

MCQs		Biotechnology		Key
1)	For cloning of DNA, modified <i>E. coli</i> (bacteria) treated with various solutions at low temperature to make them.....	A. Competent	B. Dead	A
		C. Alive	D. Sterile	
2)	Most of the enzymes degrade at	A. 25 °C	B. 65 °C	B
		C. 37 °C	D. All of these	
3)	ATP is a renewable resource that is regenerated by addition of -----to ADP.	A. Nitrogen	B. Sulphur	D
		C. Carbon	D. Phosphate	
4)	1. PCR is used for.....	A. Disease diagnosis	B. Paternity establishment	D
		C. DNA finger printing	D. All of these	
5)	Endonucleases are important part of -----	A. Animal cell	B. Calvin cycle	C
		C. Gene cloning	D. Viruses	
6)	Biotechnology has played important role in the improvement of.....	A. Human health	B. Energy production	D
		C. Crop production	D. All of these	
7)	Which of the following statements is true about molecular markers	A. They speed up conventional breeding of crops	B. They have no application in forensic science	A
		C. They slow down conventional breeding of crops	D. None of these	
8)	The lysis solution is used in DNA extraction to _____	A. Solubilize the DNA	B. Remove lipids	D
		C. Dissolve RNA	D. Breakdown the nuclear and cellular membrane	
9)	The carrier molecules of genetic material in gene gun are _____	A. Iron particles	B. Carbon particles	C
		C. Gold particles	D. Nickel particles	
10)	Apical meristem is a	A. Virus free region	B. Enzyme free region	A
		C. Hormone free region	D. All of these	
11)	Part of plant used in plant tissue culture is	A. Stock	B. Explant	C
		C. Callus	D. Scion	
12)	To obtain haploid plants, we culture;	A. Entire anther	B. Embryo	A
		C. Nucleus	D. Apical bud	
13)	In phytoremediation, are involved in remediation			A

	A. Plants	B. Yeast	
	C. Animals	D. All of these	
14)	The most common solidifying agent used in micro-propagation is		A
	A. Agar	B. Agarose	
	C. Dextran	D. All of above	
15)	----- is the called the hereditary material which can pass from one generation to another generation.		D
	A. Nucleus	B. Cell wall	
	C. Plastids	D. Nucleic acid	
16)	<i>Agrobacterium rhizogene</i> causes excessive		B
	A. Foliar growth	B. Rooting	
	C. Shooting	D. Cell enlargement	
17)	Isozymes are enzymes which are		C
	A. Identical	B. Different	
	C. Similar	D. None of above	
18)	First plant whose genome was sequenced		C
	A. Rice	B. Wheat	
	C. Arabidopsis	D. Maize	
19)	Model plant for biotechnological research in cereals is		A
	A. Rice	B. Oat	
	C. Wheat	D. Maize	
20)	PEG is used for transformation and stands for		B
	A. Plant engineered genes	B. Polyethylene glycol	
	C. Polyethylene gel	D. Plant polymorphic gene	
21)	Ribosome's are factories for		C
	A. Lipid synthesis	B. Carbohydrate synthesis	
	C. Protein synthesis	D. None of above	
22)	Which of the following is not a molecular marker?		D
	A. EST	B. SNP	
	C. STS	D. SDS	
23)	Green fluorescent protein is obtained from		A
	A. Jelly fish	B. Arabidopsis	
	C. Sea weeds	D. <i>Agrobacterium</i>	
24)	Which of the following is not a vector?		B
	A. Plasmid	B. Comit	
	C. Phage	D. Cosmid	
25)	ELIZA technique is used for detection of		A
	A. Protein	B. RNA	

	C. DNA	D. mRNA	
26)	SSR stands for		A
	A. Simple sequence repeats	B. Single sequence RNA	
	C. Short single RNA	D. None of above	
27)	<i>E. coli</i> is a		C
	A. Virus	B. Mycoplasma	
	C. Bacteria	D. None of above	
28)	Branch of biotechnology that deals with health is termed as		A
	A. Red biotechnology	B. White biotechnology	
	C. Green biotechnology	D. Blue biotechnology	
29)	Due to autoclaving pH		A
	A. Decreases	B. Is not changed	
	C. Increases	D. None of above	
30)	Filter sterilization is used for		B
	A. Chemicals with high pH	B. Heat labile chemicals	
	C. Auxins only	D. Cytokinins only	
31)	Best method for chloroplast transformation is		C
	A. Whiskers	B. Agrobacterium	
	C. Gene gun	D. Electroporation	
32)	The variation in cells or tissues that arises as a result of in-vitro culture is termed as		C
	A. Transformation	B. Permanent variation	
	C. Soma clonal variation	D. Economically useful variation	
33)	Cells having nucleus from one source and cytoplasm from other are termed as		C
	A. Hybrids	B. Transformed	
	C. Cybrids	D. None of above	
34)	Sequence of template strand is 5' ATTTGTTGGCCATCCGT 3'. If a primer is designed what will be its sequence.		A
	A. TAAAC	B. ATATC	
	C. ACGGA	D. ACGCA	
35)	Genes having the ability to move from one place to another within the genome are termed as		D
	A. Mutant genes	B. Regulatory genes	
	C. Viral gene	D. Transposons	
36)	The sequence of one strand of DNA is 5' TCGATC 3'. The sequence of the complementary strand would be		B
	A. 5' TCGATC 3'	B. 3' AGCTAG 5'	
	C. 5' AGCTAG 3'	D. 5' GCTAGC 3'	
37)	An allele is		B
	A. One of the bases in DNA	B. An alternate form of a gene	
	C. Another term for epistasis	D. Present only in male parent and is responsible for sex determination	

38)	DNA is double stranded and both strands are		C
	A. Parallel	B. Covalently bound	
	C. Anti-parallel	D. Joined by sulphur bridges	
39)	Colchicine is used for		A
	A. DNA doubling	B. Denaturation of DNA	
	C. DNA repair	D. None of above	
40)	The anti-codon for GCG is		B
	A. UAU	B. CGC	
	C. CCT	D. CGU	
41)	What is the theoretical progress of nucleic acid amplification by PCR?		D
	A. 1, 2, 3, 4, 5.....	B. 1, 10, 100, 1000.....	
	C. 2, 4, 6, 8, 10, 12.....	D. 2, 4, 8, 16, 32.....	
42)	The two strands of DNA are held by		A
	A. Hydrogen bond	B. Ionic bond	
	C. Covalent bond	D. Polar bond	
43)	In blue-white screening, a white colony usually indicates that competent cell		A
	A. contains a plasmid having DNA insert.	B. was not transformed	
	C. contains a plasmid having no DNA insert.	D. was transformed with multiple non-recombinant plasmid.	
44)	During DNA replication, each strand acts as template for the synthesis of		D
	A. Replication	B. Double helix	
	C. Identical strand	D. Complementary strand	
45)	Which polymerase made widespread use of PCR possible:		B
	A. Klenow fragment	B. <i>Thermus aquaticus</i> (Taq) polymerase	
	C. DNA polymerase III	D. None of the above	
46)	The typical temperature for autoclave (operating at 15pounds per square inch of pressure) is		A
	A. 121°C	B. 63°C	
	C. 100°C	D. 200°C	
47)	Promoter regions are nucleotide sequences that		C
	A. are involved in transcription termination	B. contain the code for mRNA molecule	
	C. are involved in the initiation of transcription	D. are important to the translation process	
48)	Which culture media is used for regeneration of plants?		B
	A. Whites	B. MS	
	C. N6	D. LB	
49)	RNA is made up of sugar ...		A
	A. Ribose	B. Ribulose	
	C. Deoxyribose	D. Glucose	
50)	DNA joined together from different sources is called		B

	A. cDNA	B. Chimeric DNA	
	C. Plasmid DNA	D. Genomic DNA	
51)	RAPD is an abbreviation of		C
	A. Random amplify polyploidy DNA	B. Recombinant and polymorphic DNA	
	C. Random amplified polymorphic DNA	D. Random amplified Plant DNA	
52)	Western blotting is used for		B
	A. DNA analysis	B. Protein analysis	
	C. RNA analysis	D. All of above	
53)	DNA is soluble in		A
	A. Water	B. Ethanol	
	C. Acid	D. NaOH	
54)	Charge on DNA is		C
	A. Positive	B. No charge	
	C. Negative	D. Non of above	
55)	DNA do not contains		B
	A. Phosphoric acid	B. Sulphuric acid	
	C. Nitrogen bases	D. Ribose sugar	
56)	Genetic code is		C
	A. Commaless	B. Degenerate	
	C. Both A&B	D. Non of above	
57)	It is theoretically possible for a gene from one organism to function in another organism. Why is this possible?		D
	A. All organisms have ribosomes.	B. All organisms have transfer RNA.	
	C. All organisms have similar nuclei.	D. All organisms have the same genetic code	
58)	Plasmids are important in biotechnology because they are		C
	A. Surfaces for respiratory processes in bacteria.	B. Surfaces for protein synthesis in eukaryotic recombinants	
	C. A vehicle for the insertion of recombinant DNA into bacteria.	D. Recognition sites on recombinant DNA strands.	
59)	If you discover a bacterial cell having no restriction enzymes, which of the following would you expect to happen?		D
	A. The cell would be unable to replicate its DNA.	B.) The cell would create incomplete plasmids.	
	C. The cell would become an obligate parasite	D. The cell would be easily infected and lysed by bacteriophages.	
60)	Which two enzymes are needed to produce recombinant DNA?		C
	A. Polymerase, ligase	B. DNA polymerase, topoisomerase	
	C. Restriction enzyme, ligase	D. Endonuclease, transcriptase	
61)	Bacteria containing recombinant plasmids are often identified by which process		B

	A. Removing the DNA of all cells in a culture to see which cells have plasmids	B. Exposing the bacteria to an antibiotic that kills the cells lacking the plasmid	
	C. Examining the cells with an electron microscope	D. Producing antibodies specific for each bacterium containing a recombinant plasmid	
62)	Which of the following is not correct?		B
	A. There are more codons than amino acids so that the code is redundant	B. One codon specify one amino acid	
	C. Some codons are used for initiation or termination of a gene	D. There are 64 different codons	
63)	Open reading frames		C
	A. Have many termination codons	B. Are the same sequence in all functional genes	
	C. Have no termination codon	D. Are restricted to diploid organisms	
64)	A culture started with 4 cells and ended with 128 cells. How many mitosis generations did the cells go through:		D
	A. 64	B. 6	
	C. 32	D. 5	
65)	DNA helicase is an enzyme used for		B
	A. Restriction	B. Separating DNA strands during replication	
	C. Ligation	D. Join DNA strands after replication	
66)	Introduction of DNA into cells by exposing to high voltage pulse is		D
	A. Electrofusion	B. Electrolysis	
	C. Electrofision	D. Electroporation	
67)	Which statement is true for chloroplast DNA?		C
	A. Coded by the nucleus.	B. A subset of nuclear DNA.	
	C. Maternally inherited.	D. None of the above.	
68)	The mitochondrial DNA is _____.		B
	A. Just like the nuclear DNA.	B. Double stranded circular DNA.	
	C. Single stranded linear DNA.	D. Single stranded circular DNA.	
69)	Replication occurs in _____ direction.		C
	A. 3' → 5'.	B. Both (a) and (c).	
	C. 5' → 3'.	D. in any direction.	
70)	The major RNA component of the cell is _____.		B
	A. tRNA.	B. rRNA.	
	C. mRNA.	D. all are equal in amount.	
71)	Why do we have to make a complementary DNA		C
	A. Because our sample is DNA.	B. RNA is single stranded.	
	C. DNA is much more stable than RNA.	D. mRNA does not contain any genetic information.	
72)	cDNA is _____.		B
	A. DNA with both introns and exons.	B. Eukaryotic DNA with only exons.	

	C. DNA with only introns.	D. Used to make precursor mRNA.	
73)	Which bacteria known as natural genetic engineer of plants?		A
	A. <i>Agrobacterium tumefaciens</i> .	B. <i>Bacillus</i> .	
	C. <i>E. coli</i> .	D. <i>Streptomyces</i> .	
74)	Introns are _____		C
	A. Coding sequences	B. Proteins	
	C. Non coding	D. All of above	
75)	Vir genes of agrobacterium are induced by		C
	A. Opines	B. Cytokinins	
	C. Acetosyringone	D. Auxins	
76)	RAPD is an abbreviation of		A
	A. Random amplified polymorphic DNA	B. Recombinant and polymorphic DNA	
	C. Random amplify polyploidy DNA	D. Random amplified Plant DNA	
77)	Western blotting is used for		B
	A. DNA analysis	B. Protein analysis	
	C. RNA analysis	D. All of above	
78)	DNA is soluble in		A
	A. Water	B. Ethanol	
	C. Acid	D. NaOH	
79)	Gene gun is used in a biotechnology lab. For		C
	A. Transduction	B. Transcription	
	C. Transformation	D. None of above	
80)	Branch of biotechnology that deals with health is termed as		A
	A. Red biotechnology	B. Green biotechnology	
	C. Blue biotechnology	D. White biotechnology	
81)	Best method for chloroplast transformation is		D
	A. Electroporation	B. Whiskers	
	C. <i>Agrobacterium</i>	D. Gene gun	
82)	Polynucleotide chain of nucleic acids is termed as		C
	A. Protein	B. Both a and c	
	C. DNA	D. None of above	
83)	DNA is double stranded and both strands are		C
	A. Parallel	B. Covalently bound	
	C. Anti parallel	D. Joined by sulphur bridges	

84)	The sequence of one strand of DNA is 5' TCGATC 3'. The sequence of the complementary strand would be		A
	A. 3'AGCTAG 5'	B. 5' CTAGCT 3'	
	C. 5' TCGATC 3'	D. 5' GCTAGC 3'	
85)	Charge on DNA is		C
	A. Positive	B. No charge	
	C. Negative	D. High charge	
86)	Which one of the following is not a PCR reagent		C
	A. Taq polymerase	B. Buffer	
	C. Iron	D. MgCl ₂	
87)	The two strands of DNA are held by		A
	A. Hydrogen bond	B. Ionic bond	
	C. Covalent bond	D. Polar bond	
88)	The anticodon for GCG is:		B
	A. UAU	B. CGC	
	C. CCT	D. CGU	
89)	What is the genetic function of restriction enzyme?		D
	A. Adds new nucleotides to the growing strand of DNA	B. Repairs breaks in sugar-phosphate backbones	
	C. Joins nucleotides during replication	D. Cleaves nucleic acids at specific sites	
90)	Sugarcane seed is called as		D
	A. Rosette	B. Seed bud	
	C. Grain	D. Fuzz	
91)	DNA do not contain		C
	A. Phosphoric acid	B. Nitrogen bases	
	C. Sulphuric acid	D. Ribose sugar	
92)	The most common methodology of plant transformation is		A
	A. Agrobacterium	B. Electroporation	
	C. Microinjection	D. None of these	
93)	Mitochondria is called		A
	A. The power house of the cell	B. Both A and C	
	C. Circuit house of the cell	D. None of the above	
94)	A better quality DNA can be extracted from		B
	A. Roots	B. Younger leaves	
	C. Flowers	D. Older leaves	
95)	DNA can be isolated in large quantities and separated from protein by using		D

	A. Liquid nitrogen	B. CTAB	
	C. Ethanol	D. Kits	
96)	The gene formed by the joining of DNA segments from two different sources is called		D
	A. Adjunct gene	B. Both a and c	
	C. Joined gene	D. Chimeric gene	
97)	<i>Thermus aquaticus</i> is the source of		C
	A. Vent polymerase	B. Primase enzyme	
	C. Taq polymerase	D. Both a and b	
98)	Restriction Enzymes are also termed as		A
	A. Biological scissors	B. Molecular knives	
	C. Molecular scalpels	D. All of these	
99)	In phytoremediation, are involved in remediation		A
	A. Plants	B. Yeast	
	C. Animals	D. Bacteria	
100)	DMSO (Dimethyl sulfoxide) is used as		D
	A. Gelling agent	B. Chelating agent	
	C. Aggregating agent	D. Cryoprotectant	
101)	Separation of both the strands in DNA duplex is		A
	A. Denaturation	B. Extension	
	C. Annealing	D. None of the above	
102)	Which one of the following does not have cell wall		A
	A. Virus	B. Fungi	
	C. Bacteria	D. Nematodes	
103)	Taq DNA Polymerase is isolated from		C
	A. <i>Agrobacterium tumefaciens</i>	B. <i>Pseudomonas syringae</i>	
	C. <i>Thermos aquaticus</i>	D. None of the above	
104)	CpG islands are rich in		A
	A. GC content	B. CA content	
	C. AT content	D. GT content	
105)	A functional gene cassette should not have one of the following		C
	A. Gene of interest	B. Promoter	
	C. DNA Polymerase	D. Terminator	

106)	Average number of plasmids in a bacterium is called				A
	A.	Copy number	B.	Plasmid number	
	C.	Integration number	D.	None of the above	
107)	Which one of them is not used as a method of transformation				D
	A.	<i>Agrobacterium tumefaciens</i>	B.	Biolistic bombardment	
	C.	Microinjection	D.	RT-PCR	
108)	Undifferentiated mass of plant cells is called				A
	A.	Callus	B.	Endosperm	
	C.	Cancerous tumour	D.	Seed coat	
109)	Physically distinct unit of genome is				B
	A.	Gene	B.	Chromosome	
	C.	Centromere	D.	DNA	
110)	Unidirectional transfer of DNA from one bacterium to another through cell to cell contact is				A
	A.	Conjugation	B.	Crossing over	
	C.	Transduction	D.	None of the above	
111)	DNA replication occurs at				C
	A.	Anaphase stage	B.	Telophase stage	
	C.	Metaphase stage	D.	None of the above	
112)	Which parts of amino acids are involved in peptide bonds?				B
	A.	The carboxyl group on one amino acid and the side chain on the other	B.	The amino group on one amino acid and the carboxyl group on the other	
	C.	The carboxyl group on both amino acids	D.	The amino group on both amino acids	
113)	A competent bacteria is				C
	A.	Able to survive under harsh conditions	B.	Able to reproduce successfully	
	C.	Able to get transfected with plasmid	D.	None of the above	
114)	Post translational modifications are termed when				A
	A.	Additional groups are attached to the protein molecule its after synthesis	B.	Transcription fails to start	
	C.	DNA replication is not normal and repair is done	D.	None of the above	
115)	Two strands of DNA are bound together through				B
	A.	Ionic interaction	B.	Hydrogen bonding	
	C.	Covalent interactions	D.	None of the above	
116)	Chromosome condensation occurs at				A

	A. Metaphase stage of mitotic cell division	B. Telophase stage of mitotic cell division	
	C. Anaphase stage of mitotic cell division	D. None of the above	
117)	When a cross is made between hybrid and one of the parents, it is called		C
	A. Test cross	B. Double cross	
	C. Back cross	D. None of the above	
118)	Mitochondria is called		A
	A. The power house of the cell	B. Both of the above	
	C. Circuit house of the cell	D. None of the above	
119)	Which pathogen hijacks the machinery of host cell for its multiplication		C
	A. Birds	B. Fungi	
	C. Virus	D. Bacteria	
120)	Sex linked genes in human can be on		B
	A. X chromosome only	B. Both of them	
	C. Y chromosome only	D. Autosomal chromosomes only	
121)	Which part of an amino acid gives it its unique properties?		A
	A. Side chain	B. The amino group	
	C. Peptide bond	D. The carboxyl group	
122)	Copy number refers to...		B
	A. Number of bacterial cells in a bacterial colony	B. Number of molecules of a plasmid in single bacterial cell	
	C. Copies of a protein that a bacterium makes out of a plasmid.	D. Number of molecules of a plasmid in single bacterial colony.	
123)	What does the term protein domain refer to?		C
	A. A region in the cell where a protein can be found	B. The functional activity of a protein	
	C. A segment of a protein that can fold independently into its own compact, three-dimensional structure	D. The region on a protein that determines how it folds into a three dimensional structure	
124)	Which hydrogen bonds have been found to stabilize a polypeptide's folded shape?		D
	A. Hydrogen bonds between side chain atoms	B. Hydrogen bonds between backbone atoms and side chain atoms	
	C. Hydrogen bonds between backbone atoms	D. All of the above	
125)	Technique used to probe protein from database is;		C
	A. Peptide probing	B. Mass spectrometry	
	C. Peptide-mass fingerprinting	D. Peptide fingerprinting	
126)	An instrument used to measure mass to charge ratio of ionized substances is;		B
	A. Mass analyser	B. Mass spectrometer	
	C. Mass detector	D. Mass developer	
127)	The pH value at which the net charge of an amphoteric substance is zero is;		B

	A. Isofocusing point	B. Isoelectric point	
	C. Isoabundance point	D. Electrofocusing point	
128)	In a folded protein, the nonpolar (hydrophobic) amino acids tend to be		A
	A. Tucked away inside protein	B. Distributed throughout the protein	
	C. Exposed on outside of the protein	D. None of the above	
129)	What provides the information necessary to specify the three-dimensional shape of a protein?		A
	A. The protein's amino acid sequence	B. Protein's peptide bond	
	C. The protein's interaction with molecular chaperones	D. The protein's interactions with other polypeptides	
130)	The biological activity of a protein is determined by its:		D
	A. Peptide bond	B. Ability to form β sheets	
	C. Ability to form α helix	D. Amino acid sequence	
131)	Yeast integrative plasmids are.....		B
	A. Yeast plasmids having human genes	B. Bacterial plasmids having yeast genes.	
	C. None of the above	D. Yeast plasmids having bacterial gene	
132)	BLAST is an online tool used to		C
	A. Find corresponding protein sequences of the test sequence	B. Find the secondary structures of RNA sequence	
	C. Find the identity of test sequence with other sequences present on the data base	D. None of the above	
133)	Restriction Fragment Length polymorphisms are based upon		B
	A. Exonuclease activity of DNA Polymerase-III	B. The presence or absence of restriction sites	
	C. None of the above	D. The proofreading ability of <i>Pfu</i> polymerase	
134)	Yeast two hybrid system is used to study		D
	A. DNA-DNA interaction	B. Protein-RNA interactions	
	C. DNA-RNA interactions	D. Protein-protein interactions	
135)	RNA sequence can be obtained		A
	A. By sequencing the product of an RT-PCR reaction	B. By analyzing the sequence of the relevant protein	
	C. By cloning RNA into cloning vectors	D. By using quick colony lysis	
136)	Primer extension is.....		C
	A. A cloning technique	B. Used to make efficient PCR	
	C. Used to analyse the transcript of a gene	D. Used to identify the novel proteins	
137)	Ti plasmid of <i>Agrobacterium</i> is disarmed		D
	A. To make <i>agrobacterium</i> environmental friendly	B. To accelerate transformability of <i>agrobacterium</i>	

	C. To add left and right borders.	D. To remove tumor inducing ability of the vector	
138)	Which of the Polymerase has proofreading ability		C
	A. Taq DNA Polymerase	B. DNA Polymerase-II	
	C. <i>Pfu</i> DNA Polymerase	D. DNA Polymerase α	
139)	Melting Temperature of a PCR primer is calculated by the equation		B
	A. $T_m = \{4x (G+C)\} + \{4x (A+T)\}$	B. $T_m = \{4x (G+C)\} + \{2x (A+T)\}$	
	C. $T_m = \{2x (G+C)\} + \{2x (A+T)\}$	D. $T_m = \{4x (G+C)\} + \{2x (A-T)\}$	
140)	New genes can be identified by		A
	A. Heterologous probing of related sequences	B. Unspecific hybridization	
	C. Homologous recombination	D. Down regulation of reported genes	
141)	Functional genomics deals with		B
	A. Genomic analysis using molecular markers	B. The characterization of gene functions of known genes/partially known gene sequences	
	C. Development of molecular markers	D. Functional analysis of proteins	
142)	The polarity in a DNA strand is indicated by referring to one end as the 3' end and the other as the 5' end. Which structure is on the 3' end?		A
	A. Hydroxyl group	B. Nitrogenous base	
	C. Phosphate group	D. Carboxyl group	
143)	The specified sequence in the DNA molecule associated with the gene which is responsible for ensuring that the gene is turned ON or Turned OFF at proper time		B
	A. Exon	B. Regulatory sequence	
	C. Intron	D. Repetitive sequence	
144)	What type of bond connects two nucleic acids in a DNA molecule?		B
	A. Hydrogen Bond	B. Phosphodiester Bond	
	C. Covalent Bond	D. Ionic Bond	
145)	The complete set of information in an organism's DNA is called		C
	A. Chromosome	B. Exons	
	C. Genome	D. Introns	
146)	Transcriptome is.....		D
	A. Total protein content of the cell	B. Total cDNA content of the cell	
	C. All of the above	D. Total mRNA content of the cell	
147)	Molecular Pharming is		C
	A. Using pharmaceuticals in molecular biology	B. The study of Pharmaceuticals at molecular level	

	C. The expression of protein of pharmaceutical importance in bacteria, yeasts or plants using transgenic technology	D. The study of Pharmaceutical in lower organisms and their fitness for human consumption	
148)	RNA interference is.....		C
	A. A traditional genetics approach	B. An endogenous cell response against foreign antigens	
	C. Used to knock down the expression of gene(s) under study at post transcriptional level	D. A reverse genetics approach	
149)	Variation captured from somatic cells during tissue culture of plant cells is called		A
	A. Soma-clonal variation	B. Environmental variation	
	C. Genetic variation	D. Tissue cultural variation	
150)	Gene therapy is.....		B
	A. Possible only in prokaryotic organisms	B. Used to cure inherited genetic disorders	
	C. All of the above	D. Over expression of genes responsible for muscular tissue development	
151)	Environmental Biotechnology deals with...		D
	A. Soil reclamation	B. Remediation of contaminated environment	
	C. Air pollution	D. All of the above	
152)	Forensic science is based on...		D
	A. DNA profiling	B. Protein profiling	
	C. RNA profiling	D. All of them	
153)	Southern hybridization is used to detect		A
	A. DNA	B. Proteins	
	C. RNA	D. Metabolites	
154)	Selectable Markers are		B
	A. Kanamycin	B. Used to select transgenic cell, tissues and plants under selection pressure	
	C. Ampicillin	D. All of the above	
155)	Flora hypothesis states that.....		A
	A. For every a virulence gene in pathogen, there is a resistance gene in host	B. Systemic acquired resistance is the result of the induction of signalling	
	C. For every pathogen of a disease, it is possible to create symptoms under controlled conditions	D. All of the above	
156)	Totipotency of cell is called.....		C
	A. Ability of a tissue to grow into full plant	B. Potential to generate proteins for independent cell survival	

	C.	The potential of a cell to turn into plantlet	D.	All of the above	
157)	Somatic hybrids are achieved...				A
	A.	By protoplast fusion of somatic cells	B.	Mixing of somatic cells with PEG	
	C.	Crossing of somatic cells	D.	Crossing of two inbred lines	
158)	Theory of natural selection was forwarded by				C
	A.	Barbra McClintock	B.	W.S. Sutton	
	C.	Charles Darwin	D.	Watson and Crick	
159)	Ploidy level of wheat is.....				B
	A.	Monoploid	B.	Hexaploid	
	C.	Triploid	D.	Octaploid	
160)	Law of Independent assortment of genes was given by				C
	A.	Watson and Crick	B.	Hardy and Weinberg	
	C.	Gregor Mendel	D.	Charles Darwin	
161)	DNA methylation generally involves the addition of methyl group at position 5 of the				A
	A.	Cytocine	B.	Thymine	
	C.	Guanine	D.	Adenine	
162)	DNA concentration is measured by.....				B
	A.	Infra-Red irradiation	B.	Ultraviolet (UV) absorbance spectrophotometry	
	C.	Ultracentrifugation	D.	None of the above	
163)	Topoisomerases are the enzymes required for the				C
	A.	Degradation of double stranded DNA	B.	Ligation of DNA fragments	
	C.	Removal of super coils from the covalently closed circular DNA	D.	De- phosphorylation of double stranded DNA fragment	
164)	5' end of DNA sequence has				B
	A.	Hydroxyl group	B.	Phosphate group	
	C.	Carboxyl group	D.	Amino group	
165)	DNA polymerases are the enzymes involved in				A
	A.	DNA synthesis	B.	DNA degradation	
	C.	RNA synthesis	D.	Protein synthesis	
166)	Start codon for replication is				B
	A.	AUA	B.	ATG	
	C.	AUG	D.	AUC	

167)	Codon is present on				B
	A.	DNA	B.	mRNA	
	C.	RNA	D.	tRNA	
168)	An <i>aminoacyl tRNA synthetase</i> (aaRS) is an enzyme that				B
	A.	Attaches the appropriate amino acid onto its <i>tRNA</i> .	B.	Both A and C	
	C.	Catalyse the esterification of a specific cognate amino acid	D.	None of above	
169)	Grey biotechnology deals with				D
	A.	Agriculture	B.	Industry	
	C.	Health	D.	Waste water and air pollution	
170)	Biosafety level one deals with				A
	A.	Well characterized organisms	B.	GMOs	
	C.	Lethal organisms	D.	None of above	
171)	<i>E. coli</i> deliver the DNA into				B
	A.	Chloroplast	B.	Nucleus	
	C.	Mitochondria	D.	Cytoplasm	
172)	Removal of electron from an atom is termed as				A
	A.	Ionization	B.	Hydration	
	C.	Polymerization	D.	Dissociation	
173)	Charge on neutron is				B
	A.	Positive	B.	No charge	
	C.	Negative	D.	Dipolar	
174)	Following polymerase possess proof reading activity.				D
	A.	Taq polymerase	B.	NTU Taq	
	C.	Dream Taq	D.	Pfu Taq	
175)	UV light can cause damage to				C
	A.	Hearing	B.	Brain	
	C.	Eyes	D.	Skin	
176)	During blue white selection the recombinant colonies are				C
	A.	Blue	B.	Both A and C	
	C.	White	D.	None of above	
177)	Transformation is a process of				A
	A.	Horizontal gene transfer	B.	Both A and C	
	C.	Vertical gene transfer	D.	None of above	
178)	Most efficient DNA for transformation is				D
	A.	ssDNA	B.	Double stranded DNA	

	C. Linear DNA	D. Supercoiled DNA	
179)	Alpha particles consist of		C
	A. 1 proton 2 neutrons	B. 2proton 0 neutron	
	C. 2 proton 2 neutrons	D. 0 proton 0 neutron	
180)	In Heterochromatin the activity of gene is		A
	A. Suppressed	B. Decreased	
	C. Increased	D. None of above	
181)	The main function of ribosomes in cell is production of		A
	A. Proteins	B. Lipids	
	C. Carbohydrates	D. DNA	
182)	Every enzyme works in a specific ----- which is maintained by its buffer.		A
	A. pH	B. Nucleus	
	C. Cell	D. Time	
183)	-----is the term used for carrier molecules used to clone the fragments of DNA.		A
	A. Vector	B. Parasite	
	C. Predators	D. Marker	
184)	In technique of plant tissue culture, the starting plant material used should be disease free which is called		D
	A. Callus	B. Root cutting	
	C. Leaf	D. Explant	
185)	For cloning of DNA, modified <i>E. coli</i> bacteria treated with various solutions at low temperature to make them		B
	A. Dead	B. Competent	
	C. Active	D. Alive	
186)	Most commonly use promotor in transgenic plants is.....		B
	A. Prn	B. CAMV 35S	
	C. Actin	D. None of these	
187)	DMSO (Dimethyl sulfoxide) is used as		D
	A. Gelling agent	B. Chelating agent	
	C. Aggregating agent	D. Cryoprotectant	
188)	<i>Agrobacterium tumefaciens</i> integrates T-DNA into.....		C
	A. Mitochondria	B. Chloroplast	
	C. Nucleus	D. All of these	
189)	In monocots, is taken as model plant for transformation studies		B
	A. Barley	B. Rice	
	C. Sugarcane	D. Wheat	
190)	Branch of biotechnology that deals with agriculture is termed as		C

	A. Red biotechnology	B. Blue biotechnology	
	C. Green biotechnology	D. White biotechnology	
191)	The term AFLP stands for		B
	A. Amplified Fragment Loss Polyploidy	B. Amplified Fragment Length Polymorphism	
	C. Amplified Fragment Length Polyploidy	D. Amplified From Length Polymorphism	
192)	Agrobacterium strains are used for transfer of genetically modified DNA in plant cells because they contain		C
	A. Ligase	B. Endonuclease	
	C. T-DNA	D. Borders	
193)	Endonucleases after restriction, either produce blunt ends orends		C
	A. Long	B. Short	
	C. Sticky	D. Small	
194)	Most of the endonucleases have been isolated from.....		A
	A. Bacteria	B. Enzymes	
	C. Viruses	D. Fungi	
195)	Enzymes are ----- in nature		B
	A. Nucleic Acid	B. Protein	
	C. Carbohydrates	D. Antibodies	
196)	Which of the following is not correct?		C
	A. There are 64 different codons	B. Some codons are used for initiation or termination of a gene	
	C. All codons specify a specific amino acid	D. There are more codons than amino acids so that the code is redundant	
197)	Heteroplasmy is a state when cell contain		C
	A. Transformed nuclear and plastid genome	B. Only transformed plastids	
	C. Both wild type and transformed plasmid	D. Only wild type plastid	
198)	What is added to the 3'-end of many eukaryotic mRNAs after transcription?		C
	A. Introns	B. A cap structure, consisting of a modified G nucleotide	
	C. A poly A tail	D. The Tri-nucleotide 5'-CCA	
199)	Which of the following is best to sterilize heat labile (heat unstable) solutions.		B
	A. Dry heat	B. Membrane filtration	
	C. Autoclave	D. Pasteurization	
200)	Bacterial Artificial Chromosomes are constructed to		A
	A. Clone large DNA fragments	B. Transform plants with	
	C. Make new species of bacteria	D. Improve the health of bacteria	
201)	Metabolic interference is a term used to describe a method to metabolize a compound and prevent the synthesis of something that is normally produced. What compound(s) have been targeted for metabolic interference in tomato?		C
	A. ACC (1-aminocyclopropane-1-carboxylic acid)	B. SAM (S-adenosylmethionine)	
	C. Both (1) and (2)	D. AOA (Aminooxyacetic acid)	

202)	Which of the following statements is true regarding genomics?		D
A	Plant genomics lags behind similar efforts in animals and microorganisms	B	Researchers can make use of genomic information even if the entire genome of an organism is not known
C	Researchers are busy in trying to determine the genome of the potato plant	D	All of the above
203)	The first transgenic plants expressing engineered foreign genes were tobacco plants produced by the use of		A
A	<i>Agrobacterium tumefaciens</i>	B	<i>Bacillus thuringiensis</i>
C	<i>Arabidopsis thaliana</i>	D	<i>Streptomyces hygroscopicus</i>
204)	Plants containing genes encoding cytokines and blood clotting factors are used in		B
A	Nutrition improvement	B	Pharmaceutical production
C	Vaccine production	D	Textile production
205)	Transplastomics		A
A	targets genes in the chloroplast	B	provides exceptionally low yields of protein products
C	produces genes that are released in pollen	D	offers little opportunity for practical use
206)	Plants derived sexually from the same plant are_____ while those derived from somatic tissue from the same plant are_____		C
A	identical, different	B	different, also different
C	different, identical	D	plants cannot be derived from somatic tissue
207)	A vector having ori from two different organisms is known as		D
A	Expression vector.	B	Selectable marker
C	Insertion vector	C	Shuttle vector
208)	During the RNA isolation procedure, phenol/chloroform is used. Why?		C
A.	To precipitate DNA	B.	To Precipitate RNA
C.	To precipitate proteins	D.	Both b and c
209)	Cell lysis to release nucleic acid is achieved by_____.		D
A.	Enzyme digestion	B.	Detergents
C.	Physical disruption	D.	All of the above
210)	During DNA isolation, detergents are employed to_____.		A
A.	dissolve the lipid membrane of cells	B.	to remove cell wall of bacteria and plant cells.
C.	homogenize to remove cell wall.	D.	to remove cell wall of animal cells
211)	Plasmid DNA and genomic DNA differ in density and can be separated by_____		B
A.	enzymatic digestion.	B.	cesium chloride gradients
C.	PEG separation methods	D.	chromatographic methods
212)	Commonly used method for quantification of nucleic acid is_____.		D
A.	Gel electrophoresis method	B.	Spectrophotometric method
C.	Chromatographic method	D.	All the above
213)	What type of covalent bond links the amino acids in a protein?		A
A.	Peptide bonds.	B.	Hydrogen bonds
C.	Ionic bonds	D.	Glycosidic bonds
214)	Kinases are employed to catalyze the _____		B
A.	inhibition ATP breakdown	B.	addition or removal of a phosphate group.
C.	addition or removal of a ketone group	D.	addition or removal of a ketone group
215)	In a double stranded DNA molecule, purines: pyrimidines ratio is_____.		D
A.	Variables	B.	Determined by the base sequence in RNA
C.	Genetically determined	D.	Always 1:1
216)	The process of translation requires the presence of_____		A
A.	mRNA, tRNA and ribosomes	B.	mRNA, ribosomes and RNA polymerase
C.	DNA, mRNA and RNA polymerase	D.	Chromatin, DNA and amino acids

217)	Genetic codon is triplet sequence of _____		A
	A. Nucleotide base in mRNA	B. Nucleotide base in DNA	
	C. Amino acids and polypeptide chain	D. Deoxyribose sugars DNA	
218)	RNAs that catalyze biological reactions, such as self-splicing introns, are known as _____		C
	A. Enzyme	B. Spliceosome	
	C. Ribozymes	D. Chloroplasts	
219)	Promoters for eukaryotic mRNA synthesis _____.		D
	A. are more complex than prokaryotic promoters	B. can require binding of multiple transcription factors to form a transcription complex	
	C. have specific DNA sequences such as the "TATA" box that are recognized by proteins	D. All of the above	
220)	In eukaryotes the regions of DNA that encode a polypeptide product are called _____		B
	A. Promoters	B. Exons	
	C. Enhancers	D. Leader sequences	
221)	An mRNA is 333 nucleotides long, including the termination codon. The number of amino acids in the protein translated from this mRNA should be _____		D
	A. 999	B. 630	
	C. 330	D. 111	
222)	Which of the following primers would allow amplification of given single-stranded DNA sequence 5' - ATGCCTAGGTC- 3'?		D
	A. 5' -ATGCC- 3'	B. 5' -TACGG- 3'	
	C. 5' -CTGGA- 3'	D. 5' -GACCT- 3'	
223)	DNA from a eukaryotic organism is digested with a restriction endonuclease and the resulting fragments cloned into a plasmid vector. Bacteria transformed by these plasmids collectively contain all of the genes of the organism. This culture of bacteria is referred to as a _____		D
	A. Restriction map	B. RFLP profile	
	C. F factor	D. Genomic library	
224)	Which of the following seals the sticky ends of restriction fragments to make recombinant DNA?		D
	A. Reverse transcriptase	B. Restriction enzymes	
	C. Gel electrophoresis	D. DNA ligase	
225)	In addition to their circular chromosome bacteria also have smaller rings of DNA called _____		C
	A. Genes	B. Plastomes	
	C. Plasmids	D. Genome	
226)	Which process is used to insert normal genes into human cells to treat disorders?		A
	A. Gene therapy	B. Live vector vaccines	
	C. Molecular cloning	D. Stem cell therapy	
227)	Southern blot is a technique for the detection of _____.		B
	A. proteins immobilized on a membrane	B. DNA immobilized on a membrane	
	C. RNA in solution	D. DNA in solution	
228)	RT-PCR means _____.		A
	A. Reverse transcriptase PCR	B. Rotating tube PCR	
	C. Rightward template PCR	D. Real time PCR	
229)	How do dideoxynucleoside triphosphates (ddNTPs) terminate a nascent DNA strand?		B
	A. They possess a bulky additional group which causes DNA polymerase to dissociate	B. They have no 3' hydroxyl group so cannot form a phosphodiester bond with the 5' phosphate group of the next nucleotide	
	C. They form abnormal hydrogen bonds causing the DNA duplex to unwind.	D. They form normal hydrogen bonds causing the DNA duplex to unwind	

230)	T-DNA is DNA _____		A
	A. of plasmid origin which is transferred to the <i>Agrobacterium</i> chromosome.	B. from the chromosome of <i>Agrobacterium</i> species which is transferred to the plant genome	
	C. of genomic origin which is transferred to the plant genome	D. None of the above	
231)	In terms of containment, which of the following is an advantage of chloroplast transformation over nuclear transformation?		B
	A. Chloroplasts are surrounded by a double membrane	B. There are no chloroplasts in pollens of most plant species.	
	C. Chloroplasts are smaller than the nucleus	D. Chloroplasts are prokaryotic in nature	
232)	RAGE is the abbreviation of?		C
	A. Rapid amplification of genomic ends	B. Rapid acrylamide gel electrophoresis	
	C. Recombinant activation of gene expression.	D. None of the above	
233)	A DNA vaccine is _____.		C
	A. A DNA molecule that is recognized by an antibody	B. A vaccine that works by stimulating the immune system to recognize pathogen DNA sequences	
	C. A vaccine that is administered as DNA; the DNA is then expressed to produce a protein, which stimulates an immune response	D. A DNA molecule that is recognized by an antigen	
234)	Which of the following human therapeutic proteins has been produced both in transgenic animals and in transgenic plants?		A
	A. Somatotropin	B. Erythropoietin	
	C. Nerve growth factor	D. FSH	
235)	DNA sequence of ATTCGATG is transcribed as _____		C
	A. AUUCGAUG	B. UAAGCUAC	
	C. CAUCGAAU	D. GUAGCUUA	
236)	Termination of polypeptide chain formation is brought about by _____.		B
	A. UUG, UAG and UCG.	B. UAA, UAG, and UGA	
	C. UUG, UGC, and UCA	D. UCG, GCG and ACC	
237)	The features of DNA-binding proteins are _____		C
	A. Usually, monomeric	B. Interact with DNA by ionic bonds	
	C. Contain DNA binding motifs	D. Can regulate gene expression	
238)	Which one is NOT true for transcription termination _____		C
	A. occurs at the ends of coding regions	B. can be induced by specific RNA stem-loops	
	C. is similar in prokaryotes and in the nucleus of eukaryotes.	D. can involve the action of several proteins	
239)	Which one is true for splicing		B
	A. It removes introns	B. It removes exons	
	C. It always requires spliceosome	D. It occurs primarily in the cytoplasm	
240)	Histone _____ is a well-known phenomenon for regulation of nuclear gene expression		B
	A. Methylation	B. Acetylation	
	C. Remodeling	D. Re-arrangement	
241)	During southern blotting DNA fragments from a gel are transferred to a membrane so that		B
	A. Only the DNA of interest may be transferred	B. The DNA fragments may be attach permanently to a substrate	
	C. RFLPs in the DNA may be analyzed.	D. To separate out the PCRs	
242)	The Southern blotting procedure enables the detection and analysis of DNA sequences. This means that _____		D

	A. number of sequences can be determined	B. DNA of individuals and species can be compared.	
	C. size of restriction fragments that contain the sequence can be determined.	D. All of the above	
243)	It is theoretically possible for a gene from any organism to function in any other organism because		A
	A. The basic chemistry of DNA is similar in all organisms.	B. All organisms are made up of cells	
	C. All organisms have similar nuclei.	D. All organisms have transfer RNA	
244)	If a bacterial cell has no restriction enzyme, which of the following is expected to happen?		D
	A. It would become an obligate parasite	B. It would be unable to replicate its DNA	
	C. It would create incomplete plasmids	D. It would be easily infected and lysed by bacteriophages.	
245)	The bacterial cells protect their DNA from restriction enzymes by		D
	A. Forming "sticky ends" of bacterial DNA to prevent the enzyme from attaching	B. Using DNA ligase to seal the bacterial DNA into a closed circle	
	C. Adding histones to protect the double-stranded DNA	D. Adding methyl groups to adenines and cytosines	
246)	Ali has cloned a gene that has a role in conferring resistance to insects. Which technique can be used to find out the physical location of that gene in the genome?		D
	A. DNA microarray assays	B. <i>In vivo</i> mutagenesis	
	C. RFLP analysis	D. <i>In situ</i> hybridization	
247)	Why is it difficult to get bacteria to express genes directly from eukaryotic DNA?		D
	A. Eukaryotic genes may contain transposons.	B. Codon preference is different in prokaryotes than eukaryotes	
	C. Eukaryotic genes contain introns.	D. Both b and c	
248)	A gene that contains introns can be made shorter (but remain functional) for genetic engineering by _____		D
	A. Using a restriction enzyme to cut the gene into shorter pieces	B. Using RNA polymerase to transcribe the gene	
	C. Using DNA ligase to put together fragments of the DNA that codes for a particular polypeptide	D. Using reverse transcriptase to reconstruct the gene from its mRNA	
249)	Plasmids have essential features of _____.		D
	A. origin of replication	B. Selectable markers	
	C. MCS	D. All of the above	
250)	Which bacteria is known as a natural genetic engineer of plants?		A
	A. <i>Agrobacterium tumefaciens</i>	B. <i>E. coli</i>	
	C. <i>Bacillus</i>	D. <i>Streptomyces</i>	
251)	Phagemid is a combination of _____		A
	A. plasmid and cosmid	B. bacteriophage and plasmid	
	C. cosmid and shuttle vector	D. Ti plasmid and SV40 vector	
252)	What is the function of the cos-site?		A
	A. Packing of nucleic acid.	B. Packing of protein coat	
	C. Cell lysis	D. Regulation of structural genes	
253)	DNA pellet is washed to remove excess salt by using _____.		A
	A. 70% Ethyl Alcohol.	B. 20% Ethyl Alcohol	
	C. 1% Ethyl Alcohol.	D. 10% Ethyl Alcohol	
254)	The purity of the DNA is checked by taking the OD ratio of _____.		A
	A. 260,280	B. 260,290	
	C. 260,270	D. 260,275	
255)	Which of the following genes detoxifies the herbicide Phosphinothricin?		B
	Nitrilase	Phosphinothricin acetyl transferase	
	Glutathione S-transferase (GST)	None of these	

256)	In a _____ protocol, bacteria with engineered abilities to detoxify pollutants are intentionally released in an area.		C
	A	Microcosm establishment	B
	C	Bioremediation	D
		Mibridization	Rhizosecretion
257)	Metabolic interference is a term used to describe a method to metabolize a compound and prevent the synthesis of something that is normally produced. What compound(s) have been targeted for metabolic interference in tomato?		C
	A	ACC (1-aminocyclopropane-1-carboxylic acid)	B
	C	Both (1) and (2)	D
		SAM (S-adenosylmethionine)	AOA (aminooxyacetic acid)
258)	Which of the following statements is true regarding genomics?		D
	A	Plant genomics lags behind similar efforts in animals and microorganisms	B
	C	Researchers are busy in trying to determine the genome of the potato plant	D
		Researchers can make use of genomic information even if the entire genome of an organism is not known	All of the above
259)	The first transgenic plants expressing engineered foreign genes were tobacco plants produced by the use of _____.		A
		<i>Agrobacterium tumefaciens</i>	<i>Bacillus thuringiensis</i>
		<i>Arabidopsis thaliana</i>	<i>Streptomyces hygroscopicus</i>
260)	Plants containing genes encoding cytokines and blood clotting factors are used in _____.		B
		Nutrition improvement	Pharmaceutical production
		Vaccine production	Textile production
261)	Transplastomics _____.		A
	A	Targets genes in the chloroplast	B
	C	Produces genes that are released in pollen	D
		Provides exceptionally low yields of protein products	Offers little opportunity for practical use
262)	Plants derived sexually from the same plant are _____ while those derived from somatic tissue from the same plant are _____.		C
	A	identical, different	B
	C	different, identical	D
		different, also different	plants cannot be derived from somatic tissue
263)	Two or more adjoining somatic protoplasts is fused with any chemical is known as _____.		B
	A.	Spontaneous fusion.	B.
	C.	Protoplast fusion.	D.
		Induced fusion.	Somatic cell fusion.
264)	The genetic variability exhibited during <i>in vitro</i> manipulations is termed as _____.		A
	A.	Soma-clonal variation.	B.
	C.	Micro propagation.	D.
		Organogenesis.	Androgenesis
265)	A cytoplasmic hybrid refers to _____.		B
	A.	Inbrid	B.
	C.	Pseudo-hybrid.	D.
		Cybrid.	None of the above.
266)	Protoplast fusion can be done using _____.		D
	A.	Glycerol.	B.
	C.	Nitrogen.	D.
		Ethylene.	Polyethylene glycol.
267)	Which one of the following is used as Cryoprotectant?		A
	A.	DMSO.	B.
	C.	Ethyl acetate.	D.
		Glycerate	Calcium ions.
268)	The ability of callus to differentiate into a plant organ is called as _____.		C
	A.	Dedifferentiation.	B.
	C.	Redifferentiation.	D.
		Differentiation.	Totipotency.
269)	The mitochondrial DNA is _____.		C
	A.	Just like the nuclear DNA.	B.
	C.	Double stranded circular DNA.	D.
		Single stranded linear DNA.	Single stranded circular DNA
270)	Which statement is true for chloroplast DNA.		B
	A.	Coded by the nucleus.	B.
		Maternally inherited.	

	C. A subset of nuclear DNA.	D. None of the above.	
271)	A characteristic feature of the chloroplast genome is the presence of two _____.		D
	A. simple tandem arrays.	B. repeat interspersions.	
	C. compound tandem arrays.	D. identical inverted repeats.	
272)	The plants with engineered abilities to detoxify pollutants are intentionally released in an area is called _____.		B
	A. Micro-ecosystem establishment.	B. Phytoremediation.	
	C. Hybridization.	D. Rhizosecretion.	
273)	Transposons are _____.		B
	A. Mobile genetic elements between homologous chromosomes.	B. Mobile genetic elements between non-homologous chromosomes.	
	C. Non mobile genetic elements	D. Recombinant genetic elements.	
274)	The enzyme that is found in retroviruses and that is required for the synthesis of DNA from RNA is		D
	A. DNA ligase	B. RNA polymerase	
	C. Restriction endonuclease	D. Reverse transcriptase	
275)	_____ are small, extra circular DNA molecules found in some bacteria		B
	A. Vector	B. Plasmid	
	C. Chromosome	D. Genetic engineered DNA	
276)	_____ protect bacteria against bacteriophages		B
	A. DNA polymerase enzyme	B. Restriction enzyme	
	C. DNA ligase enzyme	D. All of them	
277)	The only plasmid used for the production transgenic plants is _____		B
	A. Pr-plasmid	B. Ti-plasmid	
	C. Ds-plasmid	D. All of them	
278)	The rate of migration of the DNA fragments through the agarose gel is determined by		C
	A. Ratio of adenine to cytosine in the fragment	B. Presence of hydrogen bonds between base pairs	
	C. Number of nucleotides in the fragment	D. Volume of the starting sample	
279)	Which culture technique is used for the development of haploid plants?		A
	A. Anther culture	B. Organ culture	
	C. Callus culture	D. Embryo culture	
280)	The initiation of adventitious roots and shoots from cells of cultured explant is termed as _____.		A
	A. Organogenesis	B. Micro propagation	
	C. Callus culture	D. Suspension culture	
281)	2, 4-D alone can be used as growth hormones in _____ culture.		
	A. Organ	B. Anther	
	C. Callus	D. Pollen	
282)	An unorganized undifferentiated and highly proliferative mass of cells is defined as _____		A
	A. callus	B. explant	
	C. tissue	D. totipotent	
283)	Under <i>in vitro</i> conditions high cytokinin and low auxin induces _____.		B
	A. root.	B. shoot.	
	C. germination	D. organ.	
284)	The collection of experimental methods for growing large number of isolated cells under sterile condition is called as _____.		A
	A. plant tissue culture.	B. taxonomy.	
	C. anatomy.	D. physiology.	
285)	Successful insertion of a DNA fragment into BAC is initially confirmed by _____.		D
	A. growth of cells on media with Amp.	B. growth of cells on media with Tet.	
	C. blue colonies production.	D. white colonies production.	
286)	RACE-PCR stands for?		A

	A.	Random Amplification of cDNA Ends Polymerase Chain Reaction.	B.	Rapid Amplification of cDNA Ends Polymerase Chain Reaction.	
	C.	Reverse Amplification of cDNA Ends Polymerase Chain Reaction	D.	Remote Amplification of cDNA Ends Polymerase Chain Reaction.	
287)	Replication occurs in _____ direction.				B
	A.	3' → 5'.	B.	5' → 3'.	
	C.	Both (a) and (b).	D.	In any direction.	
288)	The major RNA component of the cell is _____.				C
	A.	tRNA.	B.	mRNA.	
	C.	rRNA.	D.	all are equal in amount.	
289)	The formula for calculating the melting temperature (T _m) of DNA is=.				A
	A.	2(A+T) + 4(G+C).	B.	2(G+C) + 4(A+T).	
	C.	2(A+G) + 4(C+T).	D.	2(A+C) + 4(G+T).	
290)	Why do we have to make a complementary DNA? Why not just use mRNA?				C
	A.	Because our sample is DNA.	B.	RNA is single stranded.	
	C.	DNA is much more stable than RNA.	D.	mRNA does not contain any genetic information.	
291)	Which of the following are used to stain proteins?				A
	A.	Coommassie brilliant blue.	B.	Bromo phenol blue.	
	C.	Xylene cyanol.	D.	Ethidium bromide.	
292)	Increasing the concentration of agarose gel _____.				B
	A.	increases the pore size.	B.	decreases the pore size.	
	C.	does not affect the pore size.	D.	decreases the melting point.	
293)	The solid support used in a microarray is _____.				D
	A.	silicon	B.	glass	
	C.	alumina	D.	both (a) and (b)	
294)	Which of these is not a fluorescent dye?				C
	A.	SYBER Green.	B.	Acridine orange.	
	C.	Methylene blue.	D.	Ethidium bromide.	
295)	Plants are more readily manipulated by genetic engineering than are animals because ____.				C
	A.	Plant cells have larger nuclei.	B.	More vectors are available for transferring recombinant DNA into plant cells.	
	C.	A somatic plant cell can often give rise to a complete plant.	D.	Genes can be inserted into plant cells by microinjection	
296)	The first genetically engineered organism was _____.				C
	A.	A sheep	B.	A yeast	
	C.	<i>E.coli</i> .	D.	<i>Haemophilus influenzae</i> Rd virus.	
297)	Which gene transfer technique involves the use of a fatty bubble to carry a gene into a somatic cell?				B
	A.	Electroporation.	B.	Liposome transfer	
	C.	Microinjection.	D.	Particle bombardment.	
298)	RFLPs are NOT _____.				D
	A.	used to construct linkage maps.	B.	cut by restriction endonucleases.	
	C.	polymorphic DNA sequences	D.	used in DNA sequencing.	
299)	Chromosome walking is a technique used to _____.				D
	A.	move chromosomes around the nucleus.	B.	move a fragment of chromosomal DNA from one area of a chromosome to another.	
	C.	recombination between chromosomal DNA of two different species.	D.	a method used to locate a gene using a set of clones from a DNA library.	
300)	Which of the following gene transfer technique involves the use of a fatty bubble for transformation				C
	A.	Electroporation	B.	Microinjection	

	C. Liposome transfer	D. Particle bombardment	
301)	DNA replication is an essential aspect of reproduction and inheritance that results from untwisting of double stranded DNA helical molecule into complementary strands simultaneously, it is proposed that		A
	A. The daughter DNA strand grows only in 5'—3' direction	B. The daughter DNA strand grows only in 3'—5' direction	
	C. RNA polymerase is the key enzyme involving its replication into two identical strands	D. All of above	
302)	Which of the following statements is true about plastid expression system		C
	A. All of the plastid genes are encoded by the nucleus	B. Plastid genome is paternally inherited	
	C. Plastids have their own transcriptional translational machinery	D. Foreign proteins can't be expressed in plastids	
303)	Which statement about DNA replication is not correct?		B
	A. Unwinding of the DNA molecule occurs as hydrogen bonds break	B. Replication occurs as each base is paired with another exactly like it.	
	C. The enzyme that catalyzes DNA replication is DNA polymerase.	D. Complementary base pairs are held together with hydrogen bonds	
304)	Taq DNA polymerase is the most commonly used enzyme in polymerase chain reaction because		A
	A. It is a thermostable polymerase	B. It has proof reading ability	
	C. It is isolated from algae	D. None of these	
305)	Supercoiling of closed circular DNA can be introduced or removed by		C
	A. Polymerases	B. Ligases	
	C. Topoisomerases	D. All of above	
306)	A nucleoside consist of		C
	A. Sugar and nitrogen	B. Sugar and phosphorus	
	C. A nucleotide without Phosphorus	D. A nucleotide with phosphorus	
307)	Ti plasmid is used for the transformation of		A
	A. Plant cells	B. Animal cells	
	C. Fungal cells	D. None of these	
308)	The plasmid vector having resistance to ampicillin is		D
	A. pBR327	B. pUC19	
	C. T/A cloning vector	D. All of these	
309)	The most common solidifying agent used in micro-propagation is		A
	A. Agar	B. Dextran	
	C. Mannan	D. All of above	
310)	In a protein chain, amino acids are joined by.....		C
	A. Hydrogen bond	B. Covalent bond	
	C. Peptide bond	D. All of these	
311)	The sequence of start codon is		B
	A. UGG	B. ATG	
	C. AGG	D. GCU	
312)	The agarose gel electrophoresis is used to visualize _____		D
	A. Cell membrane	B. Lipids	
	C. Plastids	D. Nucleic acid	
313)	Why is it difficult to get bacteria to express genes directly from eukaryotic DNA?		D
	A. Eukaryotic genes may contain transposons	B. Codon preference is different in prokaryotes than eukaryotes	
	C. Eukaryotic genes contain introns	D. Both B & C	
314)	9. The differentiating nitrogenous bases between RNA and DNA are		C

	A. Cytocine and Guanine	B. Adenine and thymine	
	C. Thymine and Uracil	D. Cytocine and thymine	
315)	The lysis solution is used in DNA extraction to		C
	A. Solubilize the DNA	B. Dissolve RNA	
	C. Breakdown the nuclear and cellular membrane	D. Remove lipids	
316)	Formation of peptide bond require energy in the form of		A
	A. ATP	B. ADP	
	C. GTP	D. No energy at all	
317)	Bollguard cotton is most closely associated with which of the following terms?		D
	A. Beta-carotene	B. Glyphosate	
	C. Event 176	D. Bt	
318)	Rice genome sequencing is of great importance as		C
	A. Rice genome has unique genes not found in other plants	B. Rice genome is very large compared to the genome of other grains	
	C. Rice is taken as model monocot plants and will help to understand other monocots	D. None of these	
319)	DNA can be seen in gel documentation system due to		D
	A. Crystal violet	B. Giemsa staining	
	C. Methylene blue	D. Ethidium bromide staining	
320)	The expression vectors can contain _____ along with Multiple cloning sites		C
	A. Terminator alone	B. Promoter alone	
	C. Promoter and terminator	D. None of the above	
321)	The main function of chloroplast in plants is		A
	A. Photosynthesis	B. ATP synthesis	
	C. Stress response	D. None of these	
322)	Golden rice is		C
	A. A variety of rice grown along the yellow river in China	B. Long stored rice having yellow color tint	
	C. A transgenic rice having gene for Vitamin A	D. Wild rice variety with yellow colored grains	
323)	. The term RFLP stands for		D
	A. Reduced Fragment Loss Polyploidy	B. Restriction Fragment Length Polyploidy	
	C. Random Fragment Length Polymorphism	D. Restriction Fragment Length Polymorphism	
324)	Gene therapy is done to		D
	A. Do plastic surgery	B. Clone genes	
	C. Remove tumors	D. Treat genetic diseases/disorders	
325)	The study of the management of the genomic/biological information with the help of computer programs is		A
	A. Bioinformatics	B. Biotechnology	
	C. Biostatistics	D. Bioenergetics	
326)	The entire complement of the genetic material in an organism is called		B
	A. Genetic map	B. Genome	
	C. Genetic code	D. None of the above	
327)	Undifferentiated mass of plant cells is called		B
	A. Cancerous tumor	B. Callus	
	C. Endosperm	D. Seed coat	
328)	The typical temperature for autoclave (operating at 15pounds per square inch of pressure) is		A
	A. 121°C	B. 100 °C	
	C. 63 °C	D. 200 °C	
329)	. RNA Contain		B
	A. ATGC	B. AUGC	

	C. TAGC	D. All the above	
330)	Electrophoresis is conducted to		A
	A. Separate DNA fragments	B. Clone DNA	
	C. Transform DNA	D. Isolate DNA	
331)	cDNA stands for		B
	A. Chromosomal DNA	B. Complementary DNA	
	C. Combined DNA	D. Cumulative DNA	
332)	MCS in a vector stands for		B
	A. Marker centre sequence	B. Multiple cloning site	
	C. Multiple copy sequence	D. Methylated cloning sequence	
333)	Condon is a combination of		C
	A. Three amino acids	B. Four amino acids	
	C. Three nucleotides	D. Four nucleotides	
334)	Proteins are made of amino acids linked together by specific bonds called		A
	A. Peptide bonds	B. Nitrogen bonds	
	C. Hydrogen bonds	D. Hydrogen & Nitrogen bonds	
335)	Which of the following is not a restriction endonuclease?		B
	A. Eco RI	B. DNA Ligase	
	C. Hind III	D. Bam HI	
336)	Northern hybridization is		C
	A. Used to identify specific protein	B. Used to identify a specific DNA	
	C. Used to identify a specific RNA	D. Used to identify both DNA and RNA	
337)	The enzyme that is required for the synthesis of DNA from RNA is		D
	A. DNA ligase	B. RNA polymerase	
	C. Restriction endonuclease	D. Reverse transcriptase	
338)	Reverse transcriptase PCR uses		A
	A. mRNA as a template to form cDNA	B. Protein as a template to form DNA	
	C. DNA as a template to form ssDNA	D. All of these	
339)	Southern hybridization is used to detect		D
	A. RNA	B. Proteins	
	C. Metabolites	D. DNA	
340)	DNA is a unique biomolecule because.....		D
	A. It may denature and renature	B. It may replicate itself	
	C. It may withstand high temperature	D. All of these	
341)	The World leader in biotech crop producing countries is		A
	A. USA	B. Argentine	
	C. Brazil	D. India	
342)	Which of the following is most suitable method of producing virus free plants		D
	A. Anther culture	B. Embryo culture	
	C. Ovule culture	D. Meristem culture	
343)	Which of the following enzymes is used to remove phosphate group present at 5'-end of DNA sequence?		B
	A. Restriction endonuclease	B. Alkaline phosphatase	

	C. Polynucleotide kinase	D. T4 DNA ligase	
344)	Any of the recombinant DNA molecule is developed by		D
	A. Joining two different DNA fragments	B. Joining three different DNA fragments	
	C. Joining four different DNA fragments	D. All of these	
345)	. The Cosmid vector is		B
	A. A bacterial vector	B. Combination of both bacteria and virus	
	C. Combination of both bacteria and yeast	D. None of these	
346)	The most valuable discovery in the recent Biotechnology is		A
	A. Discovery of restriction enzymes	B. Discovery of RNA isolation kit	
	C. Discovery of gold particles	D. None of these	
347)	Nanotechnology deals with the synthesis, manipulation and characterization of the materials with ----- in size		A
	A. 1-100 nanometer	B. 1-1000 nanometer	
	C. 1 to 10000 nanometer	D. All of above	
348)	The most desirable nano-fibers used for the genetic transformation are		C
	A. Boron carbide fibers	B. Carbon carbide fibers	
	C. Silicon carbide fibers	D. None of these	
349)	Taq DNA polymerase requires 5' nick to start process of amplification, which is formed by...		B
	A. Primase	B. Primer	
	C. dNTPs	D. Template	
350)	<i>E. coli</i> is normally used in gene cloning because		D
	A. It is human friendly	B. It supports the replication of recombinant DNA	
	C. It is easy to transform and handle	D. All of these	
351)	Transfer of recombinant plasmid DNA into <i>E. Coli</i> cells requires		C
	A. NaCl treatment	B. UV rays treatment	
	C. CaCl ₂ treatment	D. Cell lysing	
352)	Restriction endonucleases have ability to restrict foreign DNA molecule but don't cleave the host DNA because		C
	A. Target restriction sites are not available	B. Restriction endonucleases become inactive when they reach the host DNA	
	C. DNA molecule of target restriction sites is methylated	D. All of these	
353)	Application of molecular techniques in forensic science is called		A
	A. Genetic finger printing	B. In vitro culture	
	C. Hybridoma technology	D. Gene Therapy	
354)	A radioactive probe used in genetic analysis contains		A
	A. ³² P	B. ¹⁴ C	
	C. ¹² N	D. ³⁸ K	
355)	Dolly, the first animal developed through cloning is		D

	A. Camel	B. Rat	
	C. Cow	D. Sheep	
356)	In somatic cell gene therapy, the functional genes can be introduced into		C
	A. Sperm cells	B. Egg cells	
	C. Cardiac cells	D. Germinal cells	
357)	The term Totipotency refers to		C
	A. The ability of a plant cell to arrest the growth of a plant	B. The ability of a plant cell to develop disease in plant	
	C. The ability of a plant cell to develop into a complete plant	D. All of these	
358)	Golden rice, developed through transgenic technology contains		B
	A. Nicotinic acid	B. β - carotene	
	C. β - glucosidase	D. All of these	
359)	Okazaki segments are		C
	A. Segments of DNA capable of replication	B. Segments of DNA that undergo recombination	
	C. Segments of DNA formed during replication of DNA	D. Product of transcription	
360)	DNA can be separated from protein by using		D
	A. Liquid nitrogen	B. Ethanol	
	C. Isopropanol	D. Chloroform	
361)	A segment of DNA that reads the same from forward as well as backward is called		A
	A. Palindromic DNA	B. Complementary DNA	
	C. Plasmid DNA	D. Complementary DNA	
362)	It is theoretically possible for a gene from any organism to function in any other organism. Why is this possible?		B
	A. All organisms have ribosomes.	B. All organisms use the same genetic codes	
	C. All organisms are made up of cells	D. All organisms have similar nuclei	
363)	What two enzymes are needed to produce recombinant DNA?		C
	A. Endonuclease, Transcriptase	B. DNA polymerase, Topoisomerase	
	C. Restriction enzyme, Ligase	D. Transcriptase, Ligase	
364)	PCR is used for.....		D
	A. Disease diagnosis	B. DNA finger printing	
	C. Paternity establishment	D. All of these	
365)	Biotechnology has played important role in the improvement of.....		D
	A. Human health	B. Crop production	
	C. Energy production	D. All of these	
366)	Which of the following statements is true about molecular markers		A
	A. They speed up conventional breeding of crops	B. They slow down conventional breeding of crops	
	C. They have no application in forensic science	D. None of these	
367)	The carrier molecules of genetic material in gene gun are.....		B
	A. Iron particles	B. Gold particles	
	C. Carbon particles	D. Nickel particles	
368)	Enzymes are ----- in nature		C
	A. Nucleic acid	B. Carbohydrate	
	C. Protein	D. None of these	
369)	Endonucleases after restriction, either produce blunt ends orends		B
	A. Long	B. Sticky	
	C. Short	D. Small	
370)	Exonuclease digest the DNA from the -----.		B

	A. Middle region of DNA	B. 5' end or 3'end	
	C. Intergenic region	D. Promoter	
371)	A cloning vector must have		D
	A. UGA	B. UAA	
	C. UAG	D. All of these	
372)	The term GMOs is used for the organisms		C
	A. Which have received novel genes	B. Their own genes have been altered	
	C. Both a & b	D. None of these	
373)	Non coding sequences present within a gene are called		D
	A. Exon	B. Operon	
	C. Promoter	D. Intron	
374)	DNA can be isolated in large quantities by separated from protein by using		C
	A. Liquid nitrogen	B. Ethanol	
	C. CTAB	D. Kits	
375)	Western blotting is used for		C
	A. DNA analysis	B. RNA analysis	
	C. Protein analysis	D. All of above	
376)	Segments of DNA that results into protein is known as		A
	A. Exon	B. Intron	
	C. Null Alleles	D. None of above	
377)	Removal of the tumor causing gene from Ti plasmid is termed as		B
	A. Inactivation	B. Disarming	
	C. Replacement	D. None of these	
378)	We purify a protein		D
	A. To study its function	B. To determine its sequence	
	C. To analyze its physical properties	D. All of these	
379)	Branch of biotechnology that deals with agriculture is termed as		C
	A. Red biotechnology	B. Blue biotechnology	
	C. Green biotechnology	D. White biotechnology	
380)	The Golden Rice developed through transgenic technology is rich in.....		D
	A. Vitamin C	B. Biotin	
	C. Lysine	D. β -carotene and ferritin	
381)	Plasmids are commonly used cloning vectors for which of the following features?		C
	A. They are single stranded	B. They can be multiplied in any organism	
	C. They have ability of self-replication in bacterial cells	D. Replicate freely outside bacterial cells	
382)	Which of the followings is a genetically modified crop?		D
	A. Bt-cotton	B. Bt-brinjal	
	C. Golden rice	D. All of these	
383)	Polymerase Chain Reaction was invented by.....		A
	A. Kary Mullis	B. Boyer	
	C. Sanger	D. Cohn	
384)	DNA is soluble in		B
	A. Ethanol	B. Water	
	C. Both water and ethanol	D. Isopropanol	
385)	Ligase enzyme uses ____ to join two segments of DNA.		D
	A. ADP	B. NADH	
	C. NADP	D. ATP	

386)	Which one of them is not a plant hormone		C
	A. Auxin	B. Cytokinin	
	C. Urea	D. Ethylene	
387)	Western blot analysis relies on theto detect particular protein from thousands of protein on your membrane		D
	A. Secondary antibody	B. Primary antibody	
	C. Nylon membrane	D. Both a & b	
388)	Which of the following methods may be used to develop transgenic plants?		C
	A. Agrobacterium	B. Gene gun	
	C. Both a & b	D. None of these	
389)	Which of the following gene is used for insect resistance		C
	A. Avp1	B. EPSPS	
	C. Bt	D. All of these	
390)	The process of transcription in eukaryotes is completed in		A
	A. Nucleus	B. Cytoplasm	
	C. Nucleolus	D. Golgi bodies	
391)	Which of the following statements is true about Taq DNA polymerase?		B
	A. It is used for DNA ligation	B. It is a thermostable enzyme and remains stable at 90°C	
	C. It is a temperature sensitive enzyme which degrades at 65°C	D. All of these	
392)	Which of the following media is used for bacterial growth		B
	A. MS media	B. LB media	
	C. MMS Vitamins	D. None of these	
393)	The most authentic fingerprinting technique is based on		D
	A. Restriction analysis	B. PCR	
	C. Hybridization	D. Both b&c	
394)	RFLP stand for		C
	A. Randomly amplified fragment length polymorphism	B. Randomly restricted fragment length polymorphism	
	C. Restriction fragment length polymorphism	D. None of these	
395)	Use of biotechnological techniques in breeding is called		C
	A. Conventional Breeding	B. Mendel's Breeding	
	C. Molecular Breeding	D. Both a & b	
396)	Undifferentiated mass of cells is called		A
	A. Callus	B. Explant	
	C. Regeneration	D. All of these	
397)	Optimum temperature for bacterial growth is		B
	A. 30°C	B. 37°C	
	C. 65°C	D. None of these	
398)	The codon is present in		D
	A. DNA	B. RNA	
	C. rRNA	D. mRNA	
399)	A technique of using very small metal particles coated with desired gene in the gene transfer is called		D
	A. Electroporation	B. Microinjection	
	C. Liposome	D. Biolistic	
400)	A vector having ori from two different organisms is known as		D
	A. Expression vector	B. Selectable marker	
	C. Insertion vector	D. Shuttle vector	
401)	Computational methodology used to find best matching between receptor and ligand is?		C
	A. Molecular affinity checking	B. Molecular docking	

	C. Protein-protein hybridization	D. Molecular matching	
402)	The process of finding relative location of any gene on chromosome is called		B
	A. Genome editing	B. Genome mapping	
	C. Genome tracing	D. Chromosomal walking	
403)	Cell lysis to release nucleic acid is achieved by_____.		D
	A. Enzymatic digestion	B. Detergents	
	C. Physical disruption	D. All of these	
404)	During DNA isolation, detergents are employed to_____		A
	A. Dissolve the lipid membrane of cells	B. To remove cell wall of bacteria and plant cells	
	C. Homogenize to remove cell wall	D. To remove cell wall of animal cells	
405)	If any of the two genes show 50% recombination. Which of the following statement is true?		C
	A. They are on different chromosomes	B. They are on same chromosome but far apart	
	C. Both a & b	D. None of these	
406)	Plasmid DNA and genomic DNA differ in density and can be separated by_____		B
	A. Enzymatic digestion	B. Cesium chloride gradients	
	C. PEG separation methods	D. Chromatographic methods	
407)	Commonly used method for quantification of nucleic acid is_____.		D
	A. Gel electrophoresis method	B. Spectrophotometric method	
	C. Chromatographic method	D. All of these	
408)	The first published complete gene sequence was of		C
	A. M13 phage	B. T4 Phage	
	C. Fx174	D. Lambda phage	
409)	Replication proceeds faster in eukaryotic chromosomes because.....		C
	A. eukaryotes have more amount of DNA for replication	B. eukaryotic replication machinery is more efficient than prokaryotic	
	C. eukaryotic chromosomes have multiple origins of replication	D. eukaryotic chromosomal DNA is a linear	
410)	In a double stranded DNA molecule, purines:pyrimidines ratio is_____		D
	A. Variable	B. determined by the base sequence in RNA	
	C. genetically determined	D. always 1:1	
411)	The process of translation requires the presence of_____		A
	A. mRNA, tRNA and ribosomes	B. mRNA, ribosomes and RNA polymerase	
	C. DNA, mRNA and RNA polymerase	D. chromatin, DNA and amino acids	
412)	Which of the following is NOT a characteristic of eukaryotic gene expression system		C
	A. Polycistronic mRNAs are very rare	B. Many genes are interrupted by noncoding DNA sequences	
	C. Transcription and translation are coupled	D. mRNA is often extensively modified before translation	
413)	RNAs that catalyze biological reactions, such as self-splicing introns, are known as_____		C
	A. Enzymes	B. spliceosome	
	C. ribozymes	D. chloroplast	
414)	Promoters for eukaryotic mRNA synthesis_____.		D
	A. are more complex than prokaryotic promoters	B. can require binding of multiple transcription factors to form a transcription complex	
	C. have specific DNA sequences such as the "TATA" box that are recognized by proteins	D. all the above	
415)	In eukaryotes the regions of DNA that encode a polypeptide product are called_____.		
	A. promoters	B. exons	
	C. enhancers	D. leader sequences	

416)	An mRNA is 333 nucleotides long, including the termination codon. The number of amino acids in the protein translated from this mRNA should be _____		D
	A. 999	B. 630	
	C. 110	D. 111	
417)	Which of the following primers would allow amplification of given single-stranded DNA sequence 5' - ATGCCTAGGTC- 3'?		D
	A. 5' -ATGCC- 3'	B. 5' -TACGG- 3'	
	C. 5' -CTGGA- 3'	D. 5' -GACCT- 3'	
418)	DNA from a eukaryotic organism is digested with a restriction endonuclease and the resulting fragments cloned into a plasmid vector. Bacteria transformed by these plasmids collectively contain all of the genes of the organism. This culture of bacteria is referred to as a _____		A
	A. Genomic Library	B. Restriction map	
	C. RFLP profile	D. F' factor	
419)	Which of the following seals the sticky ends of restriction fragments to make recombinant DNA?		D
	A. Reverse transcriptase	B. Restriction enzymes	
	C. Gel electrophoresis	D. DNA ligase	
420)	In addition to their circular chromosome bacteria also have smaller rings of DNA called _____.		C
	A. Genes	B. Plastome	
	C. Plasmids	D. Genome	
421)	Which process is used to insert normal genes into human cells to treat disorders?		A
	A. Gene therapy	B. Live vector vaccines	
	C. Molecular cloning	D. Stem cell therapy	
422)	Southern blot is a technique for the detection of _____.		B
	A. Proteins immobilized on a membrane	B. DNA immobilized on a membrane	
	C. RNA in solution	D. DNA in solution	
423)	How do dideoxynucleoside triphosphates (ddNTPs) terminate a nascent DNA strand?		B
	A. They possess a bulky additional group which causes DNA polymerase to dissociate	B. They have no 3' hydroxyl group so cannot form a phosphodiester bond with the 5'phosphate group of the next nucleotide	
	C. They form abnormal hydrogen bonds causing the DNA duplex to unwind	D. They form normal hydrogen bonds causing the DNA duplex to unwind	
424)	The principle behind the <i>Yeast</i> two-hybrid system is the detection of protein-protein interactions by ____.		A
	A. assembling a functional transcription factor from two fusion proteins	B. in a pair of hybrid <i>Yeast</i> strains	
	C. studying the hybridization of two cDNA sequences	D. in a pair of hybrid <i>Yeast</i> strains	
425)	T-DNA is DNA _____		A
	A. of plasmid origin which is transferred to the <i>Agrobacterium</i> chromosome	B. from the chromosome of <i>Agrobacterium</i> species which is transferred to the plant genome	
	C. of genomic origin which is transferred to the plant genome	D. none of the above	
426)	In terms of containment, which of the following is an advantage of chloroplast transformation over nuclear transformation?		B
	A. Chloroplasts are surrounded by a double membrane	B. There are no chloroplasts in pollens of most plant species	
	C. Chloroplasts are smaller than the nucleus	D. Chloroplasts are prokaryotic in nature	
427)	RAGE is the abbreviation of?		C
	A. Rapid amplification of genomic ends	B. Rapid acrylamide gel electrophoresis	
	C. Recombinant activation of gene expression	D. None of the above	
428)	A DNA vaccine is _____.		C

	A. A DNA molecule that is recognized by an antibody	B. a vaccine that works by stimulating the immune system to recognize pathogen DNA sequences	
	C. a vaccine that is administered as DNA; the DNA is then expressed to produce a protein, which stimulates an immune response	D. a DNA molecule that is recognized by an antigen	
429)	Which of the following human therapeutic proteins has been produced both in transgenic animals and in transgenic plants?		A
	A. Somatotropin	B. Erythropoietin	
	C. Nerve growth factor	D. FSH	
430)	DNA sequence of ATTCGATG is transcribed as _____.		C
	A. AUUCGAUG	B. UAAGCUAC	
	C. CAUCGAAU	D. GUAGCUUA	
431)	Termination of polypeptide chain formation is brought about by _____.		B
	A. UUG, UAG and UCG	B. UAA, UAG, and UGA	
	C. UUG, UGC, and UCA	D. UCG, GCG and ACC	
432)	which one is NOT true for transcription termination _____.		C
	A. occurs at the ends of coding regions	B. can be induced by specific RNA stem-loops	
	C. is similar in prokaryotes and in the nucleus of eukaryotes	D. can involve the action of several proteins	
433)	Which one is true for splicing		B
	A. It removes introns	B. It removes exons	
	C. It always requires spliceosome	D. It occurs primarily in the cytoplasm	
434)	Histone _____ is a well-known phenomenon for regulation of nuclear gene expression.		B
	A. Methylation	B. Acetylation	
	C. Remodeling	D. Re-arrangement	
435)	During southern blotting DNA fragments from a gel are transferred to a membrane so that		B
	A. Only the DNA of interest may be transferred	B. The DNA fragments may be attach permanently to a substrate	
	C. RFLPs in the DNA may be analyzed	D. To separate out the PCRs	
436)	The Southern blotting procedure enables the detection and analysis of DNA sequences. This means that _____.		D
	A. number of sequences can be determined	B. DNA of individuals and species can be compared	
	C. size of restriction fragments that contain the sequence can be determined	D. all of the above	
437)	It is theoretically possible for a gene from any organism to function in any other organism because		A
	A. The basic chemistry of DNA is similar is all organisms	B. All organisms are made up of cells	
	C. All organisms have similar nuclei	D. All organisms have transfer RNA	
438)	If a bacterial cell have no restriction enzyme, which of the following is expected to happen?		D
	A. It would become an obligate parasite	B. It would be unable to replicate its DNA	
	C. It would create incomplete plasmids	D. It would be easily infected and lysed by bacteriophages	
439)	The features of DNA-binding proteins are _____.		C
	A. Usually monomeric	B. Interact with DNA by ionic bonds	
	C. Contain DNA-binding motifs	D. Can regulate gene expression	
440)	The bacterial cells protect their DNA from restriction enzymes by		B
	A. Forming "sticky ends" of bacterial DNA to prevent the enzyme from attaching	B. Adding methyl groups to adenines and cytosines	
	C. Using DNA ligase to seal the bacterial DNA into a closed circle	D. Adding histones to protect the double-stranded DNA	
441)	Why is it difficult to get bacteria to express genes directly from eukaryotic DNA?		D

	A. Eukaryotic genes may contain transposons	B. Codon preference is different in prokaryotes than eukaryotes	
	C. Eukaryotic genes contain introns	D. Both b and c	
442)	A gene that contains introns can be made shorter (but remain functional) for genetic engineering by _____.		D
	A. using a restriction enzyme to cut the gene into shorter pieces	B. using RNA polymerase to transcribe the gene	
	C. using DNA ligase to put together fragments of the DNA that codes for a particular polypeptide	D. using reverse transcriptase to reconstruct the gene from its mRNA	
443)	Phagemid is a combination of _____.		A
	A. Plasmid and cosmid	B. Bacteriophage and plasmid	
	C. Cosmid and shuttle vector	D. Ti plasmid and SV40 vector	
444)	Plasmids have essential features of _____.		D
	A. Origin of replication.	B. Selectable markers	
	C. MCS	D. All the above	
445)	What is the function of cos-site?		A
	A. Packing of nucleic acid	B. Packing of protein coat	
	C. Cell lysis	D. Regulation of structural genes	
446)	Which technique is used to find out the physical location of transgene in the host genome?		D
	A. DNA microarray assays	B. <i>in vivo</i> mutagenesis.	
	C. RFLP analysis	D. <i>in situ</i> hybridization	
447)	DNA pellet is washed to remove excess salt by using _____.		A
	A. 70% Ethyl Alcohol	B. 20% Ethyl Alcohol	
	C. 1% Ethyl Alcohol	D. 10% Ethyl Alcohol	
448)	Which compounds is used as cryo-protectants		D
	A. Dimethyl sulfoxide (DMSO).	B. Glycerol	
	C. Proline	D. All the above	
449)	_____ digests the terminal phosphate ends		C
	A. DNA polymerase	B. Taq polymerase	
	C. Alkaline phosphatase	D. DNA ligase	
450)	What is the full form of RAPD		C
	A. Rapidly Amplified Polymorphic DNA	B. Rapid Amplification of Polymorphic DNA	
	C. Randomly Amplified Polymorphic DNA	D. Random Amplification of Polymorphic DNA	
451)	The purity of the DNA is checked by taking OD ratio of _____		A
	A. 260,280	B. 260,290	
	C. 260,270	D. 260,275	
452)	Clones can be identified by hybridizing them with a/an _____		B
	A. Vector	B. Probe	
	C. Antibody	D. Virus	
453)	Eukaryotic proteins cloned into overexpression vectors and expressed in prokaryotes are NOT always functional. Why might this be		A
	A. Prokaryotes cannot glycosylate proteins the same way as eukaryotes	B. Prokaryotes have proteases specific for eukaryotic proteins.	
	C. Prokaryotes do not use the same genetic code as eukaryotes	D. Prokaryotes have different promoters than eukaryotes, and hence the eukaryotic proteins cannot initiate mRNA synthesis	
454)	What key feature of Taq polymerase allows PCR to be conveniently performed		C
	A. Taq polymerase does not require primers	B. Taq polymerase does not require a template	
	C. Taq polymerase is not damaged by heating	D. Taq polymerase can work at very low temperatures	
455)	In order to clone eukaryotic DNA into prokaryotic cells _____.		B

	A. DNA with both exons and introns must be used	B. DNA without introns must be added	
	C. RNA with both exons and introns must be used	D. introns must be added back to eukaryotic DNA	
456)	cDNA is _____.		
	A. DNA with both introns and exons	B. DNA with only introns	
	C. eukaryotic DNA with only exons	D. used to make precursor mRNA	
457)	Chromosome walking is a technique used to _____.		D
	A. move chromosomes around the nucleus	B. move a fragment of chromosomal DNA from one area of a chromosome to another	
	C. recombination between chromosomal DNA of two different species.	D. to locate a gene using a set of clones from a DNA library	
458)	Which of the following vectors can carry the largest insert		C
	A. Plasmids	B. Macro-plasmids	
	C. YACs and BACs	D. Cosmid	
459)	RFLPs are NOT _____.		D
	A. used to construct linkage maps	B. cut by restriction endonucleases	
	C. polymorphic DNA sequences	D. used in DNA sequencing	
460)	Approximately 20-30% human protein is		B
	A. Similar	B. Polymorphic	
	C. Irregular	D. Variable	
461)	The most common enzymes used for protein digestion include		C
	A. Ligase	B. Taq Polymerase	
	C. Pepsin	D. None of them	
462)	The protein folding can be reversed by use of		A
	A. Detergents	B. Water	
	C. Ethanol	D. Butanol	
463)	For short term storage [up to 24 h], most proteins can be kept at		A
	A. 4°C	B. -4°C	
	C. -20°C	D. -80°C	
464)	Which is the best expression system for recombinant proteins with respect to cost and yield		A
	A. Bacterial	B. Yeast	
	C. Insect	D. Mammalian	
465)	The ideal size of template plasmid in Site Directed Mutagenesis is		B
	A. 1 kb	B. 3 kb	
	C. 6 kb	D. 10 kb	
466)	The best way to isolate plant mitochondria is		A
	A. Zonal centrifugation	B. Column chromatography	
	C. Differential Centrifugation	D.	
467)	Which of the following fusion tag has highest size		B
	A. Maltose binding protein (MBP)	B. Glutathione-S-transferase (GST)	
	C. Poly Histidine	D. None of above	
468)	In Column Chromatography, molecules can be separated on the basis of		D
	A. Size	B. Charge	
	C. Specific binding	D. All of these	
469)	Which of the following codons represents start codon?		C
	A. AGG	B. UAG	
	C. AUG	D. None of these	
470)	Bacterial strain used for Protein expression		B
	A. LBA-4404	B. BL-21	
	C. Both of these	D. None of these	

471)	DpnI cleaves only DNA that is methylated at the adenosine of following recognition site				D
	A.	CATG	B.	ATGC	
	C.	GCTA	D.	GATC	
472)	Glutathione S-transferase is used as				C
	A.	Affinity tag	B.	Solubility tag	
	C.	Both of these	D.	None of these	
473)	Cell lysis can be done by				C
	A.	Sonication	B.	Osmotic shock	
	C.	Both of these	D.	None of these	
474)	Which one doesn't work as restriction enzyme				D
	A.	Sall	B.	XhoI	
	C.	PstI	D.	DNase	
475)	DNA polymerase makes DNA copy from				A
	A.	DNA	B.	RNA	
	C.	Both DNA and RNA	D.	None of these	
476)	Which enzyme is required to join compatible ends of DNA				D
	A.	DNA polymerase	B.	Restriction endonuclease	
	C.	RNase	D.	None of these	
477)	DNA is soluble in				B
	A.	Ethanol	B.	Water	
	C.	Both water and Ethanol	D.	Isopropanol	
478)	If all the nucleotides are present with equal frequencies and at random, what are the chances of having a particular four nucleotide long motif?				A
	A.	1/256	B.	1/64	
	C.	1/16	D.	1/8	
479)	For PCR we use				B
	A.	RNA primers	B.	DNA primers	
	C.	Both DNA and RNA primers	D.	None of these	
480)	Which of the following statement is true				C
	A.	Different restriction enzymes can never produce compatible ends	B.	Different restriction enzymes always produce compatible ends	
	C.	Different restriction enzymes can produce compatible ends	D.	None of these statements is true	
481)	Which statement is NOT true about non-invasive molecular imaging technique?				D
	A.	It is free from risk of contamination	B.	It provides data not limited to one time point	
	C.	It is free from processing artifacts	D.	It is cheaper than conventional techniques	
482)	Assume that you are trying to insert a gene into a plasmid and someone gives you a preparation of DNA cut with restriction enzyme X. The gene you wish to insert has sites on both ends for cutting by restriction enzyme Y. You have a plasmid with a single site for Y, but not for X. Your strategy should be to				C
	A.	Cut the plasmid with restriction enzyme X and insert the fragments cut with Y into the plasmid	B.	Cut the plasmid with enzyme X and then insert the gene into the plasmid	
	C.	Cut the DNA again with restriction enzyme Y and insert these fragments into the plasmid cut with the same enzyme	D.	Insert the fragments cut with X directly into the plasmid without cutting the plasmid	
483)	A plasmid naturally encodes genes responsible for				D
	A.	Toxin production	B.	Antibiotic resistance	

	C. Metal Resistance	D. All of these	
484)	EcoRI is a restriction enzyme that produces		A
	A. Sticky ends	B. Blunt ends	
	C. Sticky end on 5' side and blunt end on 3' side	D. Sticky end on 3' side and blunt end on 5' side	
485)	What is the role of SDS in SDS-PAGE?		A
	A. protein denaturing and imparting net negative charge	B. imparting overall negative charge to the protein	
	C. imparting equal mass to all proteins	D. protein unfolding and imparting net positive charge	
486)	Which one doesn't work as restriction enzyme		D
	A. Sall	B. XhoI	
	C. PstI	D. DNase	
487)	Which enzyme is required to join compatible ends of DNA		D
	A. DNA polymerase	B. Restriction endonuclease	
	C. RNase	D. None of these	
488)	Which one is double strand, circular self-replicating and extra chromosomal DNA		C
	A. Short RNA	B. Phi29	
	C. Plasmid	D. Bacteriophage	
489)	Bacteria defend themselves from bacteriophages with		C
	A. Endonucleases	B. Short RNA	
	C. Exonucleases	D. DNA Pol-I	
490)	Vectors should have		D
	A. MCS	B. Selectable markers	
	C. Origin of replication	D. All of these	
491)	The size of processor chips produced by Intel with the help of nanotechnology is		B
	A. 45nm -65nm.	B. 22 nm	
	C. 1-100 nanometer	D. All of above	
492)	Magnetic nanowires used to create dense memory devices are made up of an alloy of		C
	A. Silver and Gold	B. Iron and Zinc	
	C. Iron and Nickel	D. Silver and Titanium	
493)	Which of the following is favored for primer design?		C
	A. The melting temperature should be different for both the primers	B. Primers should be long in length	
	C. Primers should not be complementary to each other	D. Matching should be of whole primer to the template	
494)	Cell culture media is complex and can be stored under which of the following conditions?		D
	A. On the bench top and out of direct sun light	B. Always store media in the biological safety cabinet	
	C. At 37°C in the dark	D. At 37°C in the dark	
495)	During the growth of animal cells it is important to keep cells in which phase of the growth curve?		C
	A. Stationary phase	B. Lag phase	
	C. Log phase	D. Decline phase	
496)	Cold loving bacteria are called Cold loving bacteria are called		D
	A. Mesophiles	B. Thermophiles	

	C. Both of these	D. None of these	
497)	Which of the following components bind to the solid column made of silica, under high salt concentration?		D
	A. Proteins	B. Polysaccharides	
	C. Both proteins and polysaccharides	D. Plasmid DNA	
498)	The location of plasmid DNA can be visualized by addition of:		B
	A. Bromophenol blue	B. Ethidium bromide	
	C. Ortho xylene	D. Texas red	
499)	Among five types of histones, how many are similar in all eukaryotes.		D
	A. One	B. Two	
	C. Three	D. Four	
500)	The eukaryotic chromosomal proteins positively charged at neutral pH are called		A
	A. Non-histone chromosomal proteins	B. Histone	
	C. Both of these	D. None of these	
501)	DNA-dependent RNA polymerase synthesizes		A
	A. Various types of RNA	B. Only mRNA	
	C. Only rRNA	D. None of above	
502)	The function of core promotor is		A
	A. It position the DNA-dependent RNA polymerase	B. It starts the transcription	
	C. It helps transcriptional machinery to assemble together	D. All of these	
503)	Basic Leucine zipper is an example of		A
	A. Activator	B. Suppressor	
	C. Terminator	D. Promotor	
504)	To start, transcription of a gene, enhancers interact with		A
	A. Activators	B. Co-activators	
	C. Both of these	D. None of above	
505)	Type of molecular database in which content are controlled by the submitter is called		C
	A. Derivative Databases	B. Secondary Databases	
	C. Primary Databases	D. None of these	
506)	TrEMBL belongs to following database		B
	A. Nucleotide Sequence Database	B. Protein Sequence Database	
	C. None of these	D. Both	

507)	To validate the results obtained from 4 biological replicates of microarrays analysis, we use		B
	A. PCR	B. RT-qPCR	
	C. RNA-Seq	D. One more biological replicate of microarrays	
508)	cDNA is a DNA copy synthesized from mRNA. This cDNA is		A
	A. Single stranded DNA	B. Single stranded RNA	
	C. Double stranded DNA	D. Double stranded RNA	
509)	Universal Probe Library is an online tool to design primers for		B
	A. PCR	B. RT-qPCR	
	C. RNA-Seq	D. Microarrays	
510)	NCBI is perfect example of		A
	A. Secondary Databases	B. Primary Databases	
	C. None of these	D. Both of these	
511)	Each record in a database is called an		A
	A. Entry	B. File	
	C. Record	D. Ticket	
512)	Which of the following is a protein sequence database		D
	A. DDBJ	B. EMBL	
	C. GenBank	D. None of these	
513)	Which of the following nanoparticle has healing property		D
	A. Zinc oxide	B. Gold ion	
	C. Aluminum Silicate	D. Silver ion	
514)	Size of nano material could be		D
	A. 0.01-0.100 micron	B. 1000-10000 Pico meter	
	C. 1-100 nanometer	D. All of these	
515)	Three commonly used nanomaterial among these are		C
	A. Silver, Carbon, Silica	B. Silver, Carbon, Cadmium	
	C. Silver, Carbon, Zinc	D. Silver, Carbon, Titanium	
516)	Which of the following nanoparticle is hydrophobic in nature		A
	A. Zinc oxide	B. Gold ion	
	C. Aluminum Silicate	D. Silver ion	
517)	Size and shape of nanoparticle can be estimated by		C
	A. Eye observation of nano particle size	B. Through instruments	
	C. Color of the solution	D. None of these	
518)	Size of nano particle depends on		D
	A. Chemical Reactivity	B. Melting point	
	C. Mechanical Strength	D. All of these	
519)	If you were to shrink yourself down until you were only a nanometer tall, how thick would a sheet of paper appear to you? (An average sheet of paper is approx. 0.1 mm thick)		C
	A. About 100 meters	B. About 1 kilometers	
	C. About 100 kilometers	D. About 10000 kilometers	
520)	What is grey goo?		A
	A. A hypothetical substance composed of out-of-control self-replicating nanobots that consumes all living matter on Earth	B. The feeder material used to grow grey nanoparticles in the laboratory	
	C. Toxic byproduct resulting from the synthesis of carbon nanotubes	D. Waste product from the production of nanoglue made from the membranes on the feet of the Madagascan Grey Gecko	

521)	Nanorobots (nanobots)...		A
	A. Do not exist yet	B. Exist in experimental form in laboratories	
	C. Are already used in nanomedicine to remove plaque from the walls of arteries	D. Waste product from the production of nanoglue made from the membranes on the feet of the Madagascan Grey Gecko	
522)	Choose the correct statement		C
	A. If we properly arrange carbon atoms in coal then it may become diamond	B. By rearranging atoms in sand, silicon chip can be made	
	C. Both are correct	D. None of the above	
523)	Use of nanotechnology for various biological applications is called		B
	A. Bio-nanotechnology	B. Nano-biotechnology	
	C. Both of these	D. None of these	
524)	Which statement is true about nanostructures?		C
	A. Their one dimension must be in the nanometer scale range	B. Their more than one dimensions can be in the nanometer scale range	
	C. Both statements are true	D. Both statements are false	
525)	Matrix type structure in which drug is dispersed is called		C
	A. Nano Tablet	B. Nano Capsule	
	C. Nano Sphere	D. All of these	
526)	Which of the following are used in sun screen lotions?		D
	A. Gold nanoparticles	B. Silver nanoparticles	
	C. Quantum dot nanoparticles	D. Titanium dioxide nanoparticles	
527)	Sol gel processing belongs to which type of nano synthesis method		A
	A. Chemical	B. Physical	
	C. Biological	D. None of these	
528)	Which nanoparticle is scratch resistant?		C
	A. Zinc oxide	B. Silver ion	
	C. Aluminum silicate	D. Gold ion	
529)	Non-coding DNA sequences are called		A
	A. Introns	B. Exons	
	C. Genes	D. None of these	
530)	DNA polymerase makes DNA copy from		A
	A. DNA	B. RNA	
	C. Both DNA and RNA	D. None of these	
531)	Which enzyme is required to join compatible ends of DNA?		D
	A. DNA polymerase	B. Restriction endonuclease	
	C. RNase	D. None of these	
532)	DNA is soluble in		B
	A. Ethanol	B. Water	
	C. Both water and ethanol	D. Isopropanol	
533)	For PCR we use		B
	A. RNA primers	B. DNA primers	
	C. Both DNA and RNA primers	D. None of these	
534)	Which of the following statement is true		C
	A. Different restriction enzymes can never produce compatible ends	B. Different restriction enzymes always produce compatible ends	

	C. Different restriction enzymes can produce compatible ends	D. None of these statements is true	
535)	If the primers used were slightly shorter and more variable than the intended oligonucleotide sequences then		D
	A. The PCR reaction would not commence	B. The PCR reaction would end after one cycle	
	C. The reaction would generate a single short PCR product	D. The reaction would yield a mixture of non-specific PCR products	
536)	What would happen if there are no dNTPs in the reaction		D
	A. PCR would proceed normally	B. Non-specific PCR of random templates will occur	
	C. The reaction will cease after a few cycles	D. The PCR reaction will not commence	
537)	Which statement is true about PCR		B
	A. It is used to transcribe specific genes	B. It amplifies specific DNA sequences	
	C. It uses a DNA polymerase that denatures at 55 Centigrade	D. It is a method for sequencing DNA	
538)	Which of the following steps are catalyzed by Taq polymerase in a PCR reaction?		C
	A. Denaturation of template DNA	B. Annealing of primers to template DNA	
	C. Extension of primer end on the template DNA	D. All of the above	
539)	In sequential order, what are the three steps of PCR?		C
	A. Anneal Primers, Extend DNA, Denature DNA	B. Denature DNA, Extend DNA, Anneal Primers	
	C. Denature DNA, Anneal Primers, Extend DNA	D. Extend DNA, Anneal Primers, Denature DNA	
540)	Which of the following is favored for primer design?		
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	C.	RNA-Seq	D.	Microarrays	

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	A. Secondary Databases	B. Primary Databases	
	C. None of these	D. Both of these	
558)	Each record in a database is called an		A
	A. Entry	B. File	
	C. Record	D. Ticket	
559)	Which of the following is a protein sequence database		D
	A. DDBJ	B. EMBL	
	C. GenBank	D. None of these	
560)	The gene formed by the joining of DNA segments from two different sources is called		C
	A. Adjunct gene	B. Joined gene	
	C. Chimeric gene	D. a) Both a and b	
561)	Most commonly use promotor in transgenic plants is.....		C
	A. Prn	B. Actin	
	C. CAMV 35S	D. None of these	
562)	Agrobacterium integrates T-DNA into		B
	A. Mitochondria	B. Nucleus	
	C. Chloroplast	D. All of these	
563)	In monocots, is taken as model plant for transformation studies		C
	A. Barley	B. Sugarcane	
	C. Rice	D. Wheat	
564)	Branch of biotechnology that deals with agriculture is termed as		C
	A. Red biotechnology	B. Blue biotechnology	
	C. Green biotechnology	D. White biotechnology	
565)	DMSO (Dimethyl sulfoxide) is used as		D
	A. Gelling agent	B. Aggregating agent	
	C. Chelating agent	D. Cryoprotectant	
566)	The term AFLP stands for		C
	A. Amplified Fragment Loss Polyploidy	B. Amplified Fragment Length Polyploidy	
	C. Amplified Fragment Length Polymorphism	D. Amplified From Length Polymorphism	
567)	In phytoremediation, are involved in remediation		A
	A. Plants	B. Animals	
	C. Yeast	D. Bacteria	
568)	<i>Thermus aquaticus</i> is the source of		B
	A. Vent polymerase	B. Taq polymerase	
	C. Primase enzyme	D. Both a and b	
569)	Restriction Enzymes are also termed as		A
	A. Biological scissors	B. Molecular scalpels	
	C. Molecular knives	D. All of these	
570)	Which set of three amino acid from the following amino acids are all polar		C
	A. W K Q	B. H M N	

	C. T N Y	D. M T C	
571)	Which One of following component is not a part of mass spectrometric technique, guess which one		D
	A. Ion source	B. Analyzer	
	C. Detector	D. X – ray source	
572)	A protein structure having the hydrogen bonds arranged side by side in a polypeptide chains is ...		B
	A. Primary structure	B. α -helix	
	C. β -pleated sheets	D. Tertiary structure	
573)	Which of the following is a false statement about following protein structure		
	A. α -Keratin is α helical	B. Collagen is α helical	
	C. Hemoglobin has a quaternary structure	D. α -Keratin is β pleated structure	
574)	Molecules that are found only in certain cells and in certain plants are known as....		C
	A. Primary Metabolite	B. Bioactive compound	
	C. Secondary Metabolite	D. Peptides	
575)	Every enzyme works in a specific ----- which is maintained by its buffer.		C
	A. Nucleus	B. cellular structure	
	C. pH	D. cell	
576)	2. ----- is the term used for carrier molecules used to clone the fragments of DNA.		A
	A. Vector	B. Predators	
	C. Parasite	D. Virus	
577)	Agrobacterium strains are used for transfer of genetically modified DNA in plant cells because they contain		B
	A. Ligase	B. T-DNA	
	C. Endonuclease	D. Borders	
578)	Enzymes are ----- in nature		C
	A. Nucleic Acid	B. Carbohydrates	
	C. Protein	D. Antibodies	
579)	Most of the endonucleases have been isolated from.....		A
	A. Bacteria	B. Viruses	
	C. Enzymes	D. Fungi	
580)	A cloning vector must have		D
	A. Multiple cloning sites	B. An origin of replication	
	C. Selectable marker gene	D. All of these	
581)	Which of the following is stop codon		D
	A. UGA	B. UAA	
	C. UAG	D. All of these	
582)	The term GMOs is used for the organisms		C
	A. Which have received novel genes	B. Their own genes have been altered	
	C. Both a & b	D. None of these	
583)	SNP is the abbreviation of		B
	A. Small Nucleotide polymorphism	B. Single Nucleotide polymorphism	
	C. Synthetic Nucleotides polymorphism	D. None of these	
584)	Which of the following cellular organelles have genetic material		D
	A. Nucleus	B. Chloroplast	
	C. Mitochondria	D. All of these	
585)	The process of translation is completed in		B
	A. Nucleus	B. Cytoplasm	
	C. Nucleolus	D. Lysosome	
586)	27. Which reagent is not part of PCR reaction?		C
	A. Buffer	B. Nucleotide triphosphates	

	C. SYBR Green	D. Heat stable DNA polymerase	
587)	The fusion temperatures T_m ($^{\circ}\text{C}$) of primers is estimated by the following formula:		B
	A. $4 \times (\text{A}+\text{T}) + 2 \times (\text{C}+\text{G})$	B. $2 \times (\text{A}+\text{T}) + 4 \times (\text{C}+\text{G})$	
	C. $2 \times (\text{C}+\text{T}) + 4 \times (\text{A}+\text{G})$	D. $2 \times (\text{A}+\text{T}) + 2 \times (\text{C}+\text{G})$	
588)	_____ are small, extra circular DNA molecules found in some bacteria.		A
	A. Plasmid	B. Chromosome	
	C. Genetic engineered DNA	D. All of these	
589)	Non coding sequences present within a gene are called		D
	A. Exon	B. Operon	
	C. Promoter	D. Intron	
590)	Which one of the following is not a PCR reagent		B
	A. Taq polymerase	B. Iron	
	C. Buffer	D. MgCl_2	
591)	Sugarcane seed is called as		D
	A. Rosette	B. Grain	
	C. Seed bud	D. Fuzz	
592)	A better quality DNA can be extracted from		C
	A. Roots	B. Flowers	
	C. Younger leaves	D. Older leaves	
593)	DNA can be isolated in large quantities by separated from protein by using		C
	A. Liquid nitrogen	B. Ethanol	
	C. CTAB	D. Kits	
594)	Mitochondria is called		A
	A. The power house of the cell	B. Circuit house of the cell	
	C. Both of the above	D. None of the above	
595)	The most common methodology of plant transformation is		A
	A. Agrobacterium	B. Circuit house of the cell	
	C. Electroporation	D. None of the above	
596)	DNA do not contain		B
	A. Phosphoric acid	B. Sulphuric acid	
	C. Nitrogen bases	D. Ribose sugar	
597)	What is the genetic function of restriction enzyme?		D
	A. Adds new nucleotides to the growing strand of DNA	B. Joins nucleotides during replication	
	C. Repairs breaks in sugar-phosphate backbones	D. Cleaves nucleic acids at specific sites	
598)	The anticodon for GCG is:		C
	A. UAU	B. CCT	
	C. CGC	D. CGU	
599)	40.The two strands of DNA are held by		A
	A. Hydrogen bond	B. Covalent bond	
	C. Ionic bond	D. Polar bond	
600)	The last amino acid of a protein is called		A
	A. Carboxyl terminus	B. Phosphate terminus	
	C. Amino terminus	D. Calcium terminus	
601)	Transcription Factor is a/an		C
	A. RNA sequence bound to DNA	B. DNA sequence that regulate transcription	
	C. Protein that binds to DNA and helps in starting transcription	D. None of the above	

602)	A plant, yeast or bacterial cell with removed cell wall is called		A
	A. Protoplast	B. Cytoplasm	
	C. Chloroplast	D. Chromoplast	
603)	DNA can be seen in gel documentation system due to		A
	A. Ethidium bromide staining	B. Methylene blue	
	C. Giemsa staining	D. Crystal violet	
604)	We purify a protein		D
	A. To study its function	B. To analyze its physical properties	
	C. To determine its sequence	D. All of these	
605)	The domains is part of		C
	A. DNA	B. RNA	
	C. Protein	D. None of these	
606)	Bt cotton is not:		D
	A. A GM plant	B. A bacterial gene expressing system	
	C. Insect resistant	D. Resistant to all pesticides	
607)	Protein-protein interactions are experimentally determined by which screening method		C
	A. Yeast two-hybrid (Y2H)	B. Bacterial two-hybrid (B2H)	
	C. Both a and b	D. None of these	
608)	Which of the following result is provided by western blot analysis?		C
	A. Detects DNA molecules	B. Detects RNA molecules	
	C. Detects protein molecules	D. Determine chromosomal structure	
609)	All of the below are amino acids except		D
	A. Serine	B. Threonine	
	C. Cysteine	D. Saleen	
610)	Dolly, the first animal developed through cloning is		D
	A. Camel	B. Cow	
	C. Rat	D. Sheep	
611)	Signal needed for the start of translation is		A
	A. AUG	B. CTT	
	C. UUU	D. UUA	
612)	Quantitative analysis of transgene expression can be done		B
	A. Southern blot analysis	B. Real time PCR	
	C. Western blot analysis	D. None of above	
613)	Most common method for animal transformation is.....		D
	A. In planta transformation	B. Gene gun	
	C. Agrobacterium	D. Microinjection	
614)	Taq polymerase is used in PCR because of its		D
	A. Low thermal stability	B. High speed	
	C. High fidelity	D. High thermal stability	
615)	Liquid nitrogen is used for tissue thawing or as a cryoprotectant at _____		B
	A. -96 °C	B. -196 °C	
	C. -176 °C	D. -279 °C	
616)	Segments of DNA that results into protein is known as		A
	A. Exon	B. Enhancer	
	C. Intron	D. Gene	
617)	A segment of DNA to which RNA polymerase attaches for transcription is called		C
	A. Terminator	B. Enhancer	
	C. Promotor	D. Gene	
618)	Functional genomics deals with		A

	A. The characterization of gene functions of known genes/partially known gene sequences	B. Genomic analysis using molecular markers	
	C. Functional analysis of proteins	D. Development of molecular markers	
619)	BLAST is an online tool used to		A
	A. Find the identity of test sequence with other sequences present on the data base	B. Find the secondary structures of RNA sequence	
	C. Find corresponding protein sequences of the test sequence	D. None of the above	
620)	The term AFLP stands for		B
	A. Amplified Fragment Loss Polyploidy	B. Amplified Fragment Length Polymorphism	
	C. Amplified Fragment Length Polyploidy	D. Amplified From Length Polymorphism	
621)	In monocots, is taken as model plant for transformation studies		B
	A. Barley	B. Rice	
	C. Sugarcane	D. Wheat	
622)	Branch of biotechnology that deals with agriculture is termed as		B
	A. Red biotechnology	B. Green biotechnology	
	C. Blue biotechnology	D. White biotechnology	
623)	Most commonly use promotor in transgenic plants is.....		B
	A. Prn	B. CAMV 35S	
	C. Actin	D. None of these	
624)	Agrobacterium integrates T-DNA into		C
	A. Mitochondria	B. Chloroplast	
	C. Nucleus	D. All of these	
625)	PCR Involves		D
	A. Denaturation	B. Extension	
	C. Annealing	D. Melting Curve	
626)	Protoplast isolation involves		D
	A. Cellulases	B. Xylenases	
	C. Pectinases	D. Non of the above	
627)	Double haploids can be used		B
	A. To get 100% homozygosity in an inbred line	B. To increase heterotic potential of an attempted cross	
	C. To get 100% homozygosity in the next generation of a primary transgenic	D. To get accelerate breeding cycles	
628)	Transcript profiling can be accomplished through		D
	A. Real Time PCR	B. Rt-PCR	
	C. Northern Blot analysis	D. Southern blot analysis	
629)	Non-radioactive labelling of nucleotides include....		D

	A. Biotin Labelling	B. Use of fluorophores	
	C. DIG labelling	D. GFP-Labeling	
630)	Replication errors can bring.....		A
	A. Transversion	B. Deletions	
	C. Translocation	D. Transitions	
631)	DNA replication.....		C
	A. Starts from Origin of replication	B. Is Semi conservative	
	C. Needs no protein to synthesize new DNA strands	D. Proceeds bidirectional	
632)	Methylguanylate.....		D
	A. Protects the newly synthesized RNA from enzymatic activity.	B. Binds to the 3' end of messenger RNA	
	C. Is a methylated Guanine	D. Helps in translation initiation	
633)	Primase is...		B
	A. Needed for primer synthesis, as DNA polymerase can't bind single stranded DNA.	B. Replaced by DNA polymerase α during primer synthesis	
	C. An RNA polymerase enzyme	D. Used to Synthesize first 4-5 nucleotides of template strand	
634)	BLAST allows researchers to compare		C
	A. Differential alignment	B. Differential similarity	
	C. Sequence similarity	D. Sequence alignment	
635)	In an SDS-PAGE experiment proteins are separated on the basis of their:		C
	A. Negatively charged side chains	B. Charge-to-mass ratio	
	C. Molecular weight	D. Positively charged side chains	
636)	An effective way of purifying liquids containing suspensions is		B
	A. Crystallization	B. Centrifugation	
	C. Decanting	D. Separating funnel	
637)	The mitochondrial DNA is		C
	A. Similar to nuclear DNA	B. Likewise bacterial chromosomal DNA	
	C. Likewise chloroplast DNA	D. All of these	
638)	Introns refer to		B
	A. Prokaryotic rRNA and tRNA genes	B. Eukaryotic gene sequences not represented in protein sequence of that gene	
	C. Eukaryotic rRNA and tRNA genes	D. B & C	
639)	<i>E. coli</i> is normally used in gene cloning because		D
	A. It is human friendly	B. It is easy to transform and handle	

	C. It supports the replication of recombinant DNA	D. All of these	
640)	An instrument used to measure mass to charge ratio of ionized substances is;		B
	A. Mass analyser	B. Mass spectrometer	
	C. Mass detector	D. Mass developer	
641)	The pH value at which the net charge of an amphoteric substance is zero is;		B
	A. Isofocusing point	B. Isoelectric point	
	C. Isoabundance point	D. Electrofocusing point	
642)	A compound that induces the production of antibodies is called		A
	A. Antigen	B. Hormone	
	C. Enzyme	D. None of the above	
643)	A plant tissue that transports water in plants is called		A
	A. Xylem	B. Cortex	
	C. Phloem	D. Pith	
644)	DNA polymerases are the enzymes involved in		B
	A. RNA synthesis	B. DNA synthesis	
	C. DNA degradation	D. None of the above	
645)	DNA can be seen in gel documentation system due to		A
	A. Ethidium bromide staining	B. Giemsa staining	
	C. Methylene blue	D. Crystal violet	
646)	Protein-protein interactions are experimentally determined by which screening method		C
	A. Yeast two-hybrid (Y2H)	B. Bacterial two-hybrid (B2H)	
	C. Both A and B	D. None of these	
647)	The domains is part of		B
	A. DNA	B. Protein	
	C. RNA	D. None of these	
648)	We purify a protein		D
	A. To study its function	B. To determine its sequence	
	C. To analyze its physical properties	D. All of these	
649)	Bt cotton is not:		D
	A. A GM plant	B. Insect resistant	
	C. A bacterial gene expressing system	D. A bacterial gene expressing system	
650)	Bacterial Artificial Chromosomes are constructed to		A
	A. Clone large DNA fragments	B. Make new species of bacteria	
	C. Transform plants with	D. Improve the health of bacteria	
651)	The last amino acid of a protein is called		A
	A. Carboxyl terminus	B. Amino terminus	
	C. Phosphate terminus	D. Calcium terminus	
652)	Transcription Factor is a/an		B
	A. RNA sequence bound to DNA	B. Protein that binds to DNA and helps in starting transcription	

	C	DNA sequence that regulate transcription	D	None of the above	
653)	A plant, yeast or bacterial cell with removed cell wall is called				A
	A	Protoplast	B	Chloroplast	
	C	Cytoplasm	D	Chromoplast	
654)	Which of the following is not correct?				B
	A	There are 64 different codons	B	All codons specify a specific amino acid	
	C	Some codons are used for initiation or termination of a gene	D	There are more codons than amino acids so that the code is redundant	
655)	In blue-white screening, a white colony usually indicates that competent cell				A
	A	Contains a plasmid having desirable DNA insert.	B	Contains a plasmid having no DNA insert	
	C	Was not transformed	D	Was transformed non-recombinant plasmid	
656)	Which of the following is best to sterilize heat labile (heat unstable) solution.				C
	A	Dry heat	B	Autoclave	
	B	Membrane filtration	D	Pasteurization	
657)	What is added to the 3'-end of many eukaryotic mRNAs after transcription?				B
	A	Introns	B	A poly A tail	
	C	A cap structure, consisting of a modified G nucleotide	D	Tri-nucleotide 5'-CCA	
658)	Heteroplasmy is a state when cell contain				B
	A	Transformed nuclear and plastid genome	B	Both wild type and transformed plasmid	
	C	Only transformed plastids	D	Only wild type plastid	
659)	Properties of genetic code are				D
	A	Degeneracy	B	Non- overlapping	
	C	Universality	D	All of above	
660)	All of the following are examples of housekeeping genes except _____.				A
	A.	Beta galactosidase	B.	Ribosomal protein genes	
	C.	Enzymes required for basic metabolic pathways	D.	rRNA genes	
661)	Control of gene expression in eukaryotic cells occurs at which level(s)? Please choose only one answer:				D
	A.	Only the transcriptional level	B.	Epigenetic and transcriptional levels	
	C.	Epigenetic, transcriptional, and translational levels	D.	Epigenetic, transcriptional, posttranscriptional, translational, and posttranslational levels	
662)	Post-translational control refers to: Please choose only one answer:				B
	A.	Regulation of gene expression after transcription	B.	Regulation of gene expression after translation	
	C.	Control of epigenetic activation	D.	Period between transcription and translation	
663)	If glucose is absent, but so is lactose, the lac operon will be _____				B
	A.	activated	B.	repressed	
	C.	activated, but only partially	D.	mutated	
664)	Prokaryotic cells lack a nucleus. Therefore, the genes in prokaryotic cells are: Please choose only one				D
	A.	All expressed, all of the time	B.	Transcribed and translated almost simultaneously	
	C.	Transcriptionally controlled because translation begins before transcription ends	D.	B and C are true	

665)	In the context of prokaryotic gene expression, which of the following is the most appropriate definition of an operator?		D
	A.	A cluster of genes that are regulated by a single promoter	B.
	C.	A non-coding, regulatory DNA sequence that is bound by RNA polymerase.	D.
			A DNA-binding protein that regulates gene expression
			A non-coding, regulatory DNA sequence that is bound by a repressor protein
666)	Which of the following can be described as 'a sequence that can be several thousand base pairs upstream or downstream of a eukaryotic promoter and which increases gene expression as much as 200-fold'?		B
	A.	CAAT box	B.
	C.	Insulator	D.
			Enhancer
			TATA box
667)	Nuclear receptors belong to which class of transcription factor?		D
	A.	Helix-loop-helix proteins	B.
	C.	Leucine zipper proteins	D.
			Helix-turn-helix proteins
			Zinc finger proteins
668)	What best describes the mechanism by which the co-activator CREB-binding protein (CBP) activates transcription?		C
	A.	CBP has DNA methyltransferase activity.	B.
	C.	CBP interacts with the basal transcription complex.	D.
			CBP has histone acetyl transferase activity.
			CBP interacts with the basal transcription complex and also has histone acetyl transferase activity.
669)	Which of the following statements, concerning regulation of <i>Trp</i> operon expression by attenuation, is correct?		D
	A.	The leader peptide sequence encodes enzymes required for tryptophan synthesis.	B.
	C.	Rapid translation of the leader peptide allows completion of the mRNA transcript.	D.
			The leader peptide sequence contains no tryptophan residues
			Rapid translation of the leader peptide prevents completion of the mRNA transcript.
670)	Which of the following statements regarding regulation of transferrin-receptor protein synthesis is correct?		D
	A.	The iron-responsive element is an iron-binding sequence in the mRNA that encodes transferrin-receptor protein.	B.
	C.	When iron is abundant the IRE-binding protein binds to and stabilizes the mRNA that encodes transferrin-receptor protein.	D.
			The iron-responsive element is in the 5' untranslated region of the mRNA that encodes transferrin-receptor protein.
			When iron is scarce the IRE-binding protein binds to and stabilizes the mRNA that encodes transferrin-receptor protein.
671)	RNAi stands for which of the following?		C
	A.	RNA Inducer.	B.
	C.	RNA Interference.	D.
			RNA Insertion.
			RNA Intron.
672)	Suppose a certain gene contains the double-stranded sequence: 5'- ATGTTTAGCGCC -3'		C

	3'- TACAAATCGCGG -5'		
	If the top strand is the sense strand and codes for an mRNA whose sequence begins 'ATG', which of the following would be the sequence of the corresponding segment of antisense RNA?		
	A.	5'-AUGUUUAGCGCC-3'	B. 5'-CCGCGAUUUGUA-3'
	C.	5'-GGCGCUAAACAU-3'	D. 5'-UACAAAUCGCGG-3'
673)	Western blotting is used for		
	A.	DNA analysis	B. Protein analysis
	C.	RNA analysis	D. All of above
674)	The effectors of gene silencing are short double-stranded RNA molecules produced by the action of the enzyme dicer. Approximately what size are these molecules?		
	A.	11 bp	B. 22 bp
	C.	75 bp	D. 100 bp
675)	Which of the following is true of the lac operon in E. coli?		
	A.	The operon is only switched on in the absence of lactose in the growth medium.	B. The lac operon messenger RNA is a poly-cistronic mRNA (it carries information for synthesis of several proteins)
	C.	The enzyme β -galactosidase is only produced in large quantities when the lac repressor is bound to the operator.	D. The promoter is the binding site for the lac repressor.
676)	Which of the following statements about mRNA stability is correct? Please select all that apply.		
	A.	Prokaryotic mRNAs have a half-life of only a few minutes.	B. Regulation of mRNA stability is a way of regulating gene expression.
	C.	It is thought that polyA tails stabilize eukaryotic mRNAs.	D. Histone mRNAs have especially long polyA tails and are especially stable.
677)	An epigenetic change in gene expression is an inherited change that does not involve any change in the nucleotide sequence of the gene. True or false?		
	A.	True	B. False
	C.		D.
678)	Which of the following statements is true of RNA interference?		
	A.	RNA interference is a normal way for organisms to regulate gene expression.	B. RNA interference is a mechanism for combating virus infection in plants.
	C.	RNA interference occurs only in vertebrates.	D. RNA interference is already used therapeutically for many disorders.
679)	One commonly used statistical method to determine goodness of fit is the		
	A.	Chi square test	B. Sum rule
	C.	Binomial expansion equation	D. Product rule

680)	Proteins function at		B
	A. Molecular level	B. Cellular level	
	C. Organism level	D. Population level	
681)	Duringthe chromosomes have reached their respective poles and decondense		B
	A. Anaphase	B. Telophase	
	C. Cytokinesis	D. Metaphase	
682)	The phenomenon in which two alleles are both expressed in the heterozygous individual is called		C
	A. Incomplete dominance	B. Complete dominance	
	C. Codominance	D. Gene dosage effect	
683)	The term, refers to the phenomenon that two or more genes can be located on the same chromosomes		B
	A. linkage groups	B. linkage	
	C. crossing over	D. bivalent	
684)	When a gene is transferred between two different species, this is called		D
	A. Homologous recombination	B. Non-homologous recombination	
	C. Vertical gene transfer	D. Horizontal gene transfer	
685)	Barr body is highly condensed.....		D
	A. X chromosome	B. Y chromosome	
	C. Pigmentation	D. Gene	
686)	When centromere is in the middle chromosome is called		A
	A. Metacentric	B. Sub-metacentric	
	C. Acrocentric	D. Telocentric	
687)	Ais a micrograph in which all the chromosomes within a single cell have been arranged in a standard fashion		A
	A. A karyotype	B. G banding	
	C. Polarography	D. A paralogue	
688)	A gigantic chromosome in salivary glands of Drosophila are		C
	A. Y chromosomes	B. X chromosomes	
	C. Polytene Chromosomes	D. Dicentric chromosome	
689)is the predominant DNA found in living cells.		B
	A. A DNA	B. B DNA	
	C. Z DNA	D. A & B DNA	
690)	A cross between two true breeding lines one with dark blue flowers and one with bright white flowers produces F1 offspring that are light blue. When the F1 progeny are selfed a 1:2:1 ratio of dark blue to light blue to white flowers is observed. What genetic phenomenon is consistent with these results?		B
	A. Epistasis	B. Incomplete dominance	
	C. Codominance	D. Inbreeding depression	
691)	Mutations which occur in body cells which do not go on to form gametes can be classified as:		B
	A. Auxotrophic mutations	B. Somatic mutations	
	C. Morphological mutations	D. Oncogenes	
691)	What would be the frequency of AABBCC individuals from a mating of two AaBbCc individuals?		A
	A. 1/64	B. 1/32	
	C. 1/16	D. 1/8	
692)	The stage of meiosis in which chromosomes pair and cross over is:		A
	A. prophase I	B. metaphase I	
	C. prophase II	D. metaphase II	
693)	Polyploidy refers to:		B

	A.	Extra copies of a gene adjacent to each other on a chromosome	B.	An individual with complete extra sets of chromosomes	
	C.	A chromosome which has replicated but not divided	D.	Multiple ribosomes present on a single mRNA	
694)	A gene showing codominance				A
	A.	Has both alleles independently expressed in the heterozygote	B.	Has one allele dominant to the other	
	C.	Has alleles tightly linked on the same chromosome	D.	Has alleles expressed at the same time in development	
695)	The phenomenon of "independent assortment" refers to:				B
	A.	Expression at the same stage of development	B.	Unlinked transmission of genes in crosses resulting from being located on different chromosomes, or far apart on the same chromosome.	
	C.	Association of an RNA and a protein implying related function	D.	Independent location of genes from each other in an interphase cell	
696)	Mendel's law of segregation, as applied to the behavior of chromosomes in meiosis, means that:				B
	A.	Pairing of homologs will convert one allele into the other, leading to separation of the types.	B.	Alleles of a gene separate from each other when homologs separate in meiosis I, or in meiosis II if there is a single crossover between the gene and the centromere.	
	C.	Genes on the same chromosome will show 50% recombination	D.	Alleles of a gene will be linked and passed on together through meiosis	
697)	Which component of transcribed RNA in eukaryotes is present in the initial transcript but is removed before translation occurs:				A
	A.	Intron	B.	3' Poly A tail	
	C.	Ribosome binding site	D.	5' cap	
698)	Choose the correct statement about the genetic code.				D
	A.	Includes 61 codons for amino acids and 3 stop codons	B.	Almost universal; exactly the same in most genetic systems	
	C.	Three bases per codon	D.	All of above	
699)	X-chromosome inactivation				D
	A.	Normally takes place in males but not females	B.	Is the cause of the Y chromosome being genetically inactive	
	C.	Takes place in humans so that the same X chromosome is inactive in all of the cells of a female	D.	Results in genetically turning off one of the two X chromosomes in female mammals	
700)	DNA ligase is:				A
	A.	An enzyme that joins fragments in normal DNA replication	B.	An enzyme involved in protein synthesis	
	C.	An enzyme of bacterial origin which cuts DNA at defined base sequences	D.	An enzyme that facilitates transcription of specific genes	
701)	An Hfr strain of <i>E. coli</i> contains:				C
	A.	a vector of yeast or bacterial origin which is used to make many copies of a particular DNA sequence	B.	a bacterial chromosome with a human gene inserted	
	C.	a bacterial chromosome with the F factor inserted	D.	a human chromosome with a transposable element inserted	

702)	Generation of antibody diversity in vertebrate animals takes place through:				D
	A.	the presence of as many genes in the germ line as there are types of antibodies possible.	B.	infection with bacteria carrying antibody genes	
	C.	infection with viruses carrying antibody genes	D.	rearrangement of DNA in tissues that go on to produce antibodies	
703)	Replication of DNA:				C
	A.	Takes place in a “conservative” manner	B.	Takes place in a “dispersive” manner	
	C.	Takes place in a “semi-conservative” manner	D.	Usually involves one origin of replication per chromosome in eukaryotes	
704)	A duplication is: an exchange between non-homologous chromosomes, resulting in chromosomes				C
	A.	With new genes adjacent to each other.	B.	Loss of genes in part of a chromosome	
	C.	An extra copy of the genes on part of a chromosome	D.	A reversal of order of genes on a chromosome	
705)	<p>What is the co-transduction frequency for the A and B genes, from the following dataset? (Assume that there has been selection for the A+ form of the A gene).</p> <p>Genotype Number</p> <p>A+B+ C+ 10</p> <p>A+B+ C- 30</p> <p>A+ B- C+ 20</p> <p>A+ B- C- 40</p>				D
	A.	10	B.	20	
	C.	30	D.	40	
706)	A mutation in a codon leads to the substitution of one amino acid with another. What is the name for this type of mutation?				B
	A.	Non-sense mutation	B.	Missense mutation	
	C.	Frame-shift mutation	D.	Promoter mutation	
707)	Mapping of human chromosomes:				B
	A.	has been restricted to the sex chromosomes because of small family sizes	B.	proceeded much more successfully as large numbers of DNA markers became available.	
	C.	has determined that the number of linkage groups is about twice the number of chromosomes	D.	has demonstrated that almost all of the DNA is involved in coding for genes	
708)	Homeobox sequences				A
	A.	are present in the genome of many animal species	B.	are found in prokaryotes but not in eukaryotes	
	C.	were identified as the integration sites for bacterial viruses	D.	represent integration sites for transposable elements	
709)	Tracing of a cell lineage during development means that:				A
	A.	the cells giving rise to and derived from a specific cell are known	B.	the sequence of the enhancers for developmental genes is known	
	C.	the regulatory genes for the organism have been genetically mapped	D.	cell components in the membrane involved in signaling have been isolated	
710)	Zinc finger proteins and helix-turn-helix proteins are:				A
	A.	types of DNA-binding proteins	B.	involved in the control of translation	
	C.	components of ribosomes	D.	part of the hemoglobin in blood cells	
711)	Transcriptional activator proteins:				D
	A.	transcribe a messenger off a DNA template	B.	bind to ribosomes to activate the production of specific proteins	
	C.	are produced during an infection of bacteria by a phage	D.	bind regions near a eukaryotic gene and allow an RNA polymerase to transcribe a gene	
712)	Differential distribution of substances in the egg most typically results in:				A

	A.	differences in gene expression which may establish a pattern in the embryo as the cells divide	B.	amplification of specific genes during development	
	C.	development of polyploid tissues	D.	loss of specific genes during development	
713)	Arabidopsis is advantageous for plant genetic research because:				D
	A.	it is commercially important as a food crop	B.	it is an endangered species	
	C.	it is the closest to humans of any existing plant	D.	it is a small plant with a small genome size which can be raised inexpensively	
714)	A homeotic mutation is one which:				B
	A.	is present in only one form in an individual	B.	substitutes one body part for another in development	
	C.	results in development of a tumor	D.	is wild type at one temperature and abnormal at another	
715)	Assuming that the level of glucose is low, a mutation in the repressor of the lac operon in E. coli, preventing binding of the repressor to the operator, should result in:				A
	A.	constitutive expression of the lac operon genes	B.	lack of expression or reduced expression of the lac operon genes under all circumstances	
	C.	expression of the genes only when lactose is present	D.	expression of the genes only when lactose is absent	
716)	Assuming that the level of glucose is low, a mutation in the repressor associated with the lac operon of E. coli which prevents binding of the repressor to lactose should result in:				B
	A.	constitutive expression of the lac operon genes	B.	lack of expression or reduced expression of the lac operon genes under all circumstances	
	C.	expression of the genes only when lactose is present	D.	expression of the genes only when lactose is absent	
717)	RFLP analysis is a technique that				A
	A.	uses hybridization to detect specific DNA restriction fragments in genomic DNA	B.	is used to determine whether a gene is transcribed in specific cells	
	C.	measures the transfer frequency of genes during conjugation	D.	is used to detect genetic variation at the protein level.	
718)	Plasmid vectors for cloning				A
	A.	can generally accommodate larger inserts than phage vectors can	B.	grow within bacteria, and are present in bacterial colonies on an agar plate	
	C.	can accommodate inserts of over 100 kilobases	D.	include centromeres to allow propagation in yeast	
719)	Simple tandem repeat polymorphisms in humans are most useful for:				A
	A.	solving criminal and paternity cases	B.	reconstructing the relationships of humans and chimps.	
	C.	estimating relationships of humans and Neanderthals	D.	transferring disease resistance factors into bone marrow cells	
720)	The polymerase chain reaction or PCR is a technique that				C
	A.	was used to demonstrate DNA as the genetic material	B.	is used to determine the content of minerals in a soil sample	
	C.	uses short DNA primers and a thermostable DNA polymerase to replicate specific DNA sequences in vitro.	D.	measures the ribosome transfer rate during translation	
721)	Positional cloning refers to:				D
	A.	using a selection procedure to clone a cDNA	B.	mapping a gene to a chromosomal region and then identifying and cloning a genomic copy of the gene from the region	
	C.	isolating a gene by PCR using primers from another species	D.	isolating a gene from a specific tissue in which it is being expressed	

722)	Large quantities of useful products can be produced through genetic engineering involving:		D
	A. bacteria containing recombinant plasmids	B. yeast carrying foreign genes	
	C. transgenic plants	D. all of the above	
723)	On average, how many fragments would a restriction enzyme which recognizes a specific 4 base sequence in DNA be expected to cleave a double-stranded bacteriophage with a genome size of 5,000 bp into?		C
	A. about 2	B. about 4	
	C. about 20	D. about 50	
724)	The “sticky ends” generated by restriction enzymes allow:		D
	A. selection for plasmids lacking antibiotic resistance	B. easy identification of plasmids which carry an insert	
	C. replication of transfer RNA within the bacterial cell	D. pieces of DNA from different sources to hybridize to each other and to be joined together	
725)	QTL analysis is used to:		D
	A. identify RNA polymerase binding sites	B. map genes in bacterial viruses	
	C. determine which genes are expressed at a developmental stage	D. identify chromosome regions associated with a complex trait in a genetic cross	
726)	Assuming Hardy-Weinberg equilibrium, the genotype frequency of heterozygotes, if the frequency of the two alleles at the gene being studied are 0.6 and 0.4, will be:		C
	A. 0.80	B. 0.64	
	C. 0.48	D. 0.32	
727)	The likelihood of an individual in a population carrying two specific alleles of a human DNA marker, each of which has a frequency of 0.2, will be:		D
	A. 0.4	B. 0.32	
	C. 0.16	D. 0.08	
728)	A threshold trait is one which:		B
	A. is expressed on a continuous scale (such as blood pressure)	B. is present in a few discrete classes, but is influenced by both genetics and the environment (such as diabetes or schizophrenia)	
	C. is caused by only a single gene, with no environmental influence	D. is present in a very low frequency in the population	
729)	Mitochondrial DNA is advantageous for evolutionary studies because:		A
	A. it is inherited only through the female parent and thus evolves in a way that allows trees of relationship to be easily constructed	B. it is inserted into the X chromosome	
	C. it first appeared in humans and is not found in other animals	D. it evolves more slowly than the genes in the nucleus	
730)	What are the assumptions of Hardy Weinberg equilibrium?		B
	A. Small population size, random mating, no selection, no migration, no mutation	B. large population size, random mating, no selection, no migration, no mutation	
	C. large population size, random mating, heterozygotes survive the best, no migration, no mutation	D. large population size, like individuals mate, no selection, no migration, no mutation	
731)	Twin studies in humans are useful because:		D
	A. they allow more refined estimates of chromosome location to be made	B. twins have a greater likelihood of being heterozygous	
	C. they allow improved expression of genes	D. they allow environmental influences as opposed to genetic influences on variation in a trait to be estimated	

732)	Which of the following statements about heritability are true?		D
	A. is a measure of level of gene linkage	B. is a measure of inbreeding	
	C. is a measure of proportion of repeated DNA in an organism	D. is a measure of the proportion of variation that is due to genetic causes	
733)	The allele associated with sickle cell anemia apparently reached a high frequency in some human populations due to:		B
	A. random mating	B. superior fitness of heterozygotes in areas where malaria was present	
	C. migration of individuals with the allele into other populations	D. a high mutation rate at that specific gene	
734)	The multiprotein complex which play a critical role in sister chromatid alignment is called.		A
	A. Cohesin	B. Condensin	
	C. Catenan	D. Scaffold	
735)	DNA polymeraseis only eukaryotic polymerase that associates with primase.		A
	A. α	B. β	
	C. γ	D. ϵ	
736)	Cells can be fractionated into different chemical components. Both Griffith and Avery found cellular fractions that could transform non-disease causing bacteria into disease causing bacteria. In each case, the transforming fraction contained predominantly which of the following molecules?		D
	A. Carbohydrates	B. Protein	
	C. Lipids	D. Nucleic acid	
737)	What functional group is found on the 3' end of a nucleotide?		C
	A. Nitrogenous base	B. Phosphate	
	C. Hydroxyl	D. Carboxyl	
738)	Which of the following is found in DNA but not in protein?		D
	A. Sulphur	B. Phosphorus	
	C. Carbon	D. Nitrogen	
739)	In what direction is RNA polymerized?		C
	A. 3' to 5'	B. N to C	
	C. 5' to 3'	D. 3 to 5	
740)	Where does translation begin, as indicated on the mRNA transcript?		A
	A. start codon	B. promoter	
	C. terminator	D. transcription start site	
741)	If the following were a complete mRNA, which codon would be recognized as the stop codon? 5' UAAUGCUGACUAGUUAAGCCCCGAGCGAA-3'		A
	A. UAA	B. UGA	
	C. UAG	D. UCA	
742)	What is the function of the protein encoded by the LacZ gene?		C
	A. Turns glucose into lactose	B. Turns glucose into pyruvate	
	C. Turns lactose into glucose and galactose	D. Turns lactose into glucose and galactose.	
743)	When should E. coli produce beta-galactosidase?		D
	A. High glucose, low lactose	B. Low glucose, low lactose.	
	C. High glucose, high lactose	D. Low glucose, high lactose	
744)	You cross the two true-breeding parental plants, and find that all the F1 progeny have small red flowers. Which of the following phenotypes are dominant?		B
	A. large yellow	B. small red	
	C. large red	D. small yellow	

745)	Arrange the following steps in the correct order a. Screen the bacterial colonies b. Transform DNA into host bacterial cells c. Restrict DNA of interest d. Select bacterial host cells that have been transformed e. ligate DNA of interest into vectors		D
A.	e, c, d, b, a	B. c, b, e, d, a	
C.	a, c, b, d, e	D. c, e, b, d, a	
746)	Select the true statement or statements. a. Restriction enzymes break a phosphodiester bond on only one of the two DNA strands. b. Restriction enzymes break a phosphodiester bond on both of the DNA strands. c. All restriction enzymes produce a region of single-stranded DNA. d. Two different linear DNA molecules are cut with a single restriction enzyme such that only one end of each molecule is cut and these ends have regions of single stranded DNA. The two different DNA molecules will have compatible ends. e. Two different linear DNA molecules are each cut with a different restriction enzyme such that only one end of each molecule is cut and these ends have regions of single stranded DNA. The two different DNA molecules will NOT have compatible ends.		C
A.	c, e	B. a, d	
C.	b, d	D. a, c	
747)	A recombinant vector in a yeast genomic library may contain more than one gene. This is not the case with the recombinant vectors in a yeast cDNA library because...		A
A.	every cDNA fragment cloned into each vector carries only one gene	B. the host cells cannot be transformed with a vector carrying more than one gene	
C.	the vectors used in making a cDNA library are different.	D. different restriction enzymes are used	
748)	Unlike a genomic DNA library, particular care must be taken to ensure that the cDNA library represents every gene in the genome. Why is this the case?		D
A.	A cDNA library lacks introns	B. Host cells are more likely to reject vectors with cDNA as compared to genomic DNA.	
C.	It is harder to clone cDNA fragments as compared to genomic fragments into the vectors	D. Some genes are transcribed only in certain cell types or at low levels.	
749)	Many cDNA libraries are used as expression libraries. The vector chosen for use in an expression library must have additional DNA sequence that is not required in the vector chosen for use in a genomic DNA library. What is this sequence?		B
A.	additional restriction enzyme sites	B. a promoter specific for the host organism	
C.	a second selectable marker	D. an origin of replication	
750)	Which of the following are required for a successful PCR amplification? a. One or more copies of the DNA to be amplified. b. All of the normal DNA nucleotides. c. Some dideoxynucleotides d. Two distinct primers e. E. coli DNA polymerase f. DNA polymerase from an organism that lives at high temperature		C

	A.	All are required.	B.	a,c,d,e	
	C.	a,b,d,f	D.	a,c,d,f	
751)	A normal somatic human cell contains 46 chromosomes. During anaphase of meiosis I, prior to reformation of the nuclear envelope, how many chromosomes are present in a human cell?				B
	A.	92	B.	46	
	C.	23	D.	184	
752)	Which event takes place in meiosis, but not in mitosis?				B
	A.	Sister chromatids are separated from one another	B.	Homologous chromosomes are separated from one another	
	C.	The chromosomes align in the center of the cell	D.	The nuclear envelope reforms around the genetic material	
753)	During which phase of the cell cycle are cells considered quiescent?				C
	A.	G2 phase	B.	G1 phase	
	C.	G0 phase	D.	Any portion of interphase	
754)	What is the primary purpose of the S phase of the cell cycle?				D
	A.	Cell division	B.	Organelle replication	
	C.	Cell growth	D.	DNA replication	
755)	In the cell cycle, what is primarily responsible for cell cycle progression from G2 to M phase and is also referred to as the maturation promoting factor when in complex with cyclin-dependent kinase 1 (Cdk1)?				B
	A.	Cyclin A	B.	Cyclin B	
	C.	Cyclin D	D.	None of these	
756)	The expression of which of the following protein classes is normally associated with G1 phase of the cell cycle? I. Cyclin-dependent kinases (CDKs) II. Caspases III. Nucleic acid polymerases				A
	A.	I only	B.	II and III	
	C.	III only	D.	I and II	
757)	What provides the necessary information to specify the three dimensional shape of proteins?				C
	A.	The protein's interactions with other polypeptides	B.	Specific hydrogen bonds	
	C.	The amino acid sequence	D.	The proteins interactions with chaperone proteins	
758)	DNA helicase is an enzyme used for				B
	A.	Restriction	B.	Separating DNA strands during replication	
	C.	Ligation	D.	Join DNA strands after replication	
759)	All of the below are amino acids except				D
	A.	Serine	B.	Cysteine	
	C.	Threonine	D.	Saline	
760)	The prion disease is belong to				C
	A.	Human	B.	Plants	
	C.	Animal	D.	All of Those	
761)	Formation of peptide bond require energy in the form of				A
	A.	ATP	B.	GTP	
	C.	ADP	D.	No energy at all	
762)	Bollguard cotton is most closely associated with which of the following terms?				A

	A.	Bt	B.	Glyphosate	
	C.	β -carotene	D.	Event 176	
763)	Which of the following is present in <i>Agrobacterium tumefaciens</i> , but not on any component of a binary vector system?				D
	A.	Vir genes	B.	LB, RB	
	C.	GUS gene	D.	Ti region	
764)	The gene formed by the joining of DNA segments from two different sources is called				B
	A.	Recombinant gene	B.	Chimeric gene	
	C.	Joined gene	D.	Both a and b	
765)	Which of the following enzyme is used to cut DNA molecule in rDNA technology				D
	A.	Ligase	B.	Ribonuclease	
	C.	Phosphatase	D.	Restriction enzyme	
766)	Taq polymerase is used in PCR because of its				B
	A.	Low thermal stability	B.	High thermal stability	
	C.	High fidelity	D.	High speed	
767)	The domains is part of				C
	A.	DNA	B.	RNA	
	C.	Protein	D.	None of these	
768)	Which of the fluorescent tag used to detect genetic transformation				A
	A.	GFP gene	B.	Ampicillin gene	
	C.	Lux gene	D.	None of these	
769)	The term GMOs is used for the organisms				B
	A.	Which have received novel genes	B.	Both a & b	
	C.	Their own genes have been altered	D.	None of these	
770)	Which of the following cellular organelles have genetic material				D
	A.	Nucleus	B.	Mitochondria	
	C.	Chloroplast	D.	All of these	
771)	The process of translation is completed in				C
	A.	Nucleus	B.	Nucleolus	
	C.	Cytoplasm	D.	Lysosome	
772)	Human genome chromosome autosome:sex chromosome pair ratio is?				B
	A.	1:22	B.	22:01	
	C.	46:00:00	D.	0:46	
773)	Watson, Crick and Wilkins are credited with the discovery that DNA is?				D
	A.	The carrier of genetic information	B.	Contains Deoxyribose sugar	
	C.	Responsible for synthesis of mRNA	D.	A double stranded helix	
774)	What is the genetic function of restriction enzyme?				D

	A.	Adds new nucleotides to the growing strand of DNA	B.	Repairs breaks in sugar-phosphate backbones	
	C.	Joins nucleotides during replication	D.	Cleaves nucleic acids at specific sites	
775)	Which two enzymes are needed to produce recombinant DNA?				B
	A.	Endonuclease, transcriptase	B.	Restriction enzyme, ligase	
	C.	DNA polymerase, topoisomerase	D.	Polymerase, ligase	
776)	The anticodon for GCG is:				B
	A.	UAU	B.	CGC	
	C.	CCT	D.	CGU	
777)	The two strands of DNA are held by				A
	A.	Hydrogen bond	B.	Ionic bond	
	C.	Covalent bond	D.	Polar bond	
778)	Which of the following is not correct?				C
	A.	There are 64 different codons	B.	Some codons are used for initiation or termination of a gene	
	C.	All codons specify a specific amino acid	D.	There are more codons than amino acids so that the code is redundant	
779)	What is the theoretical progress of nucleic acid amplification by PCR?				D
	A.	1, 2, 3, 4, 5.....	B.	1, 10, 100, 1000.....	
	C.	2, 4, 6, 8, 10, 12.....	D.	2, 4, 8, 16, 32.....	
780)	Polymerase Chain Reaction is a technique used to				C
	A.	Digest DNA	B.	Sequence DNA	
	C.	Amplify DNA	D.	Denature DNA	
781)	Electrophoresis is conducted to				A
	A.	Separate DNA fragments	B.	Transform DNA	
	C.	Clone DNA	D.	Isolate DNA	
782)	cDNA stands for				C
	A.	Chromosomal DNA	B.	Combined DNA	
	C.	Complementary DNA	D.	Cumulative DNA	
783)	Condon is a combination of				C
	A.	Three amino acids	B.	Four nucleotides	
	C.	Three nucleotides	D.	Four amino acids	
784)	Function of ligase is to				A
	A.	Join DNA fragments	B.	None of above	
	C.	Break DNA fragment	D.	Both 1 & 2	
785)	MCS in a vector stands for				C
	A.	Marker centre sequence	B.	Multiple copy sequence	
	C.	Multiple cloning site	D.	Methylated cloning sequence	
786)	BT stands for				A

	A.	<i>Bacillus thuringiensis</i>	B.	<i>Bacillus theoringensis</i>	
	C.	<i>Bacilus theoringiensis</i>	D.	<i>Bacillus tooingiensis</i>	
787)	RAPD is an abbreviation of				A
	A.	Random amplified polymorphic DNA	B.	Recombinant and polymorphic DNA	
	C.	Random amplify polyploidy DNA	D.	Random amplified Plant DNA	
788)	Western blotting is used for				B
	A.	DNA analysis	B.	Protein analysis	
	C.	RNA analysis	D.	All of above	
789)	Autoclave is used for				D
	A.	Sterilizing media	B.	Sterilizing ex-plant	
	C.	Sterilizing instruments	D.	A & C	
790)	Charge on DNA is				C
	A.	Positive	B.	No charge	
	C.	Negative	D.	High charge	
791)	The variation in cells or tissues that arises as a result of in-vitro culture is termed as				B
	A.	Transformation	B.	Soma-clonal variation	
	C.	Permanent variation	D.	Economically useful variation	
792)	SSR stands for				A
	A.	Simple sequence repeats	B.	Short single RNA	
	C.	Single sequence RNA	D.	None of above	
793)	ELISA technique is used for detection of				A
	A.	Protein	B.	RNA	
	C.	DNA	D.	mRNA	
794)	Green fluorescent protein is obtained from				A
	A.	Jelly fish	B.	Arabidopsis	
	C.	Sea weeds	D.	<i>Agrobacterium</i>	
795)	Ribosome's are factories for				A
	A.	Protein synthesis	B.	Lipid synthesis	
	C.	Carbohydrate synthesis	D.	None of above	
796)	Which organelle is termed as powerhouse of cell?				A
	A.	Mitochondria	B.	Nucleus	
	C.	Chloroplast	D.	Golgi bodies	
797)	Ideal temperature for E. Coli bacterial growth is				C
	A.	25°C	B.	48°C	
	C.	37°C	D.	64°C	
798)	A _____ made inside the nucleus of a cell, associates with proteins to form ribosomes.				C
	A.	mRNA	B.	tRNA	
	C.	rRNA	D.	All of the above	

799)	Replication of DNA:				B
	A.	takes place in a “conservative” manner	B.	takes place in a “semi-conservative” manner	
	C.	takes place in a “dispersive” manner	D.	usually involves one origin of replication per chromosome in eukaryotes	
800)	Nucleic acid segment tagged with a radioactive molecule is called				C
	A.	Plasmid	B.	Clone	
	C.	Probe	D.	Vector	
801)	Molecular marker include				D
	A.	RFLP	B.	AFLP	
	C.	RAPD	D.	All of these	
802)	Transposon is known as ...?				A
	A.	Jumping gene	B.	Conservative gene	
	C.	IS element	D.	Co integrate gene	
803)	Which tropical fruit crop has been successfully engineered to be protected against a lethal virus?				C
	A.	Citrus	B.	Mango	
	C.	Papaya	D.	Lychee	
804)	ELISA stands for				B
	A.	Eco linked immunosorbent assay	B.	Enzyme linked immune sorbent assay	
	C.	Enzyme like immune sorbent assay	D.	Both b & c	
805)	Western and Southern blotting are used for expression of				D
	A.	RNA, DNA	B.	Protein, RNA	
	C.	DNA, Protein	D.	Protein, DNA	
806)	First cloned animal “Dolly” died of				C
	A.	Cancer	B.	Sclerosis	
	C.	Arthritis	D.	None	
807)	Which of the following pairs is the best model organisms?				A
	A.	Yeast, Arabidopsis	B.	Rice, mosquito	
	C.	Mushroom, rice	D.	Arabidopsis, wheat	
808)	PCR is used for				A
	A.	DNA amplification	B.	Site specific recombinase	
	C.	Site specific translocation	D.	None of these	
809)	Restriction Enzyme also called				A
	A.	Biological scissors	B.	Molecular knives	
	C.	Molecular scalpels	D.	All of these	
810)	The gene is formed by joining of DNA segments from two different sources,				B
	A.	Recombinant gene	B.	Chimeric gene	
	C.	Joined gene	D.	Both A & B	
811)	Reverse transcriptase PCR uses				A

	A.	mRNA as a template to form cDNA	B.	DNA as a template to form ssDNA	
	C.	RNA as a template to form DNA	D.	All of these	
812)	The ability of cells to take up DNA fragments from surrounding is called				B
	A.	Transfection	B.	Transformation	
	C.	Transduction	D.	Conjugation	
813)	The virus mediated gene transfer usually genetically modified bacteriophages is called				C
	A.	Transfection	B.	Transformation	
	C.	Transduction	D.	Conjugation	
814)	Double stranded RNA (dsRNA) is cleaved and converted into Small interference RNA (siRNA) by a protein called				A
	A.	Dicer	B.	Tubulin	
	C.	RISC	D.	Exportin	
815)	RNAi is a technique in which gene expression is				C
	A.	Knock out	B.	Knock in	
	C.	Knock down	D.	Kick in	
816)	The process of translation requires the presence of_____.				A
	A.	mRNA, tRNA and ribosomes.	B.	DNA, mRNA and RNA polymerase.	
	C.	mRNA, ribosomes and RNA polymerase.	D.	chromatin, DNA and amino acids.	
817)	In eukaryotes the regions of DNA that encode a polypeptide product are called_____.				C
	A.	promoters.	B.	enhancers.	
	C.	exons.	D.	leader sequences.	
818)	An mRNA is 333 nucleotides long, including the termination codon. The number of amino acids in the protein translated from this mRNA should be_____.				D
	A.	999.	B.	330	
	C.	630.	D.	111	
819)	In addition to their circular chromosome bacteria also have smaller rings of DNA called_____.				B
	A.	genes.	B.	plasmids.	
	C.	plastome.	D.	genome.	
820)	RT-PCR means_____.				A
	A.	reverse transcriptase PCR.	B.	rotating tube PCR.	
	C.	rightward template PCR.	D.	real time PCR.	
821)	T-DNA is DNA _____.				A
	A.	of plasmid origin which is transferred to the Agrobacterium chromosome.	B.	of genomic origin which is transferred to the plant genome.	
	C.	from the chromosome of Agrobacterium species which is transferred to the plant genome.	D.	none of the above.	
822)	Which bacteria known as natural genetic engineer of plants?				A

	A.	Agrobacterium tumefaciens.	B.	Bacillus.	
	C.	E.coli.	D.	Streptomyces.	
823)	In Flavr Savr tomato, -----is delayed.				B
	A.	Flowering	B.	Ripening	
	C.	Fruiting	D.	All	
824)	What key feature of Taq polymerase allows PCR to be conveniently performed?				B
	A.	Taq polymerase does not require primers.	B.	Taq polymerase is not damaged by heating	
	C.	Taq polymerase does not require a template.	D.	Taq polymerase can work at very low temperatures.	
825)	A nucleotide in DNA is made up of				B
	A.	four bases.	B.	a base plus a Deoxyribose sugar plus phosphate.	
	C.	a base plus a ribose sugar.	D.	a sugar plus a phosphate.	
826)	Nucleotides in RNA are connected to one another in the polynucleotide chain by				B
	A.	covalent bonds between bases.	B.	covalent bonds between sugar and phosphate.	
	C.	covalent bonds between sugars.	D.	hydrogen bonds between purines.	
827)	Which is a difference between DNA and RNA?				B
	A.	DNA is single-stranded and RNA is double-stranded	B.	DNA contains deoxyribose and RNA contains ribose.	
	C.	DNA is only informational and RNA is only catalytic	D.	DNA is transcribed and RNA is replicate	
828)	The nucleotide sequence of DNA				D
	A.	is the same in all organisms of a species.	B.	evolved before RN	
	C.	contains only information for translation.	D.	contains the four bases, A, T, G, and	
829)	The number of daughter chromosomes in a human cell (diploid number 46) in anaphase II of meiosis is				B
	A.	2	B.	46.	
	C.	23.	D.	69.	
830)	The genetic sex of a human is determined by				C
	A.	Ploidy, with the male being haploid	B.	X and Y-chromosomes, the male being XX.	
	C.	The Y chromosome.	D.	The number of X chromosomes, the male being XO.	
831)	In epistasis				C
	A.	nothing changes from generation to generation.	B.	a portion of a chromosome is delete	
	C.	one gene alters the effect of another.	D.	a portion of a chromosome is inverted	
832)	A compound that induces the production of antibodies is called				A
	A.	Antigen	B.	Hormone	
	C.	Enzyme	D.	None of the above	

833)	Alternative form of a gene is called				D
	A.	Chromosome	B.	RNA	
	C.	DNA	D.	Allele	
834)	Proteins are made up of				C
	A.	Nucleic Acids	B.	Carbohydrates	
	C.	Amino acid	D.	Nitrogenous bases	
835)	The ability of a cell or tissue to regenerate into a plant is called				A
	A.	Totipotency	B.	Organogenesis	
	C.	Germination ability	D.	None of the above	
836)	The introduction of gene(s) into an organism that can transfer it to next generation is called				A
	A.	Transgenesis	B.	Cloning	
	C.	Transduction	D.	Translation	
837)	A segment of DNA to which RNA polymerase attaches for transcription is called				A
	A.	Promotor	B.	Terminator	
	C.	Enhancer	D.	Gene	
838)	Organisms having no defined nucleus are				A
	A.	Prokaryotes	B.	Both of the above	
	C.	Eukaryotes	D.	None of the above	
839)	Undifferentiated mass of plant cells is called				A
	A.	Callus	B.	Endosperm	
	C.	Cancerous tumor	D.	Seed coat	
840)	Which pathogen hijacks the machinery of host cell for its multiplication				C
	A.	Birds	B.	Fungi	
	C.	Virus	D.	Bacteria	
841)	Sex linked genes in human can be on				B
	A.	X chromosome only	B.	Both of them	
	C.	Y chromosome only	D.	Autosomal chromosomes only	
842)	Mitochondria is called				A
	A.	The power house of the cell	B.	Both of the above	
	C.	Circuit house of the cell	D.	None of the above	
843)	When a cross is made between hybrid and one of the parents, it is called				C
	A.	Test cross	B.	Double cross	
	C.	Back cross	D.	None of the above	
844)	What type of bond connects two nucleic acids in a DNA molecule?				B
	A.	Hydrogen Bond	B.	Phosphodiester Bond	
	C.	Covalent Bond	D.	Ionic Bond	
845)	Environmental Biotechnology deals with.....				D
	A.	Soil reclamation	B.	Remediation of contaminated environment	

	C.	Air pollution	D.	All of the above	
846)	Theory of natural selection was forwarded by				C
	A.	Barbra McClintock	B.	WS Sutton	
	C.	Charles Darwin	D.	Watson and crick	
847)	Law of Independent assortment of genes was given by				C
	A.	Watson and Crick	B.	Hardy and Weinberg	
	C.	Gregor Mendel	D.	Charles Darwin	
848)	What Bioinformatics is?				C
	A.	A method of extracting information from current biological studies	B.	An extremely large biology textbook	
	C.	The computational part of Molecular Biology	D.	None of the above	
849)	An open reading frame (ORF) is.....				C
	A.	The sequence of a complete genome	B.	A plasmid vector used in genome sequencing	
	C.	A possible gene predicted by DNA sequencing	D.	A tool used in bioinformatics	
850)	Segments of DNA that results into protein is known as				A
	A.	Exon	B.	Null Alleles	
	C.	Intron	D.	Non of above	
851)	Termination of chain growth in protein synthesis is brought about by the codons				C
	A.	UCG, ACC, GCG	B.	UUG, UAG, UGA	
	C.	UAA, UGA, UAG	D.	UUG, UGC, UCA	
852)	_____ are popular as “Molecular stichers”				C
	A.	Restriction Endonuclease	B.	RNA polymerases	
	C.	Ligases	D.	DNA polymerases	
853)	A clone is a group of organisms developed by asexual method and are				A
	A.	Genetically similar	B.	Both a & b	
	C.	Genetically dissimilar	D.	None of these	
854)	A radioactive probe used in genetic analysis include				A
	A.	P32	B.	N12	
	C.	C14	D.	K38	
855)	Dolly, the first animal developed through cloning is				D
	A.	Camel	B.	Cow	
	C.	Rat	D.	Sheep	
856)	The expression cassette consists of				C
	A.	Cloning vector	B.	Terminator-gene-Promoter	
	C.	Promoter –gene –terminator	D.	Restriction sites	
857)	The hydrophilic compounds are those which _____ water				A
	A.	Love to bind	B.	Dissolve	

	C.	Hate to bind	D.	None of them	
858)	Enzymes are _____ in nature				A
	A.	Protein	B.	Hormones	
	C.	Nucleic acid	D.	Lipids	
859)	Study of the relationship between pharmaceuticals and genetics is called:				A
	A.	Pharmacogenomics	B.	Medicinal biotechnology	
	C.	Gene therapy	D.	Red Biotechnology	
860)	Environmental Biotechnology Cooperative Research Centre (EBCRC) is located in:				A
	A.	Australia	B.	America	
	C.	UK	D.	Japan	
861)	Bio-technique used for shortening of variety development time is:				B
	A.	Cryopreservation	B.	Anther culture	
	C.	Meristem culture	D.	Seed culture	
862)	Controlled temperature of growth room is:				C
	A.	20-30°C±2°C	B.	10-30°C±2°C	
	C.	15-30°C±2°C	D.	15-25°C±2°C	
863)	Successful autoclaving is confirmed by spore test of:				A
	A.	None of these	B.	<i>Agrobacterium rhizogenes</i>	
	C.	<i>Bacillus thuringiensis</i>	D.	<i>Agrobacterium tumefaciens</i>	
864)	Size of syringe filters used in plant tissue culture lab is:				B
	A.	0.65 µm	B.	0.2 µm	
	C.	0.45 µm	D.	0.01 µm	
865)	Wetting agents used to enhance sterilization are:				C
	A.	Tween 30	B.	Tween 80	
	C.	Both Tween 20 and 80	D.	None of these	
866)	Micro element in tissue culture media used to function in redox reactions is:				A
	A.	Fe	B.	Ca	
	C.	P	D.	S	

867)	First Gibberellin to be structurally characterized is:				B
	A.	GA ₂	B.	GA ₃	
	C.	GA ₁	D.	None of these	
868)	The best stage of cell suspensions for protoplast isolation is:				D
	A.	Lag phase	B.	Stationary phase	
	C.	Deceleration phase	D.	Log phase	
869)	DcSERK was identified in:				B
	A.	Rice	B.	Carrot	
	C.	Datura	D.	Wheat	
870)	S.V. is not restricted to, but particularly common in plants:				A
	A.	Regenerated from callus	B.	Regenerated from Cell suspension	
	C.	Regenerated from shoots	D.	None of these	
871)	Examples of changes in chromosome number in soma clones are:				D
	A.	Inversions	B.	Translocations	
	C.	Dislocations	D.	None of these	
872)	Isozymes are the results of:				D
	A.	Polyploidy	B.	Gene duplication	
	C.	Nucleic acid hybridization	D.	All of these	
873)	Limitations of SSRs are:				D
	A.	Dominance	B.	Reproducibility	
	C.	Mismatches	D.	None of these	
874)	Capacity of mature plant cells to return to meristematic condition is:				C
	A.	Differentiation	B.	Organogenesis	
	C.	Dedifferentiation	D.	All of these	
875)	Apomictic embryos are identical to:				A
	A.	Maternal parent	B.	Paternal parent	
	C.	Both parents	D.	F1 hybrids	
876)	Zygotic and somatic embryos become most comparable from:				B
	A.	Heart	B.	Globular	
	C.	Torpedo	D.	Octant	
877)	After induction, the growth of somatic embryos needs medium:				A
	A.	Without auxin	B.	With high auxin	
	C.	With cytokinin	D.	Without cytokinin	
878)	The most important growth regulator required for induction of somatic embryogenesis:				D
	A.	Biotin	B.	Ethylene	
	C.	Cytokinin	D.	Auxin	
879)	Haploid chromosome number of wheat is:				A
	A.	21	B.	31	
	C.	41	D.	42	
880)	Protoplasts cannot be isolated from cells of:				B
	A.	Animals	B.	Plants	
	C.	Bacteria	D.	Fungi	
881)	Plant tissues are macerated into single cells by:				B

	A. Rhozyme	B. Pectinases	
	C. Cellulases	D. Hemicellulases	
882)	After staining with FDA, viable protoplasts fluoresce:		C
	A. Blue	B. Bright red	
	C. Bright green	D. Colorless	
883)	For protoplast isolation plant cell suspensions should be used in:		A
	A. Log phase	B. Lag phase	
	C. Stationary phase	D. Deceleration phase	
884)	Protoplasts are more stable in:		B
	A. Hypotonic solution	B. Hypertonic solution	
	C. Isotonic solution	D. Isometric solution	
885)	Preferred carbohydrate in plant tissue culture media is:		A
	A. Sucrose	B. Glucose	
	C. Mannitol	D. Sorbitol	
886)	Prolonged exposure of in vitro plant cultures to 2,4-D results in:		C
	A. Somatic fusions	B. Protoplast generation	
	C. Soma-clonal variations	D. None of these	
887)	Cultured explants initiate callus mostly within		A
	A. 1-8 weeks	B. 1-2 weeks	
	C. 1-3 weeks	D. 1-4 weeks	
888)	Division of the cell nucleus is termed as:		B
	A. Cytokinesis	B. Karyokinesis	
	C. Rhizogenesis	D. None of these	
889)	Bacterial cell wall is composed of:		A
	A. Peptidoglycan	B. Glycoprotein S-layers	
	C. Salicylic acid	D. EDTA	
890)	MMCT was originally developed for:		D
	A. Plant cells	B. Fungal cells	
	C. Bacterial cells	D. Mammalian cells	
891)	Dye used to detect new cell wall formation of plant protoplasts is:		A
	A. Calcofluor white	B. Calcofluor red	
	C. FDA	D. Phenosafranine	
892)	Most widely used mitosis inhibitor is:		A
	A. Oryzaline	B. Colchicine	
	C. Phenosafranine	D. FDA	
893)	The bottleneck in somatic hybridization breeding programs is:		A
	A. Regeneration	B. Dedifferentiation	
	C. Low yield of protoplasts	D. Low viability of protoplasts	
894)	Hb solutions are artificial oxygen carriers with a shelf life of:		B
	A. ca. 3-4 years	B. ca. 1-2 years	
	C. ca. 1-2 days	D. ca. 1-2 months	
895)	Autopolyploidy arises by the fusion of gametes of:		A
	A. Same species	B. Different species	
	C. Recipient parent species	D. Donor parent species	
896)	Polyembryony, pollen-ovule sterility, sexual and graft incompatibilities are limitations in:		C
	A. Potato breeding	B. Tomato breeding	
	C. Citrus breeding	D. Tobacco breeding	
897)	Direct production of triploids is possible in citrus by:		B
	A. Haploid + haploid fusion	B. Haploid + diploid fusion	

	C. Diploid + diploid fusion	D. Haploid + triploid fusion	
898)	Conventional crossing of citrus somatic hybrids at tetraploid level produces:		B
	A. Haploids	B. Tetrazygs	
	C. Cybrids	D. Hexaploids	
899)	In 1999, Citrus protoplast fusion program was initiated at:		B
	A. USDA	B. CREC	
	C. ICRISAT	D. ICCARDA	
900)	Maternal to paternal EBN ratio in the potato hybrid endosperm is:		A
	A. 2:1	B. 2:2	
	C. 1:4	D. 3:2	
901)	2-4 chloroplast grains in guard cells approximately correspond to:		D
	A. 6X	B. 4X	
	C. 3X	D. 2X	
902)	In 1978, Melchers and his co-workers developed the first:		A
	A. Intergeneric somatic hybrid	B. Interspecific	
	C. Inter family somatic hybrid	D. Cybrid	
903)	Surface negative charge on plant protoplasts is reduced by:		B
	A. Mg	B. Ca ⁺⁺	
	C. K	D. Zn	
904)	High genetic instability is often associated with:		B
	A. Meristem culture	B. Protoplast culture	
	C. Nodal culture	D. Colonal propagation	
905)	The somatic hybrids have novel traits mostly due to recombination in:		C
	A. Nuclear genome	B. Chloroplast genome	
	C. Mitochondrial genome	D. All genomes in a cell	
906)	In Electrofusion, the basis of cell manipulation and alignment is:		A
	A. Dielectrophoresis	B. DC pulse	
	C. AC pulse	D. PEG	
907)	Kelier and Melchers pioneered protoplast fusion method namely:		A
	A. High pH/Ca	B. Sodium nitrate	
	C. Electrofusion	D. PEG	
908)	To be successfully exploited in crop improvement programs, somatic hybrids must be:		B
	A. High yielding	B. Fertile	
	C. Infertile	D. Pure	
909)	PEG protoplast fusion sometimes causes deformation of mitochondria due to:		A
	A. Impurities	B. High osmolarity	
	C. Low pH	D. High density	
910)	During protoplast electrofusion, DC pulse induces:		C
	A. Pearl chain formation	B. High yield of protoplasts	
	C. Breakdown of plasma membrane	D. Low protoplast viability	
911)	For protoplast electrofusion preferred DC pulse is:		A
	A. Shorter at high voltage	B. Long and high voltage	
	C. Low and high voltage	D. Not required	
912)	High voltage of DC pulse facilitates protoplast fusion at the cost of:		B
	A. Yield	B. Viability	
	C. Regenerability	D. Colony formation	
913)	Plant protoplast cultures are initially incubated in:		B
	A. Light	B. Dark	
	C. Very high humidity	D. High temperature	

914)	Doubled haploids are:		C
	A. Heterozygous	B. Self duplicating	
	C. True breeding	D. Albinos	
915)	Guha and Maheshwari cultured anthers of:		A
	A. <i>Datura innoxia</i>	B. <i>Datura ennoxia</i>	
	C. <i>Datura innocia</i>	D. <i>Datura inoxia</i>	
916)	Totipotent pollen grains- derived development of haploids is called:		A
	A. Androgenesis	B. Organogenesis	
	C. Somatic embryogenesis	D. Gynogenesis	
917)	Number of nuclei in mature pollen is:		C
	A. 1	B. 2	
	C. 3	D. 5	
918)	High frequency of albino plants regeneration is the limitation of:		B
	A. Microspore culture	B. Anther culture	
	C. Leaf culture	D. Meristem culture	
919)	Plant cells immersed in isotonic solution become:		A
	A. Flaccid	B. Plasmolyzed	
	C. Turgid	D. Protoplasts	
920)	Mechanical protoplast isolation is suitable for:		B
	A. Scale	B. Onion bulbs	
	C. Radish roots	D. All of these	
921)	Most protoplast culture media have reduced concentration of:		A
	A. Zinc and Ammonium	B. Zinc and Calcium	
	C. Boron and Calcium	D. Magnesium and Ammonium	
922)	Auxins and cytokinins are detrimental to the growth of:		C
	A. Potato protoplasts	B. Cereal protoplasts	
	C. Citrus protoplasts	D. Root meristem	
923)	IPE is calculated:		B
	A. 10 D after culture	B. 15 D after culture	
	C. 25 D after culture	D. 30 D after culture	
924)	CPW solution was devised by:		A
	A. Cocking and Peberdy	B. Power and Cocking	
	C. Cocking and MR Davey	D. Cocking and Maheshwari	
925)	Plant Protoplasts are cultured at a density of:		A
	A. 1×10^4 to 1×10^5 ppt ml ⁻¹	B. 1×10^4 to 1×10^6 ppt ml ⁻¹	
	C. 1×10^5 to 1×10^6 ppt ml ⁻¹	D. 1×10^4 to 2×10^6 ppt ml ⁻¹	
926)	Protoplasts with poorly developed walls may become:		B
	A. Uninucleate	B. Multinucleate	
	C. Unviable	D. Somatic embryo	
927)	Cryopreservation is the storage of living cells at:		C
	A. -176°C	B. -186°C	
	C. -196°C	D. -198°C	
928)	Different areas of Cryobiology are:		A
	A. Cryopreservation and cryonics	B. Biotechnology	
	C. Tissue culture	D. Transgenic technology	
929)	PEG and PVP are used in cryopreservation as:		A
	A. Penetrating cryoprotectants	B. Non penetrating cryoprotectants	
	C. Substituting cryoprotectants	D. Regenerating cryoprotectants	
930)	Cryopreservation helps preserve plant genetic resources for:		D

	A. 10 years	B. 70 years	
	C. 100 years	D. Unlimited periods	
931)	Molecular weight of PEG effective for fusion is:		B
	A. 200-20,000	B. 6000-8000	
	C. 4000-10,000	D. 1000-20,000	
932)	PEG is negative in polarity due to:		A
	A. Ether linkages	B. More Calcium ions	
	C. OH bonds	D. Low H ions	
933)	One of the followings is not Direct DNA delivery method:		A
	A. <i>Agrobacterium tumefaciens</i> - mediated	B. Biolistic	
	C. Electroporation	D. Microinjection	
934)	The oldest and reliable method of direct DNA transfer in plants is:		B
	A. Gene gun	B. PEG- mediated	
	C. Microinjection	D. NANO3- mediated	
935)	Plant protoplasts cannot be transformed via:		A
	A. <i>A. rhizogenes</i>	B. Microinjection	
	C. PEG	D. Electroporation	
936)	The method of choice for chloroplast transformation is:		B
	A. Sonication- mediated	B. Gene gun	
	C. PEG	D. Virus- mediated	
937)	Transgenics with high copy number of introduced DNA are produced via:		A
	A. Gene gun	B. <i>A. tumefaciens</i> mediated	
	C. In planta transformation	D. Electroporation	
938)	Brazil nut allergy was found in:		B
	A. GM Canola	B. GM Soybean	
	C. GM Maize	D. GM Peanut	
939)	HGT of nptII gene can occur		A
	A. 1 in 10 Billion	B. 10 in 1 Billion	
	C. 1 in 10 Million	D. 1 in 100 Billion	
940)	Amount of RNA ingested by humans is:		D
	A. 0.1 to 1 g/day	B. 0.1 to 100 g/day	
	C. 1.0 to 10 g/day	D. None of these	
941)	Probability of concerns for 35S promoter of CaMV is:		A
	A. Very low	B. Very high	
	C. Moderate	D. Not known	
942)	Highly glyphosate resistant Rye grass is found in:		C
	A. Canada	B. US	
	C. Australia	D. Austria	
943)	Chloroplast transformation is one of the methods to:		B
	A. Develop Golden rice	B. Prevent gene flow	
	C. Develop commercial Bt corn	D. Excise marker gene	
944)	Resistance of target species is prevented by:		A
	A. Gene pyramiding	B. Gene containment	
	C. Gene flow	D. Gene excision	
945)	Electroporation uses large electric pulse to disturb:		B
	A. Chloroplast	B. Phospholipid bilayer	
	C. Cytoplasm	D. Nucleus	
946)	Promotion of IP leads to:		D
	A. Economic growth	B. Creates new jobs	

	C. Enhances quality of life	D. All of these	
947)	The method of choice for chloroplast transformation is:		C
	A. Microinjection	B. Electroporation	
	C. Biolistics	D. Agrobacterium-mediated	
948)	IPO Pakistan was established in:		A
	A. April 2005	B. April 2010	
	C. April 2020	D. None of these	
949)	Who makes rules for ethical research?		B
	A. State	B. Government	
	C. Scientists	D. Researchers	
950)	Patent office of IPO Pakistan is in:		C
	A. Islamabad	B. Lahore	
	C. Karachi	D. Rawalpindi	
951)	Direct DNA delivery method not for protoplasts include:		D
	A. Laser microbeams	B. Silicon carbide fibers	
	C. Biolistics	D. All of these	
952)	Making liposomes is:		B
	A. Easy	B. Complicated	
	C. Precise	D. Simple and efficient	
953)	Liposomes can be created by:		A
	A. Forming a bilayer around DNA	B. Mixing DNA with lipids	
	C. Mixing RNA with lipids	D. None of these	
954)	Plant Protoplast transformation methods are:		D
	A. Electroporation	B. PEG-mediated	
	C. Microinjection	D. All of these	
955)	Plasmids with MCS harbor restriction sites up to:		A
	A. 20	B. 30	
	C. 40	D. 100	
956)	The Protein-encoding genes of plasmid are located near the:		A
	A. Ori	B. Vir region	
	C. Selectable marker	D. All of these	
957)	In pBR322 cloning vector, what does BR stand for:		B
	A. Initials of scientists	B. <i>Bacillus rubi</i>	
	C. Bacteriophage resistance	D. Bacterial replication	
958)	Fusion of Antibody-forming cells with tumor cells leads to:		C
	A. Somatic hybrids	B. Somatic fusions	
	C. Hybridomas	D. Vaccines	
959)	Rolling circle amplification can be used for		C
	A. Enveloped RNA viruses	B. Mega DNA viruses	
	C. Circular DNA viruses	D. All are correct	
960)	Phi29 is preferred to be used in viral research because		A
	A. It can amplify the circular DNA molecules even without thermal cycler machine	B. Its mode of action is similar to Taq polymerase	
	C. It can amplify all sorts of DNA in the cells	D. It is easy to purify and used in the laboratory	
961)	Followings are methods to grow viruses except		A
	A. Cartilage tissue	B. Abraded plant leaves	

	C.	Fertile eggs of chicken	D.	Cultured cells	
962)	Cell lines, small animals, and Arabidopsis are -----to study viruses				A
	A.	Model hosts	B.	Non-hosts	
	C.	Superior than Hela cell lines	D.	Primitive species	
963)	The phylogenetic tree can be used to infer				D
	A.	Establish the evolutionary relationship	B.	Detection of positive selection	
	C.	Determine the relationship between ancestors and their off springs	D.	all are correct	
964)	Viruses are obligate intracellular parasites because				A
	A.	They can only be maintained inside the cell.	B.	They infect all kingdoms of life	
	C.	They are not cells	D.	Their size range is very small	
965)	Viruses are metastable because				A
	A.	When they attach to the cell they can un-coat their coat proteins	B.	They can replicate inside or outside the nucleus	
	C.	They can assemble inside the cells	D.	All the options are correct	
966)	The difference between an enveloped and non-enveloped virus is				B
	A.	Presence of a strong coat protein around the virion	B.	Presence of a strong coat protein and a lipid layer around the virion of enveloped virus	
	C.	Small single stranded RNA binding proteins are bound to naked RNA	D.	Enveloped viruses can not un-coat their virions inside the cells	
967)	One of the followings is not a requirement for virus entry into the cell				C
	A.	The host defence should be inactive at the entry site	B.	The cell surface of a permissive cell should be accessible	
	C.	Cells should have porous membranes for virus entry into the cell	D.	All are correct	
968)	The plant viruses move from cell to cell through				B
	A.	Diffusion	B.	Stomata connections	
	C.	Osmosis	D.	Certain proteins	
969)	The main difference between plants and animals viruses is absence or presence of				A

	A. Cellular receptors	B. Actin transport systems	
	C. Carrier proteins	D. Insect vectors	
970)	In ----- viruses multiply in the insect vector and can be found in different organs and tissue such as muscle, nervous tissue, connective tissue, salivary glands and fat		A
	A. Circulative propagative transmission	B. Circulative non-propagative transmission	
	C. Diffusion	D. All are correct	
971)	A receptor specified for one virus		B
	A. Can not be used by any other virus	B. Have its cellular function and can be used by multiple viruses	
	C. Is evolved for virus and cant be used by host	D. Can be removed without impairing cellular function	
972)	RNA dependent RNA polymerase is an enzyme which can catalyze RNA from DNA template		B
	A. Which can catalyze RNA from DNA template	B. Which can catalyze RNA from RNA template	
	C. Which can catalyze DNA from DNA template	D. Which can catalyze DNA from RNA template	
973)	Which of the followings statements is incorrect regarding virus replication and protein synthesis		B
	A. RNA viruses encode their own RdRP	B. RNA genomes can be copied from end to end, but loss of nucleotides can occur	
	C. RNA genomes cannot be replicated from any of the nucleotides in a genome. Therefore an origin of replication is required	D. All the viruses must make RNA which can be translated by host protein synthesis machinery	
975)	The NLS stands for		A
	A. Nuclear localizing signal	B. Nucleotides localizing signal	
	C. Nuclear polarizing signal	D. All are correct	
976)	The type of autophagy in which autophagosome travels through the cytoplasm of the cell to a lysosome in mammals, or vacuoles in yeast and plants, and the two organelles fuse is called as		B
	A. Micro-autophagy	B. Macro-autophagy	
	C. Clathrin mediated autophagy	D. All are correct	
977)	The selective degradation by mitochondria is called		B
	A. Chaperon mediated autophagy	B. Mitophagy	
	C. Nuclear controlled Mitophagy	D. All are correct	
978)	The kinases which regulate the autophagy are activated by		A

	A. Growth factors and reactive oxygen species	B. Cytokinesis and diakinetics	
	C. Cell division related or CDC proteins	D. All are correct	
979)	The autophagic degradation of infectious particles is called		C
	A. Phagolysosomes	B. Vacuole mediated autophagy	
	C. Xenophagy	D. All are correct	
980)	The largest and most widespread family of cell surface receptors, found in all Eukaryote		D
	A. Are usually trans membrane proteins receptors	B. Are activated by GTPases	
	C. Have both hydrophilic and hydrophobic proteins	D. All are correct	
981)	In conjugated proteins		B
	A. The amino acids are always linked with each other by a weak bond	B. The proteins are usually attached with non-amino acids components	
	C. Hydrophobic group of organic compounds	D. All are correct	
982)	The prosthetic group of protein can be		D
	A. A metal ion and carbohydrate	B. A lipid molecule and phosphoric acid	
	C. Nucleic acid or FAD	D. All are correct	
983)	Protein prenylation involves the transfer of either		A
	A. A farnesyl or a geranyl-geranyl moiety to C-terminal cysteine(s) of the target protein	B. Prosthetic group like carbohydrates of long carbon chains	
	C. A nucleotide or phosphoric acids	D. Cytoskeleton or vesicle	
984)	Prenyltransferases participate in signal transduction pathways except		D
	A. Related to cell growth	B. Differentiation	
	C. Cytoskeletal function	D. Nucleic acids synthesis	
985)	All the proteins are synthesized in -----and modified in the organelles like----		B
	A. Nucleus and mitochondria	B. Rough endoplasmic reticulum and Golgi bodies	
	C. Smooth endoplasmic reticulum and vacuole	D. Peroxisomes and lysosomes	
	Key principles of evolution includes		D

986)	A.	Self replication	B.	Variation	
	C.	Selection	D.	All are correct	
987)	Molecular systems biology uses				A
	A.	Holistic approach	B.	Reductionist approach	
	C.	Enthusiastic approach	D.	Rational approach	
988)	Mapping higher order eukaryotic genome structure involved				B
	A.	DNA Sequencing	B.	Cross linking of DNA	
	C.	Degradation of DNA	D.	Chromosomal integration	
989)	If you know the DNA sequence, you can determine				D
	A.	Protein sequence	B.	RNA sequence	
	C.	Secondary structure of protein	D.	All are correct	
990)	We can diagnose the viruses through any of the methods except				D
	A.	PCR	B.	Rolling circle amplification	
	C.	Elisa	D.	Nucleic acids transformation	
991)	The order in which we extract DNA includes,				B
	A.	Cell lysis, removal of lipids, RNA and precipitation of DNA	B.	Cell lysis, removal of lipids, proteins, RNA and precipitation of DNA	
	C.	Cell lysis, removal of proteins by detergents, Lipid solubilisation, RNA and precipitation of DNA	D.	All are correct	
992)	The Koch's postulates are applicable except for				B
	A.	The parasites occur in all pathological conditions and can be isolated from the diseased parts	B.	The isolated parasite can always be grown and pure cultures can cause new diseases	
	C.	If no parasite occurs, then no disease is there.	D.	The parasite can be re-isolated from an experimentally inoculated host.	

993)	After Koch's postulates Evan added the followings except,		D
A.	Incidence of the disease should be significantly higher in those exposed to the putative cause than in those not exposed	B.	Elimination or modification of the putative cause or of the vector carrying it should decrease the incidence of the disease.
C.	Prevention or modification of the host's response on exposure to the putative cause should decrease or eliminate the disease	D.	The pathogen must be sequenced at molecular level to confirm the disease
994)	One of the statements about plasmid is not true		C
A.	They are circular in nature	B.	They carry antibiotic resistance
C.	Due to their short size they can not be used as a vector in gene transfer	D.	They are extra chromosomal in bacteria
995)	One of the followings is not a step in plasmid isolation		B
A.	Harvest the bacteria, get the supernatant, re-suspend the cells and get their lysis and purify through column	B.	Harvest the plasmid along with chromosomal DNA and discard the pellet of bacteria
C.	The supernatant after centrifugation contains plasmid, so it should be used to purify the plasmid	D.	The plasmid can be eluted in TE or dH2O
996)	We grow the plasmids in laboratory because		D
A.	We need to get large quantity of organisms	B.	We want to use them in industry
C.	We may need to purify the recombinant protein	D.	All are correct
997)	Liquid culture is best when		A
A.	We want to rapidly grow the bacteria or when we want to get the growth of the cells	B.	There is a lack of oxygen and bacterial growth is required
C.	To avoid any contamination	D.	To provide the best conditions for contaminants to grow
998)	-----macroscopically visible collection of millions of bacteria originating from a single bacterial cell.		C
A.	Plaque	B.	Fungal spores
C.	Colony	D.	All are correct
999)	Transgenic plants can be tested through		A
A.	PCR, Elisa and blotting techniques	B.	Transgenic vectors

	C.	Environmental factors	D.	<i>Agrobacterium tumefaciens</i>	
1000)	In genetics, sense strand is complementary to				D
	A.	Antisense strand	B.	mRNA	
	C.	None the above	D.	Both 1&2	