

BIOTECHNOLOGY- CET

MULTIPLE CHOICE QUESTIONS

- A recombinant DNA molecule is produced by joining together
 - one mRNA with a DNA segment
 - one mRNA with a tRNA segment
 - two mRNA molecules
 - Two DNA segments
- A gene produced for recombinant DNA technology contains a gene from one organism joined to the regulatory sequence of another gene. Such a gene is called
 - oncogene
 - junk gene
 - chimeric gene
 - None
- A group of genetically similar organisms obtained by a sexual reproduction is called
 - Clone
 - Population
 - Assembly
 - None
- To be useful in the preparation of recombinant DNA, a plasmid must have
 - No origin of replication
 - An origin of replication
 - The ability to alternate between the linear and circular forms
 - Restriction endonuclease activity
- Restriction endonucleases have the ability of cutting
 - DNA at random sites
 - DNA at specific sites
 - Both a and b
 - DNA and RNA at random sites
- Endonucleases, a group of enzymes cleave DNA
 - Externally
 - Internally
 - Both 1 and 2
 - Neither a nor b
- The extra chromosomal, self replicating, double stranded, closed, circular DNA molecules are called
 - Plasmids
 - Phages
 - Viruses
 - Chloroplasts
- A plasmid consisting of its own DNA with a foreign DNA inserted into it is called
 - recombinant DNA
 - non-coding DNA
 - junk DNA
 - none of the above
- Insulin, a protein, consisting of
 - 2 Polypeptide chains
 - 3 Polypeptide chains
 - 4 Polypeptide chains
 - more than 4 Polypeptides chains
- The first human protein produced through recombinant DNA technology is
 - insulin
 - erythropoitin
 - interferon
 - somatostatin
- Humulin, a genetically engineered insulin was produced for the first time by
 - Biocon India Limited
 - Glaxo
 - Eli Lilly and Company
 - Cipla
- The first licenced drug produced through genetic engineering is
 - interferon
 - insulin
 - penicillin
 - somatotropin
- Before the production of recombinant insulin, insulin for the treatment of diabetes in human was obtained from
 - healthy humans
 - dead human body
 - cows and pigs
 - dogs and cats
- The plasmid generally used for the production of recombinant insulin is
 - RK 646
 - Ti plasmid
 - ACY 17
 - pUC 18
- In one of the techniques of recombinant insulin production the genes for α and β polypeptides were inserted into the plasmid by the side of
 - ori
 - β - galactosidase gene
 - antibiotic resistant gene
 - restriction endonuclease gene

16. During recombinant insulin synthesis, the bond between insulin polypeptide and galactosidase can be removed by using
1. cyanogen bromide
 2. chymotrypsin
 3. carboxy peptidase
 4. amylase
17. Prior to the production of recombinant insulin, insulin obtained from cows and pigs were given to patients. Some of the problems faced by this treatment was
1. the insulin was not active
 2. in some humans it induced antibody production
 3. it reduces the weight of patients
 4. loss of memory power
18. A plant called *Rauolfia serpentina* is under the threat of extinction. To save this plant, which technique is highly useful?
1. genetic engineering
 2. DNA finger printing
 3. hybridoma technology
 4. in vitro culture
19. Which group of enzymes are popularly called "Molecular stichers"
1. restriction Endonuclease
 2. ligases
 3. RNA polymerase
 4. DNA polymerase
20. A clone is a group of organisms produced by
1. asexual method and genetically similar
 2. asexual method and genetically dissimilar
 3. sexual method and genetically similar
 4. sexual method and genetically dissimilar
21. Match the following:
- | | |
|------------------------------|------------------------|
| 1. Restriction endonuclease | p. Kary Mullis |
| 2. DNA Finger printing | q. Kohler and Milstein |
| 3. Polymerase chain reaction | r. Alec Jaffreys |
| 4. Monoclonal antibodies | s. Arber |
-
- | | |
|-----------------------|-----------------------|
| 1. 1-s, 2-r, 3-p, 4-q | 2. 1-s, 2-r, 3-q, 4-p |
| 3. 1-q, 2-r, 3-p, 4-s | 4. 1-s, 2-p, 3-q, 4-r |
22. Some of the steps involved in Gene Cloning are given below
- i) Insertion of isolated gene to the vector
 - ii) Introduction of recombinant vector to the host
 - iii) Isolation of desired gene
 - iv) Expression of recombinant gene in host
 - v) Extraction of recombinant gene product
- The correct sequence of steps involved are
- | | | | |
|----------------------|----------------------|----------------------|----------------------|
| 1. iii, i, iv, ii, v | 2. iii, i, ii, iv, v | 3. i, ii, iii, iv, v | 4. ii, i, iii, iv, v |
|----------------------|----------------------|----------------------|----------------------|
23. A gene for insulin has been inserted into a vector for the purpose of obtaining its protein product only. Such a vector is called
1. expression vector
 2. suppression vector
 3. storage vector for genomic library
 4. none of the above
24. Expression vectors are those
1. produce protein products
 2. used for genomic libraries
 3. used for chromosome synthesis
 4. used for finger printing
25. *E. coli* is generally used for gene cloning because
1. it supports the replication of recombinant DNA
 2. it is easy to transform

3. it is free from elements that interferes with replication and recombination of DNA
 4. all of these
26. An ideal plasmid to be used for recombinant DNA technology must have
 1. minimum amount of DNA
 2. relaxed replication control
 3. one recognition site for one restriction endonuclease
 4. all of these
27. Transgenic organisms are
 1. produced by gene transfer technology
 2. extinct organisms
 3. naturally occurring and endemic
 4. produced by traditional plant breeding technique
28. Transfer of recombinant plasmid into *E. Coli* cells needs
 1. heat treatment
 2. UV rays treatment
 3. CaCl₂ treatment
 4. lysis
29. Which of the following statement about a vector is correct
 1. all vectors are plasmids only
 2. plasmids, phages can be used as vectors
 3. fungi can also be used as vectors
 4. cyanobacteria can also be used as vectors
30. Which of the following statement about plasmids is correct?
 1. plasmids are present in bacteria only
 2. plasmids are present in all organisms
 3. plasmids present in bacteria and phages
 4. plasmids present in plants and animals
31. Which one of the following statement are not attributed to plasmids
 1. they are circular DNA molecule
 2. they have antibiotic resistant genes
 3. they have the ability of autonomous replication
 4. they have DNA that is as long as chromosomal DNA
32. Which one of the following statements about Restriction Endonuclease is true
 1. all restriction endonucleases cut DNA at specific sites
 2. all restriction endonucleases cut DNA at random sites
 3. all restriction endonucleases join DNA segments at specific sites
 4. all restriction endonucleases join DNA at random sites
33. Restriction endonucleases cut DNA at a specific site called
 1. ligation site
 2. ori
 3. recognition sequence
 4. replication site
34. Restriction endonucleases, when present in a host cell act on foreign DNA molecule and cleave them, but they do not act on host DNA molecule. It happens because
 1. Restriction endonuclease cannot act on host DNA
 2. Host DNA is packed into chromosomes
 3. Host DNA is methylated hence restriction endonucleases can't act.
 5. Restriction endonucleases become inactive when they reach host DNA
35. The presence of Restriction endonucleases were postulated in 1960 by
 1. Khorana
 2. Watson
 3. Crick
 4. Arber
36. The scientists who won nobel prize for physiology for their discovery of restriction endonucleases are

1. Jacob and Monad
c) Watson and Crick
2. Smith, Nathans and Arber
4. Alec Jaffreys and Milstein
37. Restriction endonucleases are also called
1. molecular scissors
2. molecular stichers
3. DNA synthesis
d) polymerases
38. In restriction endonuclease EcoR1, "E" stands for
1. extraction
2. the first letter of the genus in which it is present
3. endonuclease
4. endangered
39. EcoR1 cleaves DNA at
a) ${}^5\text{G AATTC}{}^3\text{/}$
 ${}^3\text{CTTAA G}{}^5\text{/}$
b) ${}^5\text{GTT}\downarrow\text{AAC}{}^3\text{/}$
 ${}^3\text{CAA}\uparrow\text{TTG}{}^5\text{/}$
c) ${}^5\text{C}\downarrow\text{AATTG}{}^3\text{/}$
 ${}^3\text{GTAA}\uparrow\text{C}{}^5\text{/}$
d) ${}^5\text{GGGCC}\downarrow\text{T}{}^3\text{/}$
 ${}^3\text{CCCGG}\uparrow\text{A}{}^5\text{/}$
40. Restriction endonucleases recognize specific sequences on DNA called
1. non-coding sequences
2. satellites
3. palindromes with rotational symmetry
4. tandem repeats
41. Main tools required for recombinant DNA technology are
1. vector, desired gene
2. vector, desired gene, mRNA of desired gene, host, restriction enzymes, ligases
3. desired gene, host, vector
4. vector, desired gene, mRNA of desired gene, host
42. An example for autonomously replicating mini chromosome is
1. virus
2. phage
3. plasmid
4. lichen
43. Which one of the following statements about plasmids is correct
1. plasmids are mobile
2. plasmids are made up of RNA and proteins
3. plasmids are present in eukaryotes
4. plasmids are present in fungi
44. DNA Ligase, used in recombinant DNA technology is obtained from
1. *E.coli* only
2. *E.coli* and also Ligase encoded by T_4 phage
3. *Saccharomyces*
4. retroviruses
45. DNA finger printing was first developed by
1. David Suzuki
2. Khorana
3. Alec Jaffreys
4. Gilbert
46. Using genetic technique in forensic science is also called
1. genetic finger printing
2. *In vitro* culture
3. hybridoma technology
4. gene therapy
47. A technique called southern blotting is used in
1. monoclonal antibody production
2. *In vitro* culture
3. genetic finger printing
4. polymerase chain reaction
48. Genetic finger printing is useful in
1. identifying the criminals involved in rape, murder etc.,
2. establishing the parentage of a disputed child
3. identifying illegal immigrants
4. all of these
49. RFLP is

1. restriction fragment length polymorphism
 2. repeated fragment length polymorphism
 3. renewed fragment length polymorphism
 4. required fragment length polymorphism
50. VNTR is
1. variable nucleotide triplet repeat
 2. variable nucleoside tandem repeat
 3. variable nucleoside triplet repeat
 4. variable number of tandem repeats
51. A small, 15-30 bases long nucleotide sequences used to detect the presence of complementary sequences in DNA sample during DNA finger printing is called
1. RFLP
 2. Probe
 3. VNTR
 4. reporter gene
52. A radio active probe used in DNA finger printing contains
1. 32 p
 2. 14 C
 3. 12 N
 4. pUC18
53. Electrophoresis, a technique used in DNA fingerprinting helps to separate
1. DNA segments
 2. cells from DNA
 3. Tissues
 4. RNA from DNA
54. In DNA finger printing, even a smallest amount of DNA obtained from samples collected at crime place, can be multiplied into millions of copies by using a technique called
1. autoradiography
 2. southern blotting
 3. polymerase chain reaction
 4. electrophoresis
55. In DNA finger printing, the DNA from the gel is transferred to _____ for hybridization
1. nitrocellulose membrane
 2. agarose
 3. autoradiogram
 4. PCR
56. Southern blotting is a technique used in genetic finger printing is called so because,
1. the blotting is done from the south side
 2. it was discovered by a scientist, E.M. Southern
 3. it was popular in South America
 4. it was popular in southern countries
57. During DNA finger printing, DNA nucleotides hybridized with probe can be detected through
1. electrophoresis
 2. polymerase chain reaction
 3. autoradiography
 4. hybridoma
58. DNA finger printing helps in
1. identifying illegal immigrants
 2. detecting the real parent of child
 3. detecting the suspect involved in crime
 4. all of these
59. RFLP, VNTR, Probe are some of the terminologies associated with
1. hybridoma technology
 2. tissue culture
 3. DNA finger printing
 3. none
60. Dolly, the first animal produced through cloning is
1. camel
 2. rat
 3. cow
 4. sheep
61. Some of the steps involved in DNA finger printing are listed below
- I. Extraction of DNA
 - II. Collecting the sample
 - III. Treating DNA with REN
 - IV. GEL Electrophoresis
 - V. Transfer segments of DNA to nitrocellulose membrane
 - VI. Hybridize with probe
 - VII. Autoradiography.
- The correct sequence is _____
1. ii, iii, iv, vi, v, i, vii
 2. ii, i, iii, vi, v, vi, vii
 2. iv, i, ii, v, iii, vi, vii
 4. i, iv, v, ii, iii, vi, vii
62. An aged person is suffering from Atherosclerosis. Since conducting a surgery is very difficult due to his old age, which of the therapies can be advised to him to overcome the problem?

1. gene therapy for Anticoagulent
 2. gene therapy for the formation of angiogenic factors
 3. both 1 and 2
 4. genetics and finger printing
63. Gene therapy can be made highly effective by conducting
1. gene therapy for each and every tissue
 2. gene therapy through injecting modified cells
 3. gene therapy for stem cells and bone marrow cells
 4. genetics and finger printing
64. Gene therapy, a technique that helps in
1. saving endangered species
 2. curing genetic disorders
 3. clonal propagation
 4. producing monoclonal antibodies
65. In 1990, the first gene-therapy was conducted on a 4 year old girl in US. The girl was suffering
1. AIDS
 2. CANCER
 3. SCID
 4. Malaria
66. SCID, a disease can be cured by Gene therapy is due to the deficiency of
1. ADA enzyme
 2. Insulin
 3. Glucagon
 4. Dystrophin
67. Gene therapy, a technique to cure inherited diseases by
1. repairing the faulty gene
 2. introducing the correct copy of the gene
 3. adding new cells to the body
 4. polymerase chain reaction
68. During gene therapy, the possible ways through which the genes can be introduced into the cell are
1. micro injection
 2. some viruses
 3. both 1 and 2
 4. erythrocytes
69. In one type of gene therapy, functional genes are introduced into the sperm or the egg. This is called
1. somatic cell gene therapy
 2. germline gene therapy
 3. vegetative cell gene therapy
 4. gametic gene therapy
70. In somatic cell gene therapy, the functional genes can be introduced into
1. sperm
 2. egg
 3. any body cells
 4. germinal cells
71. The genes introduced through somatic cell gene therapy are
1. heritable
 2. non-heritable
 3. partially heritable
 4. none of these
72. During the recent tsunami disaster a child was separated from its parents in Srilanka. Later with the help of technique the child was made to reunite with its true parents. The technique is
1. DNA finger printing
 2. gene therapy
 3. tissue culture
 3. hybridoma technology
73. Fearing that the child to be born may have a genetic disorder, a couple goes to a doctor. Which one of the techniques will be suggested by the doctor cure genetic disorder?
1. hybridoma technology
 2. gene therapy
 3. ELISA
 4. DNA finger printing
74. The work 'Hybridization' in DNA finger printing means
1. pairing between the nucleotides of DNA sample with probe
 2. pairing between the nucleotides of DNA and mRNA
 3. pairing between the nucleotides of probe with mRNA
 4. pairing between the nucleosides with mRNA
75. The main aim of human genome project is
1. to identify and sequence of all the genes present in the human body

2. to introduce new genes to human beings
 3. to remove disease causing genes from humans
 4. to improve techniques of finger printing
76. Bt cotton is a
1. a cotton variety obtained by crossing two different cotton plants
 2. a cotton variety brought from South America
 3. an insecticide sprayed on cotton plant
 4. a transgenic cotton variety
77. In biotechnology, mass culturing of cells / microbes can be achieved by using
1. Test tube culture
 2. Bioreactor
 3. Autoclave
 4. electrophoresis
78. A device in which a substrate of low value is utilized by living cells or enzymes to generate a product of higher value is called
1. bioreactor
 2. test tube culture
 3. electrophoresis
 4. chromatography
79. A bioreactor known for mass culturing of cells / microbes must have
1. agitation for mixing of cells and medium
 2. sterile conditions
 3. regulation of temperature, aeration, etc.,
 4. all of these
80. Bioreactors are used for
1. large scale production of desired substances by using cells / microbes
 2. kill bacteria
 3. to store viruses
 4. to get chemicals
81. The basic components of tissue culture media are
1. micro and macro nutrients, glucose
 2. micro and macro nutrients, vitamins, agar
 3. micro and macro nutrients and growth regulators, glucose
 4. micro and macro nutrients, growth regulators, agar, vitamins, glucose
82. Agar agar is added to tissue culture media as
1. carbon source
 2. a growth regulator
 3. nitrogen source
 4. solidifying agent
83. Agar agar, used in plant tissue culture is extracted from,
1. a fungi
 2. a bacteria
 3. an algae
 4. a virus
84. Glucose is added to the tissue culture media as
1. growth regulator
 2. carbon source
 3. solidifying agent
 4. an antibiotic
85. Explant is
1. any cut part of the plant used in tissue culture
 2. a plant extract used in tissue culture
 3. a source of growth regulators added to media
 4. solidifying agent
86. Totipotency refers to
1. the ability of a plant cell to arrest the growth of a plant
 2. the ability of a plant cell to develop disease in plant
 3. the ability of a plant cell to develop into a complete plant
 4. the ability of a plant cell to develop into a callus
87. Somatic embryos are
1. embryos developed from zygote after fertilization
 2. embryos developed from egg without fertilization
 3. embryo like structure developed from the cells of callus

4. embryo developed by ovules
88. In vitro culture of plant parts need
 1. controlled environmental condition 2. aseptic condition
 3. maintenance of pH 4. all of these
89. An amorphous mass of loosely arranged thin walled parenchyma cells developing from explant is called
 1. thallus 2. callus 3. callose 4. embryoids
90. The unique feature of callus is
 1. it gives rise to cells only
 2. it can give rise to zygotic embryos
 3. it can give rise to root, shoot and embryoids
 4. it can give rise to flowers directly
91. Meristem culture helps in developing
 1. hybrid plants 2. virus free plants
 3. disease resistant plants 3. tall plants
92. Genetic variation observed in callus obtained from tissue culture is called
 1. morphogenesis 2. rhizogenesis
 3. callogenesis 3. somaclonal variation
93. The name "Golden rice" is given to a rice variety because
 1. it contains traces of gold
 2. it is obtained from areas where gold mining is done
 3. the seeds are golden yellow in colour because of the presence of β - carotene
 4. it is made of gold
94. Golden rice is
 1. hybrid rice developed by traditional plant breeding
 2. a rice variety obtained by plant tissue culture
 3. a rice variety obtained by recombinant DNA technology
 4. hybrid rice developed by DNA finger printing
95. Golden rice a rice variety was developed by
 1. Ingo Potricus and Peter Beyer 2. Alec Jaffreys and Kary Mullis
 3. Jacob and Monad 4. Landsteiner and Weiner
96. Genes required to transfer a rice plant into "Golden rice" were obtained from
 1. carrot
 2. a plant called Daffodil and a bacterium called *Erwinia*
 3. *E.coli* and Daffodil
 4. sunflower and cotton
97. The golden rice is produced to help people suffering from
 1. beri beri 2. scurvy 3. xerophthalmia 4. AIDS
98. A transgenic plant "Golden rice" consists of foreign genes that produces
 1. β - Carotene 2. niacin 3. biotin 4. nicotinic acid
99. The "Golden rice", aimed at curing
 1. vitamin b deficiency 2. vitamin a deficiency
 3. vitamin k deficiency 4. zinc deficiency
100. The vector used to transfer gene to produce "Golden rice" is
 1. pBR322 2. pUC18 3. Ti plasmid 4. Phage
101. A variety of rice plant, into which genes were transferred to produce "Golden rice" is

1. IR-22 2. Basmathi 3. Taife-30 a 4. Sona
102. The objections raised by people against the introduction of Golden rice is
1. consumption of Golden rice may cause hypervitaminoses
 2. it is not a natural variety hence it may disturb the genotype of local varieties
 3. the transgenic rice may cause allergy
 4. all of these
103. Fruit juice or coconut milk is added to plant tissue culture media because
1. it is a source of micronutrients
 2. it is a source of macronutrients
 3. it is a source of growth regulators
 4. it helps in maintaining pH of the media
104. Which one of the following statements about plant tissue culture is correct?
1. the culturing of root is not possible
 2. any cell that is totipotent can be cultured
 3. the pH of the media need not be maintained
 4. fruit juices are added to media as carbon source
105. The plasmid used to transfer genes in plants is
1. Ti plasmid 2. P^{BR 322} 3. ECOR 1 4. P^{UC 18}
106. The bacterium used for gene transfer in plants is
1. *E.coli* 2. *Rhizobium* 3. *Azatobacter* 4. *Agrobacterium*
107. Match the following
- | Scientists | Associated with |
|------------------------|-----------------------------|
| 1. Murashige and Skoog | p. Restriction Endonuclease |
| 2. Milstein and Kohler | q. Golden rice |
| 3. Potricus and beyer | r. Tissue culture media |
| 4. Arber and Nathan | s. Hybridoma |
| 1. 1-p, 2-q, 3-r, 4-s | 2. 1-s, 2-p, 3-r, 4-q |
| 3. 1-r, 2-s, 3-q, 4-p | 4. 1-s, 2-r, 3-p, 4-q |
108. All the cells in a callus are
1. genetically homogeneous
 2. genetically heterogeneous
 3. similar in size
 4. inefficient to grow organs
109. Which one of the following statements about plant tissue culture is correct
1. cells can be cultured only on solid medium
 2. cells can be cultured both on solid and liquid medium
 3. callus do not need hormones
 4. the cells of the callus cannot be subcultured
110. POMATO, is
1. a transgenic plant
 2. a plant obtained through protoplast hybridization
 3. a plant obtained by organ culture
 4. a plant developed by plant breeding method
111. The production of a large number of genetically similar plants through plant tissue culture is called
1. hybridoma technology
 2. recombinant DNA technology
 3. gene therapy
 4. micropropagation
112. cDNA, a term used in recombinant DNA technology means
1. competetive DNA
 2. chemical DNA

3. complex DNA

4. complementary DNA

113. The process of introduction of foreign DNA into an animal cells is called
1. transversion 2. conversion 3. inversion 4. transfection
114. Genes have been transferred into animals with a view to obtain a large scale production of the proteins encoded by these genes in the milk, blood etc. This approach is also referred generally as
1. *In vitro* culture 2. molecular farming
3. gene therapy 4. hybridoma technology
115. With reference to biotechnology, microinjection is a method of
1. injecting a solution of DNA into the nucleus of a cell
2. injecting nutrients into a cell culture media
3. injecting microbes into a cell culture media
4. injecting medicine to human beings
116. Pluripotent cells derived from the early pre implantation of an embryo in mice are called
1. stem cells 2. organ culture 3. somatic cell hybridization 4. Hybridoma
117. The advantage with embryonic stem cells in producing transgenic animals is
1. these cells are immortal
2. these cells can be maintained and multiplied *in vitro* long enough to permit various manipulations for gene transfer.
3. both 1 and 2
4. neither 1 nor 2
118. The development of transgenic animals like cattle which aims at the production of recoverable quantities of pharmaceutically or biologically important proteins. Hence such transgenic animals can also be called
1. hybrids 2. cybrids 3. bioreactors 4. special varieties
119. Match the following
- | | |
|------------------------------|---|
| 1. Restriction endonucleases | p. Small DNA segments used in DNA finger prints |
| 2. Ligases | q. Molecular scissors |
| 3. Probe | r. Virus free plants |
| 4. Meristem culture | s. Molecular stichers |
1. 1-q, 2-s, 3-p, 4-r
2. 1-p, 2-q, 3-r, 4-s
3. 1-q, 2-s, 3-r, 4-p
4. 1-p, 2-s, 3-q, 4-r
120. Match the following
- | | |
|---------------------|---|
| 1. Electrophoresis | p. Gene transfer in plants |
| 2. Probe | q. Breaks bond between insulin and β -galactosidase |
| 3. Cyanogen bromide | r. Small DNA segment used for hybridization |
| 4. Ti plasmid | s. Separation of DNA segments |
1. 1-r, 2-s, 3-q, 4-p
2. 1-s, 2-r, 3-q, 4-p
3. 1-p, 2-r, 3-q, 4-s
4. 1-q, 2-p, 3-s, 4-r
121. Match the following:
- | | |
|----------------|-------------------------------------|
| 1. Explant | p. Structures developed from callus |
| 2. Embryoids | q. Plant part for tissue culture |
| 3. Glucose | r. Source of growth regulators |
| 4. Fruit juice | s. Carbon source |

1. 1-q, 2-s, 3-p, 4-r 2. 1-p, 2-q, 3-r, 4-s 3. 1-q, 2-p, 3-r, 4-s 4. 1-q, 2-p, 3-s, 4-r
122. Match the following:
- | | |
|--------------------|---------------------------------------|
| 1. PCR | p. for hybridization |
| 2. Probe | q. for gene amplification |
| 3. Electrophoresis | r. for monoclonal antibody production |
| 4. Hybridoma | s. for DNA segments separation |
1. 1-p, 2-q, 3-r, 4-s 2. 1-q, 2-s, 3-p, 4-r 3. 1-q 2-p 3-s, 4-r 4. 1-p, 2-q, 3-s, 4-r
123. In plant tissue culture, induction of roots and shoots is accomplished by
1. using a tissue of certain minimum size
 2. using a particular auxin cytokinin ratio
 3. using a specific concentration of sucrose in the medium
 4. manipulating physical factors such as light, pH, temperature
124. A part of nucleic acid used to find a gene by hybridization is called
1. vector
 2. clone
 3. probe
 4. cybrid
125. The cloned sheep "Dolly" had a genotype which is
1. haploid and identical to that of the mothers egg cell
 2. diploid and identical to that of the mothers somatic cells
 3. diploid with the haploid set of chromosomes from the father and other from the mother
 4. diploid and identical to that of the donors somatic cells
126. A segment of DNA that reads from the same forward and backward is called
1. palindromic DNA
 2. complementary DNA
 3. plasmid DNA
 4. copy DNA
127. Stem cells found in umbilical cord blood is
1. totipotent
 2. pluripotent
 3. omnipotent
 4. multipotent
128. Which of the following is associated with DNA finger printing?
1. hybridoma
 2. site specific mutagenesis
 2. shotgun cloning
 4. RFLP
129. Which technique would most likely to be used to produce a large number of genetically identical offspring
1. cloning and in vitro culture
 2. polymerase chain reaction
 3. chromatography
 4. electrophoresis
130. The restriction Endonucleases are called so because
1. they have a very restrictive or site specific endonuclease activity
 2. they cut DNA at a few restricted sites
 3. they restrict the entry of foreign DNA into the cell by cleaving the DNA due to their endonuclease activity
 4. their distribution is restricted to only some bacterial cells
131. Which one of the following organism is used for the large scale production of recombinant insulin?
1. *Plasmodium*
 2. *Agrobacterium*
 3. *Rhizobium*
 4. *E.coli*
132. 'Thermal Cycler' is used in the reaction
1. enzyme linked immuno sorbant assay
 2. ligation reaction
 3. polymerase chain reaction
 4. immobilization reaction
133. Construction of a recombinant DNA involves
1. cleaving DNA with restriction endonuclease and joining with ligase
 2. cleaving DNA with ligase and joining with endonuclease

3. cleaving and joining DNA with restriction endonuclease
 4. cleaving DNA with restriction endonuclease and joining with polymerase
134. Haploid plants can be obtained through
1. meristem culture
 2. embryo culture
 3. endosperm culture
 4. pollen culture
135. Which one of the following statements about genetic engineering is NOT correct
1. this is the process of producing transgenic organisms
 2. through this technology, one can produce recombinant insulin
 3. this process involves transfer of genes from one organism to another
 4. through this process chromosomes can be added or deleted from the cell
136. Which one of the following statements about human genome project is NOT correct
1. it helps in identifying the exact location of genes on chromosomes
 2. the information gathered from this project helps in curing genetic diseases
 3. this helps in developing artificial organs
 4. it helps in determining the sequence of 3 billion base pairs that makes up human genome
137. Which one of the following techniques is successfully used to compare two DNA samples
1. hybridoma technology
 2. ELISA
 3. genetic finger printing
 4. gene therapy
138. The chemical nature of 'humulin' produced by recombinant DNA technology is
1. lipid
 2. protein
 3. monosaccharide
 4. vitamin
139. pUC 18 is a
1. phage used as a vector
 2. bacteria used for transformation
 3. restriction endonuclease
 4. a plasmid
140. ECOR1 is a
1. DNA ligase enzyme
 2. restriction endonuclease
 3. a vector used for insulin synthesis
 4. a plasmid used as a vector
141. The unique feature of pluripotent stem cells is
1. they can develop into any tissue of the body
 2. they can develop into whole individuals
 3. they help in the production of monoclonal antibodies
 4. none of these
142. Stem cells can be obtained from
1. embryo only
 2. any part of the body
 3. blood only
 4. embryo, bone marrow, umbilical cord blood etc
143. Which one of the following therapies can be suggested to cure a person who is suffering from spinal cord injuries
1. hybridoma
 2. gene therapy
 3. stem cell therapy
 4. recombinant DNA technology
144. A hybridoma is
1. a hybrid cell obtained by fusing a β -lymphocyte with a myeloma cell in vitro
 2. a hybrid cell obtained by fusing a β -lymphocyte with a myeloma cell in vivo
 3. a hybrid cell obtained by fusing 2 β -lymphocyte cells in vitro
 4. a hybrid cell obtained by fusing any 2 body cells in vitro

145. A hybridoma cell
1. produces different types of antibodies against different types of antigens
 2. produces only specific antibodies only against a specific antigen
 3. produces different types of antibodies but only one type of antigen
 4. none of the above
146. A cancerous / myeloma cell in hybridoma helps in
1. continuous growth of hybridomas
 2. production of antibodies
 3. both 1 and 2
 4. neither 1 nor 3
147. All the antibodies produced through hybridoma are
1. polyclonal
 2. monoclonal
 3. non active
 4. over active
148. A type of β -lymphocyte that produces antibody is
1. plasma cell
 2. memory cell
 3. adipocyte
 4. erythrocyte
149. The unique feature of monoclonal antibody is that
1. it is specific to a single antigenic determinant of a single antigen
 2. it is non specific
 3. it is specific to a few antigenic determinants
 4. restricted growth
150. Monoclonal antibodies are nowadays used in
1. disease diagnosis
 2. detection of specific type of pathogen
 3. very early and accurate detection of cancer
 4. all of these
151. Monoclonal antibodies are usually produced from
1. myeloma cells
 2. hybridoma cells
 3. monocytes
 4. adipocytes
152. To produce monoclonal antibodies in large scale, the techniques that can be used are
1. in vivo in the peritoneal cavity of mice
 2. in vitro in large scale culture vessels
 3. both 1 and 2
 4. neither 1 nor 2
153. To produce monoclonal antibodies in large scale
1. stirred bioreactors can be used
 2. air lift fermenters can be used
 3. vessels based on immobilized cells can be used
 4. all of these