ABHINAV ACADEMY

UDUPI

CET25B9 BIOTECHNOLOGY PRINCIPLES AND PROCESSES

Class 12 - Biology

Time Allowed: 1 hour and 30 minutes **Maximum Marks: 75**

1. The machine used to do PCR is called as: **[1]**

   a) Thermocycler
   b) Temperature regulator
   c) Voltage Regulator
   d) Heater

2. 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

3. 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

4. E. coli carry resistance to: **[1]**

   a) Fluoroquinolone
   b) Tetracycline
   c) Ampicillin
   d) Chloramphenicol

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

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

6. What is the first step in the Southern blot technique? **[1]**

   a) Production of a group of genetically identical cells.
   b) Denaturation of DNA from a nucleated cell such as the one from the scene of crime.
   c) Denaturation of DNA on the gel for hybridization with specific probe.
   d) Digestion of DNA by restriction enzyme.

7. 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.

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

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

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

   a) Sugarcane
   b) Pearl millet

c) Barley
d) Rye

10. Which of the following restriction enzymes produces blunt ends ? **[1]**

a) Eco RV
b) Hind III
c) Xho1
d) Sal I

11. The term molecular scissors generally refers to: **[1]**

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

12. The organism used in construction of the first artificial recombinant DNA by Cohen and Boyer in 1972 was: **[1]**

a) Bacillus thuringiensis
b) E. coli
c) Agrobacterium tumefaciens
d) Salmonella typhimurium

13. Which of the given statements is correct in the context of visualizing DNA molecules separated by agarose gel electrophoresis? **[1]**

a) DNA can be seen in visible light.
b) Ethidium bromide-stained DNA can be seen under exposure to UV light.
c) Ethidium bromide-stained DNA can be seen in visible light.
d) DNA can be seen without staining in visible light.

14. 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

15. Enzymes used to join foreign DNA to plasmid is: **[1]**

a) Endonucleases
b) Pectinases
c) Ligases
d) Nucleases

16. To produce copies in billions of a DNA segment, the number of times PCR should be done is: **[1]**

a) 5 times
b) 28-32 times
c) 10 times
d) 15 times

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

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

18. Restriction in Restriction enzyme refers to: **[1]**

a) All of these
b) Cleaving of the phosphodiester bond in DNA by the enzyme.
c) Prevention of the multiplication of bacteriophage by the host bacteria.
d) Cutting of DNA at a specific position only.

19. Enzyme that cuts DNA is **[1]**

a) DNA lyase
b) DNA polymerase
c) DNA ligase
d) Restriction endonuclease

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

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

21. Molecular scissors are: **[1]**

a) Helicase
b) Ligase
c) DNA polymerase
d) Restriction endonuclease

22. Transfer of DNA into bacteria by phage is called as: **[1]**

a) Transformation
b) Hybridisation
c) Transduction
d) Conjugation

23. 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

24. Blades in a bioreactor help in: **[1]**

a) provides ample space for the formation of recombinant protein product.
b) mixing of all the components and prevent their settling.
c) provides energy to bacterial cells.
d) provides air bubbles.

25. 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

26. Plasmids are suitable vectors for gene cloning because: **[1]**

a) They are small circular DNA molecules which can integrate with the host chromosomal DNA.
b) They can shuttle between prokaryotic and eukaryotic cells.
c) They carry antibiotic resistance genes.
d) They are small circular DNA molecules with their own origin of replication site.

27. Genetic material of virus is: **[1]**

a) Either DNA or RNA
b) DNA only
c) RNA only
d) Both RNA and DNA

28. The transfer of genetic material from one bacterium to another through the mediation of a viral vector is termed as: **[1]**

a) Transduction
b) Transformation
c) Translation
d) Conjugation

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

a) The double helix
b) Polymorphism in sequence
c) DNA replication
d) Errors in base sequence

30. Genetically modified DNA fragments are called: **[1]**

a) F DNA
b) Recombinant DNA
c) Mitochondrial DNA
d) S DNA

31. Gel electrophoresis is used for: **[1]**

a) Isolation of DNA molecule.
b) Separation of DNA fragments according to their size.
c) Cutting of DNA into fragments.
d) Construction of recombinant DNA by joining with cloning vectors.

32. Which of the following is a plasmid ? **[1]**

a) SAl-I
b) Eco R-I
c) BamH-I
d) pBR 322

33. PCR was discovered by: **[1]**

a) Kary Mullis
b) Stanley Cohen
c) Hargobind Khorana
d) Herbert Boyer

34. Nucleosome is seen in: **[1]**

a) S. typhimurium
b) Yeast
c) E.coli
d) H. influenza

35. The vector for T-DNA is: **[1]**

a) Thermus aquaticus
b) Salmonella typhimurium
c) Escherichia coli
d) Agrobacterium tumefaciens

36. The property of Taq polymerase explored in PCR is: **[1]**

a) Thermolabile nature
b) Exonuclease activity
c) High fidelity
d) Resistance to high temperature

37. 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

38. The enzyme ligase is used to: **[1]**

a) Cut goi from the source DNA
b) Breakdown of lipids to fatty acids and glycerol
c) Cut the vector DNA
d) Join vector and goi (gene of interest)

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

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

40. Which of the following samples of DNA in the table given below will give the desired result during polymerase chain reaction? **[1]**

a)

Sample	Temperature used for Denaturation	Enzyme used for extension
II	Low temp./50^{o}C	Heat stable

b)

Sample	Temperature used for Denaturation	Enzyme used for extension
I	High temp./90^{o}C	Heat stable

c)

Sample	Temperature used for Denaturation	Enzyme used for extension
III	Low temp./50^{o}C	Heat resistant

d)

Sample	Temperature used for Denaturation	Enzyme used for extension
IV	High temp./90^{o}C	Heat unstable

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

a) Helium
b) Tungsten
c) Quartz
d) Zinc

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

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

43. The most important feature in a plasmid to serve as a vector in gene cloning experiment is: **[1]**

a) Its size
b) Presence of a selectable marker
c) Origin of replication (ori)
d) Presence of sites for restriction endonuclease

44. The cloning vector which is used to clone large DNA fragments (> 1000 Kb) is: **[1]**

a) Cosmid
b) Bacteriophage lambda
c) BAC
d) YAC

45. 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

46. 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.

47. A foreign DNA and plasmid cut by the same restriction endonuclease can be joined to form a recombinant plasmid using: **[1]**

a) Taq Polymerase
b) Eco RI
c) Polymerase III
d) Ligase

48. During agarose gel, electrophoresis DNA fragments move towards the anode. This is because: **[1]**

a) Anode is negatively charged

b) DNA moves in random direction

c) DNA is positively charged molecules

d) DNA is negatively charged molecules

49. 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

50. Cloning gene is a process where: **[1]**

a) Fragments of DNA are transferred from one organism to another, usually carried on a DNA vector.

b) Fragments of DNA cloned in the same organism using carrier.

c) Gene is cloned in an animal.

d) DNA is cloned in plants.

51. 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.

52. 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

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

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

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

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

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

54. The source of Taq polymerase used in PCR is a: **[1]**

a) Thermophilic fungus

b) Thermophilic bacterium

c) Halophilic bacterium

d) Mesophilic fungus

55. Gene amplification using primers can be done by: **[1]**

a) Polymerase chain reaction

b) Microinjection

c) ELISA

d) Gene gain

56. There is a restriction endonuclease called **Eco** RI. What does **Co** part in it stand be? **[1]**

a) Colon

b) Coenzyme

c) Coelom

d) Coli

57. Enzyme that cleaves nucleic acids within the polynucleotide chain is known as: **[1]**

a) Exonuclease

b) Phosphotriesterase

c) Endonuclease
d) Arylsulfatase

58. 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

59. If a recombinant DNA bearing gene for ampicillin resistance is transferred into E. coli cells and the host cells are spread on agar plates containing ampicillin, then: **[1]**

a) Both transformed and untransformed recipient cells will grow.
b) Both transformed and untransformed recipient cells will die.
c) Transformed recipient cells will die and untransformed recipient cells will grow.
d) Transformed recipient cells will grow and untransformed recipient cell will die.

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

a) Cellulase
b) Agarase
c) Chitinase
d) Pectinase

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

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

62. The mechanism that causes a gene to move from one linkage group to another is called: **[1]**

a) Translocation
b) Duplication
c) Crossing-over
d) Inversion

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

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

64. Restriction enzymes belongs to a larger class of enzymes called: **[1]**

a) Chitinase
b) Nucleases
c) Glcucatase
d) Protease

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

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

66. 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

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

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

68. 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

69. Gene-gun is suitable for: **[1]**

a) DNA fingerprinting
b) transformation of plant cells
c) disarming pathogen vectors
d) constructing recombinant DNA by joining with vectors.

70. 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

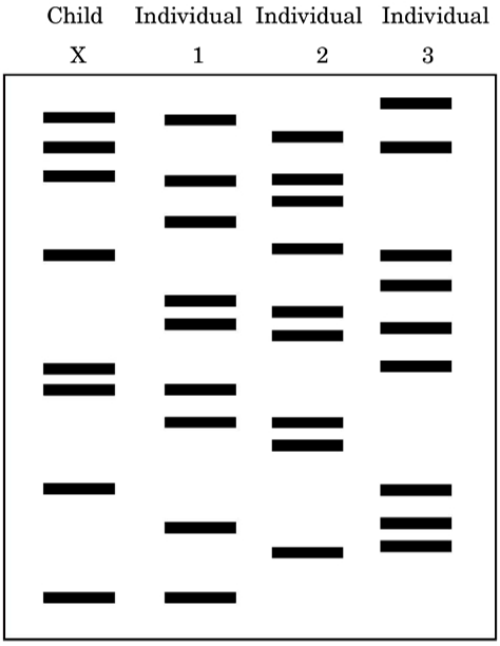
71. The smallest bands in the agarose gel will be towards _____. **[1]**

a) Anode
b) Wells
c) Cathode
d) Middle of the gel

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

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

73. DNA profiles of the child and three individuals 1, 2 and 3 who claim to be the parents of the child are given below. Select the option that shows the correct actual parent/parents of the child. **[1]**



a) Individual 1 is the only parent of the child amongst 1, 2 and 3
b) Individual 2 and 3
c) Individual 1 and 3
d) Individual 1 and 2

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

a) Autoclave
b) Bioreactors

c) Thermocycler

d) Tissue culture labs

75. The group of letters that form same words when read both forward and backward are called: **[1]**

a) Endonucleases

b) Puzzle

c) Palindrome

d) Sticky ends