is of: **[1]**

a) Helium

b) Tungsten

c) Quartz

d) Zinc

39. Who among the following was awarded the Nobel Prize for the development of PCR technique? **[1]**

a) Hargovind Khurana

b) Kary Mullis

c) Arthur Kornberg

d) Herbert Boyer

40. In genetic engineering, a DNA segment (gene) of interest, is transferred to the host cell through a vector. Consider the following four agents (i - iv) in this regard and select the correct option about which one or more of these can be used as a vector/vectors: **[1]**

i. Bacterium

ii. P

iii. Plasmodium

iv. Bacteriophage

a) (i) only
b) (i) & (iii)
c) (i), (ii) & (iv)
d) (ii) & (iv)

41. Production of large scale recombinant products can be done in: **[1]**

a) Autoclave
b) Bioreactors
c) Thermocycler
d) Tissue culture labs

42. The extraction of DNA from the agarose gel is called as: **[1]**

a) Isolation
b) Elution
c) Transformation
d) Ligation

43. Triticale, first man-made cereal crop, has been obtained by crossing wheat with: **[1]**

a) Sugarcane
b) Pearl millet
c) Barley
d) Rye

44. An institution where valuable plant material likely to become irretrievably lost in the wild or in cultivation is preserved in a viable condition in known as: **[1]**

a) Herbarium
b) Gene bank
c) Genome
d) Gene library

45. In which of the following linear polymeric biomolecule, the two ends are described as **reducing and non-reducing ends**? **[1]**

a) Amylose
b) RNA
c) Protein
d) DNA

46. The construction of the first recombinant DNA was done by using the native plasmid of: **[1]**

a) B. thuringiensis
b) E. coli
c) Yeast
d) Salmonella typhimurium

47. Overhangs produced by restriction enzymes are called as: **[1]**

a) Palindromic sequences
b) Blunt ends
c) Sticky ends
d) Polymers

48. In biotechnical processes c DNA is prepared from: **[1]**

a) B-DNA
b) mRNA
c) Z-DNA
d) hn RNA

49. The technique of DNA fingerprinting was initially developed by: **[1]**

a) Alec Jeffreys
b) Jacque Monod
c) Ian Wilmut
d) Hargobind Khorana

50. The autonomously independent, self replicating extra nuclear DNA imparting certain factors to some bacterium is called: **[1]**

a) Phagemid
b) Plasmid
c) Plastid
d) Cosmid

51. Which of the following is used to select genes of interest from a genomic library? **[1]**

a) Cloning vectors
b) Restriction enzymes
c) DNA probes
d) Gene targets

52. Which of the following techniques made it possible to genetically engineered living organism? **[1]**

a) Recombinant DNA technique
b) Heavier isotope labelling
c) Hybridization
d) X-ray diffraction

53. Which of the following is not a feature of the plasmids ? **[1]**

a) Independent replication
b) Single stranded
c) Circular structure
d) Transferable

54. Which of the following should be chosen for best yield if one were to produce a recombinant protein in large amounts? **[1]**

a) A stirred-tank bioreactor without in-lets and out-lets
b) Laboratory flask of the largest capacity
c) Any of these
d) A continuous culture system

55. The role of DNA ligase in the construction of a recombinant DNA molecule is: **[1]**

a) Formation of hydrogen bonds between sticky part of DNA fragments.
b) Ligation of all purine and pyrimidine bases.
c) Formation of the phosphodiester bond between two DNA fragments.
d) Formation of hydrogen bonds between sticky ends of DNA fragments.

56. Some clones are obtained by: **[1]**

a) Plant breeding
b) Irradiation
c) Tissue culture
d) Genetic engineering

57. The technique associated with DNA amplification is: **[1]**

a) RFLP
b) DNA fingerprinting
c) PCR
d) Southern Blotting

58. In hybridoma technology: **[1]**

a) T-cells are fused with myeloma cells.
b) B-cells are fused with T-cells.
c) C-cells are fused with T-cells.
d) B-cells are fused with myeloma cells.

59. The DNA fragments in an agarose gel at the same position signify that the two fragments have: **[1]**

a) Same molecular weight
b) The gel is not properly made
c) Different molecular weights
d) EtBr is hindering the travel of the fragments

60. Sparged stirred tank bioreactor is advantageous over the simply stirred tank bioreactor as: **[1]**

a) Air bubbles enhance the oxygen transfer area.
b) It requires less of maintenance.
c) Sparged tank has blades which move fast.
d) Vitamins and minerals are more used up in sparged stirred bioreactor.

61. Significance of 'heat shock' method in bacterial transformation is to facilitate: **[1]**

a) Expression of the antibiotic resistance gene.
b) Binding of DNA to the cell wall.
c) Uptake of DNA through transient pores in the bacterial cell wall.
d) Uptake of DNA through membrane transport proteins.

62. **R** in EcoRI restriction endonuclease denotes: **[1]**

a) Sequence of isolation of the enzyme
b) Strain RY13
c) Species
d) Genus

63. Restriction endonucleases are so called because they: **[1]**

a) Synthesize DNA
b) Cleave DNA molecules into smaller pieces
c) Restriction nuclear activity
d) Breakdown DNA molecule at random

64. The separation and purification of recombinant protein product is called as: **[1]**

a) Tissue culture
b) Extraction
c) Downstream processing
d) Hybridisation

65. Cohen and Boyer isolated an antibiotic resistance gene, by cutting out a piece of DNA from a plasmid which was responsible for conferring antibiotic resistance, in the year: **[1]**

a) 1982
b) 1965
c) 1972
d) 1962

66. DNA is extracted by: **[1]**

a) Chilling treatment
b) Ethanol Precipitation
c) Heat shock
d) Denaturation

67. Viral genome incorporated into host DNA is called: **[1]**

a) Transposon
b) Prophage
c) Prophase
d) Bacteriophage

68. Which of the following is restriction endonuclease? **[1]**

a) RNA re
b) DNA re-I
c) Hind II
d) Protease

69. Which one of the following nucleotide sequence in DNA is recognised by ECoRI **[1]**

a) $5'G \overset{\downarrow}{-} A-A-T-T-C-3'$
$3'C-T-T-A-A \underset{\uparrow}{-} G-5'$

b) $5'G-A-A-T \overset{\downarrow}{-} T-C-3'$
$3'C-T \underset{\uparrow}{-} T-A-A-G-5'$

c) $5'G-A \overset{\downarrow}{-} A-T-T-C-3'$
$3'C-T-T-A \underset{\uparrow}{-} A-G-5'$

d) $5'G-A-A \overset{\downarrow}{-} T-T-C-3'$
$3'C-T-T \underset{\uparrow}{-} A-A-G-5'$

70. Protoplast isolation was first established by: **[1]**

a) Cocking
b) Mendel
c) Skong
d) Bateson

71. DNA fragments move at different distances in Gel Electrophoresis because: **[1]**

a) The voltage is too high.

b) Molecular weights of the fragments are different.

c) DNA has a positive charge.

d) DNA gets denatured.

72. Which of the following are used in gene cloning? **[1]**

a) Mesosomes

b) Plasmids

c) Lomasomes

d) Nucleoids

73. The basis of DNA fingerprinting is: **[1]**

a) The double helix

b) Polymorphism in sequence

c) DNA replication

d) Errors in base sequence

74. Nematode specific genes were introduced into the tobacco host plant using a vector: **[1]**

a) Agrobacterium

b) Plasmid

c) pBR 322

d) Bacteriophage

75. A ladder is used in Gel electrophoresis as it helps in: **[1]**

a) it prevents the movement of DNA out of the gel.

b) comparing the size of the DNA fragment.

c) it helps in denaturation of DNA.

d) it helps in EtBr binding.