EXERCISE – I (Conceptual Question)

## PRINCIPLES AND PROCESSES

1.	Agro bacterium tumefaciens used in Genet (1) DNA-mapping (3) Gene transfer	<ul> <li>(2) DNA-modification</li> <li>(4) DNA finger printing</li> </ul>				
2.	Biologically functional gene coding for ty 1979 had:- (1) 333 nucleotide pairs	rosine t-RNA of E. coil synthesized by Khorana in $(2)$ 212 muchaetide point				
	(3) 77 nucleotide pairs	(4) 207 nucleotide pairs				
3.	Who isolated the first restriction endonucle (1) Temin & Baltimore (3) Smith	ases :- (2) Sanger				
	(5) 511101	(4) I auf berg				
4.	Genetic engineering is :- (1) Study of extra nuclear gene (3) Manipulation of RNA	(2) Manipulation of genes by artificial method (4) Manipulation of enzymes				
5.	Polymerase chain reaction technology (PCI (1) DNA identification (3) DNA amplification	R-technique) is used for :- (2) DNA Repair (4) Cleave DNA				
6.	Which structure involved in genetic engine(1) Plastid(2) Plasmid	ering:- (3) Codon (4) None				
7.	Which of the following is the example of c (1) Eco – RI (2) Hind-III	hemical scissors- (3) Bam-I (4) All the above				
8.	Restriction endonucleases are used in gener (1) They can degrade harmful proteins (3) They can cut DNA at variable site	tic engineering because :- (2) They can join DNA fragments (4) They can cut DNA at specific base sequences				
9.	When the genotype of an organism is important called	roved by the addition of foreign gene, the process is				
	(1) Tissue culture (2) Genetic diversity	(3) Genetic engineering (4) Plastic surgery				
10.	A genetically manipulated organism conta another species is called :-	aining in its genome one or more inserted gene of				
	<ul><li>(1) Transposon</li><li>(3) Transgenic organism</li></ul>	<ul><li>(2) Gene expression</li><li>(4) Retroposons</li></ul>				
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11.	Which vector is commonly used in the transfer of gene in a crop plant –(1) Plasmids of B. Subtilis(2) Bacteriophages(3) Ti-plasmids of Agrobacterium(4) E. Coli Phages								
12.	The tumour indusing capacity of Agrobacterium tumaefaciens is located in large extrachromosomal plasmid and called – (1) Ti-plasmid (2) Ri-plamid (3) Lambda phase (4) Plasmid P <sup>BR 322</sup>								
13.	Genetic engineering aims at :- (1) Destroying wild gene (2) Preserving defective gene (3) Curing human disease by introducing new gene (4) All the –above								
14.	A piece of nucleic acid using to find out a gene, by forming hybrid with it, is called as :-(1) c- DNA(2) DNA probe(3) Sticky end(4) Blunt end								
15.	Taq- polymerase which is used for amplification of DNA related with :-(1) Hybridoma technique(2) PCR-technique(3) Gene cloning(4) r-ONA technology								
16.	<ul> <li>What is true for plasmid :-</li> <li>(1) Plasmids are widely used in gene transfer</li> <li>(2) These are found in virus</li> <li>(3) Plasmid contains gene for vital activities</li> <li>(4) These are main part of chromosome</li> </ul>								
17.	Which of the following cuts the DNA from specific places :-(1) Restriction(2) Ligase(3) Exonuclease(4) Alkaline phosphate								
18.	Manipulation of DNA in genetic engineering became possible due to the discovery of :-(1) Restriction endonuclease(2) DNA ligase(3) Transcriptase(4) Primase								
19.	Which one of the following has found extensive use in genetic engineering work in plants(1) Bacillus coagulens(2) Agrobacterium tumefaciens.(3) Clostridium septicum(4) Xanthomonas citri								
20.	Restriction enzymes (1) Are endonucleases which cleave DNA at specific 'sites (2) Make DNA complementary to an existing DNA or RNA (3) Cut or join DNA fragments (4) Are required in vectorless direct gene transfer.								
21.	Restriction endonucleases :- (1) Are synthesized by bacteria as part of their defense mechanism (2) Are present in mammalian cells for degradation of DNA when the cell dies (3) Are used in genetic engineering for ligating two DNA molecules								

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(4) Are used for invitro DNA synthesis

- 22. The Ti plasmid, is often used for making transgenic plants. This plasmid is found in :-
  - (1) Yeast as a 2 pm plasmid
  - (2) Azotobacter
  - (3) Rhizobium of the roots of leguminous plants
  - (4) Agrobacterium
- Which of the following is the example of direct gene transfer :(1) Microinjection (2) Electroporation (3) Particle gun (4)
  - (4) All the above
- 25. Thermal cycle takes place in which technique (1) Gel electrophoresis (2) PCR-technique
  - (3) Centrifugation

- (4) Southern blotting
- 26. PCR-technique is used in :(1) Production of transgenic microbes
  (3) Forensic investigation
- (2) Production of genetically modified food(4) r-DNA technique

- 27. BACs and YACs are :-
  - (1) Natural DNA obtained from bacteria and yeast
  - (2) Useful vectors for eucaryotic gene transfer
  - (3) Artificial DNA obtained from bacteria and yeast
  - (4) (2) & (3) both
- 28. Restriction enzymes are :-
  - (1) Not always required in genetic engineering
  - (2) Essential tool in genetic engineering
  - (3) Nucleases that cleave DNA at specific sites
  - (4) (2) and (3) both
- 29. Function of restriction endonuclease enzyme is :
  - (1) Useful in genetic engineering
  - (2) Protects the bacterial DNA against foreign DNA
  - (3) Helpful in transcription
  - (4) Helpful in protein synthesis
- 30. Electroporation procedure involves :

(1) Fast passage of food through sieve pores in phloem elements with the help of electric stimulation.

- (2) Opening of stomatal pores during night by artificial light
- (3) Making transient pores in the cell membrane to introduce gene constructs
- (4) Purification of saline water with the help of a membrane system.
- 31. Which of the following restriction endonuclease enzyme produce blunt end in DNA:-

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	(1) Bam HI $\begin{array}{c} \downarrow \\ GGATCC \\ CCTAGG \\ \uparrow \end{array}$	$(2) ECORI \qquad \begin{array}{c} \downarrow \\ GAATTC \\ CTTAAG \\ \uparrow \end{array}$
	$(3) Hae-III \begin{pmatrix} \downarrow \\ GGCC \\ CCGG \\ \uparrow \end{pmatrix}$	(4) All the above
32.	<ul> <li>A bacterium modifies its DNA by adding me</li> <li>(1) Clone its DNA</li> <li>(2) Be able to transcribe many genes simulta</li> <li>(3) Turn its gene on</li> <li>(4) Protect its DNA from its own restriction</li> </ul>	ethyl groups to the DNA, It does so to :- aneously enzyme
33.	The restriction enzyem ECQ RI has the prop (1) endonuclease activity (3) ligation activity	(2) exonuclease activity (4) correcting the topology of replicating DNA
34.	DNA ligase is an enzyme that catalyses the s (1) splitting of DNA threads into small bits (3) denaturation of DNA	<ul> <li>(2) joining of the fragments of DNA</li> <li>(4) synthesis of DNA</li> </ul>
35.	Agrobacterium tumefaciens contains a large termed as- (1) Ti plasmid (3) Recombinant plasmid	e plasmid, which induces tumour in the plants it is (2) Ri plasmid (4) Shine Delgrano sequence
36.	More advancement in genetic engineering is (1) Restriction endonuclease (3) Protease	due to:- (2) Reverse transcriptase (4) Zymase
37.	Which of the following is used as a best gen (1) Bacillus thuriengenesis (3) Pseudomonas putida	etic vector in plants:- (2) Agrobacterium tumifaciens (4) All of the above
38.	Which of the following enzyme is used to jo(1) Terminase(2) Endonuclease	in DNA fragments :- (3) Ligase (4) DNA polymerase
39.	A kind of Biotechnology involving manipula (1) DNA replication (3) Denaturation	ation of DNA is (2) Genetic engineering (4) Renaturation
40.	<ul><li>What is true of plasmid ?</li><li>(1) Found in viruses</li><li>(3) Part of nuclear chromosome</li></ul>	<ul><li>(2) Contains genes for vital activities</li><li>(4) Widely used in gerie transfer</li></ul>
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41.	A suitable vector for gene cloning in higher (1) Baculovirus (3) Salmonella typhimurium	er organism is (2) Retrovirus (4) Neurospora crassa					
42.	PCR proceeds in three distinct steps govern (1) Denaturation, Annealing, Synthesis (2) Synthesis, Annealing, Denaturation (3) Annealing, Synthesis, Denaturation (4) Denaturation, Synthesis, Annealing	ed by temperature they are in order of :-					
43.	What is the source of the Ti (Tumor inducinvector to deliver the desirable genes into pla (1) Agrobacterium tumifaciens (3) Pyrococcus furiosus	ng) plasmid which is modified and used as a cloning ant cells? (2) Thermophilus aquaticus (4) Aedes aegypti					
44.	The thermostable enzymes, 'Taq' and 'Pfu', (1) RNA polymerases (3) Restriction endonucleases	isolated from thermophilic bacteria are :- (2) DNA polymerases (4) DNA lipases					
45.	The term "molecular scissors" generally ref (1) DNA polymerases (3) Restriction endonucleases	ers to :- (2) RNA polymerases (4) DNA ligases					
46.	In the PCR technology the DNA segment is replicated over a billion times. This repeate replications catalyzed by the enzyme :- (1) DNA polymerase (3) DNA dependent RNA polymerase (4) Primase						
47.	The restriction enzyme(s) used in recombin leaving sticky ends is/are :- (1) Eco RI (2) HindIII	<ul><li>(3) BamHI (4) All of the above</li></ul>					
48.	Cohen and Boyer isolated an antibiotic resplasmid which was responsible for conferring (1) 1962 (2) 1965	istance gene, by cutting out a piece of DNA from a ng antibiotic resistance, in the year :- (3) 1972 (4) 1982					
49.	Restriction enzyme Eco Rl cuts the DNA between bases G and A only when the sequence in DNA is:- (1) GATATC (2) GAATTC (3) GATTCC (4) GAACTT						
50.	<ul> <li>'Transgenic' plants are produced by:-</li> <li>(1) Inducing gene mutation</li> <li>(2) Arresting spindle fiber formation</li> <li>(3) Deleting sex chromosomes</li> <li>(4) Introducing foreign genes</li> </ul>						
51.	For a DNA to function as a cloning vector t (1) multiple restriction sites (3) circular nature	he most essential requirement is :- (2) several selectable markers (4) 'ori' sequence					
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52.	According to EFB, "The integration of natural science and organisms, cells, parts thereof and molecular analogues for products and services," is known as-								
	(1) Biochemistry (2) Bioinformatics	(3) Biotechnology (4) Biology							
53.	The stickiness of DNA ends facilitates the a	action of which enzyme-							
	(1) DNA polymerase	(2) DNA Ligase							
	(3) Restriction endonuclease	(4) Alkaline phosphatase							
54.	. Which technique is used to check the progression of restriction enzyme digestion-								
	(1) PCR	(2) Gel electrophoresis							
	(3) Southern Blotting	(4) Staining							
55.	In gel electrophoresis, at which end of the g	el the sample is loaded?							
	(1) In the wells	(2) Towards positive electrode							
	(3) Towards negative electrode	(4) 1 & 3 both							
56.	An antibiotic resistance gene of plasmid vo	ector which get inactivated due to insertion of alien							
	DNA, helps in the selection of –								
	(1) Transformants	(2) Recombinants							
	(3) Non-Transformants	(4) 2& 3 both							
57.	In which type of bioreactor air bubbles drar	natically increases the oxygen transfer area?							
	(1) Simple stirred tank bioreactor	(2) Sparged stirred tank bioreactor							
	(3) Both 1 & 2	(4) None of these							
59	Constinue modification (CM) has been used t								
30.	(1) Create tailor made plants	(2) Supply alternative resources to industries							
	(3) Enhanced nutritional value of food	(4) All of the above							
59.	The choice of Bt-gene for experiment dependence (1) The last of the formation of the second s	nds upon-							
	(1) The host plant/crop (3) Bacillus strain	(2) Largeted pest/insect (4) 1 & 2 both							
	(5) Daemus strain	(+) 1 & 2 000							
60.	In nematode resistance by RNA interference	e, some specific genes were introduced which form							
	dsRNA. These were introduced in-								
	(1) Nematode (2) Host plant	(3) Agrobacterium (4) All of these							
61.	Select the incorrect match-								
	(1) Transgenic mice - Polio vaccine	(2) Rosie cow - $\alpha$ lactalbumin gene							
()	(3) ssDNA/RNA probe - Gene therapy	(4) PCR-Molecular diagnosis							
62.	In EcoRI, R is stand for (1) Strain (2) Spacing	(2) Conuc (1) Order							
	(1) Strain (2) Species	(3) Ochus (4) Oluci							
63.	Restriction endonucleases are used in gener	ic engineering to form							
	(1) Recombinant molecule of protein	-							
	(2) Recombinant molecule of DNA	7 A							
	(3) Recombinant molecule of protein & DNA								

(3) Recombinant molecule of protein & DNA

(4) Recombinant cell 64. Which instrument is used for the separation of DNA fragments-(1) PCR (2) Gel electrophoresis (3) Bioreactor (4) Restriction endonuclease 65. Which of following feature is not necessary for cloning vector-(1) Origin of replication (2) High copy number (3) Selectable marker (4) Cloning sites 66. Which of the following is not true for cloning vector (1) more than two origin site of replication (2) vector should have selectable marker gene (3) single recognition site for the commonly used restriction enzyme (4) pBR-322 have tetracycline resistance 67. Transformation is a procedure through which-(1) A piece of DNA is introduced in a host bacterium (2) A piece of DNA is introduced in a vector (3) A piece of DNA is introduced from protein (4) All 68. Second letter of the name of restriction endonuclease came from the (1) Genus of organism (2) Species of organism (3) Family of organism (4) Class of organism 69. To isolate DNA from fungi we have to break the wall. This is done by (2) Cellulose (1) Lysozyme (3) Invertase (4) Chitinase 70. Which of the following enzyme will get inactivated in insertional inactivation (1) Transacetylase (2) Permease (3)  $\beta$ -galactosidase (4) Taq-polymerase 71. In presence of chromogenic substrate recombinant bacteria gives (2) Colourless colonies (1) Red coloured colonies (3) Blue colonies (4) Green colonies 72. Which of the following enzyme is known as molecular scissors (2) DNA polymerase (1) Ligase (3) Restriction enzyme (4) Helicase 73. Which of the following is not required in PCR-(1) DNA primer (2) DNA template (3) RNA primer (4) Taq polymerase 74. The substrate for restriction enzyme is-(1) Single stranded RNA (2) Proteins (3) Double stranded DNA (4) Single stranded DNA 75. In recombinant DNA technology, the term vectors refers to-

(1) the enzyme that cuts DNA into restriction fragments

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	<ul> <li>(2) the sticky end of a DNA fragment</li> <li>(3) a plasmid used to transfer DNA into a living cell</li> <li>(4) a DNA probe used to identify a particular gene</li> </ul>									
76.	pBR-322 which is a (1) an original bact (3) a viral genome	frequently used as a vec erial plasmid	<ul> <li>ctor for cloning gene is-</li> <li>(2) a modified bacterial plasmid</li> <li>(4) a transposon</li> </ul>							
		APPLICATION O	F BIOTECHNOLOG	Y						
77.	Genetically engine (1) Thyroxin	ered bacteria have been (2) Testosterone	used in commercial p (3) Human insulin	in commercial production of Human insulin (4) Melatonium						
78.	<ul> <li>Important objective of biotechnology in agriculture section is</li> <li>(1) To produce pest resistant varieties of plants</li> <li>(2) To increase the nitrogen contant</li> <li>(3) To decrease the seed number</li> <li>(4) To increase the plant weight</li> </ul>									
79.	The name of drug used in cancer treatment produced by biotechnology is(1) Interferon(2) [HGH] Human growth hormone(3) TSH(4) Insulin									
80.	The prerequisites for (1) To search an an (2) To isolate the at (3) To join antibiot (4) All of the above	or biotechnological pro tibiotic producing micr ntibiotic gene ic gene with E. coli pla	duction of antibiotics i coorganism smid	S						
81.	Modem biotechnology consist :(1) Genetic engineering(2) tissue culture(3) Microbiology(4) All the above									
82.	First artificially syn (1) Secretin	nthesysed hormone is : (2) Insulin	(3) Glucagen	(4)Renin						
83.	Transgenic animal (1) Foreign DNA is (3) Foreign DNA is	has s all its cells s some of the cells	(2) Foreign RNA is (4) Both 2 and 3	all its cells						
84.	The protein product controlling:-	ets of the following B	t toxin genes crylAc a	and cryllAb are responsible for						
	(1) Bolloworm	(2) Roundworm	(3) Moth	(4) Fruit fly						
85.	A transgenic rice (( (1) Vitamin A	Golden rice) has been d (2) Viamin B <sub>1</sub>	leveloped for increased (3) Vitamin C	l content of :- (4) Vitamin D						

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86.	During the processing of the prohormone"proinsulin" into the mature "insulin"(1) C-peptide is added to proinsulin(2) C-peptide is removed from proinsulin(3) B-peptide is added to proinsulin(4) B-peptide is removed from proinsulin								
87.	A genetically engineered bacteria used for clearing oil spills is :-(1) Escherischia coli(2) Bacillus subtilis(3) Agrobacterium tumifaciens(4) Pseudomonas putida								
88.	First transgenic plant :-(3) Tobacco(4) Maize(1) Potato(2) Tomato(3) Tobacco(4) Maize								
89.	E. coli are used in production of :- (1) Rifampicin(2) LH(3) Ecdyson(4) Interferon								
90.	A giant rat is formed in the laboratory, what is the reason-(1) Gene mutation(2) Gene synthesis(3) Gene manipulation(4) Gene replication								
91.	<ul> <li>Cultivation of Bt cotton has been much in the news. The prefix "Bt" means :- <ul> <li>(1) "Barium - treated" cotton seeds.</li> <li>(2) "Bigger thread" variety of cotton with batter tensile strength.</li> <li>(3) Produced by "biotechnology" using restriction enzymes and ligases.</li> <li>(4) Carrying an endotoxin gene from Bacillus thuringiensis.</li> </ul></li></ul>								
92.	<ul> <li>The bacteria Pseudomonas is useful because of its ability to :-</li> <li>(1) Transfer genes from one plant to another</li> <li>(2) Decompose a variety of organic compounds</li> <li>(3) Fix atmospheric nitrogen in the soil</li> <li>(4) Produce a wide variety of antibiotics</li> </ul>								
93.	Cry-gene which synthesize crystal protein isolated from :-(1) Bacillus thuriengensis(2) Rhizobium(3) Bacillus polymyxa(4) Clostridium								
94.	<ul> <li>Which of the following combination of risk are associated with genetically modified food :-</li> <li>(1) Toxicity</li> <li>(2) Allergic reaction</li> <li>(3) Antibiotic resistance in microorganism present</li> <li>(4) All the above</li> </ul>								
95.	Gene therapy first used in the treatment of :-(1) Albinism(2) Haemophilia(3) SCID(4) LIQID								
96.	<ul> <li>DNA probe is used for :-</li> <li>(1) DNA finger printing</li> <li>(2) Detection of pathogenic bacteria</li> <li>(3) Medical genetics to find whether a person carries a particular gene or not</li> </ul>								

(4) All the above

97.	Bacillus thuringiensis (1) Bioinsecticidal pla (3) Biofertilizers	(Bt) strains have beer ants	used for designing novel- (2) Bio-mineralization processes (4) Bio-metallurgical techniques				
98.	Bt-cotton is resistant f (1) Round-worm	for :- (2) Fluke – worm	(3) Boll-worm	(4) Pin-worm			
99.	Genetically engineere (1) Humulin	d human insulin is cal (2) Haematin	led :- (3) Hybridoma	(4) Hybrid			
100.	The C-peptide is (1) not present in proi (3) removed during m	nsulin aturation of insulin	<ul><li>(2) present in mature insulin</li><li>(4) also present in artificial insulin</li></ul>				
101.	<ul> <li>GEAC makes decisions regarding</li> <li>(1) the validity of GM research</li> <li>(2) the safety of introducing GM organisms for public services</li> <li>(3) the validity of biopatents</li> <li>(4) more than one options are correct</li> </ul>						
102.	The use of bio-resou authorization from the (1) Biopatent	rces by multinational e countries & people c (2) Biopiracy	companies & other oncerned, is known as (3) Biowar	organisations without proper - (4) Biodiversity			
103.	The Indian parliament (1) 1 <sup>st</sup>	t has recently cleared $(2) 2^{nd}$	which amendment of th (3) 3 <sup>rd</sup>	ne Indian patents bill. (4) 4 <sup>th</sup>			
104.	Which of the followin (1) A-peptide	ng Peptide chain in not (2) B-peptide	present in mature insu (3) C-peptide	llin. (4) A & B peptide			

	ANSWER KEY												
EXERCISE-I (Conceptual Question)													
1.	(3)	2.	(4)	3.	(3)	4.	(2)	5.	(3)	6.	(2)	7.	(4)
8.	(4)	9.	(3)	10.	(3)	11.	(3)	12.	(1)	13.	(3)	14.	(2)
15.	(2)	16.	(1)	17.	(1)	18.	(1)	19.	(2)	20.	(1)	21.	(1)
22.	(4)	23.	(4)	24.	(3)	25.	(2)	26.	(3)	27.	(4)	28.	(4)
29.	(2)	30.	(3)	31.	(3)	32.	(4)	33.	(1)	34.	(2)	35.	(1)
36.	(1)	37.	(2)	38.	(3)	39.	(2)	40.	(4)	41.	(2)	42.	(1)
43.	(1)	44.	(2)	45.	(3)	46.	(2)	47.	(4)	48.	(3)	49.	(2)
50.	(4)	51.	$(4)^{(-)}$	52.	(3)	53.	(2)	54.	(2)	55.	(4)	56.	(2)
57.	(2)	58.	(4)	59.	(2) (4)	60.	(2)	61.	(3)	62.	(1)	63.	(2)
64.	(2)	65.	(2)	66.	(1)	67.	(1)	68.	(2)	69.	(4)	70.	(3)
71.	(2)	72.	(3)	73.	(3)	74.	(3)	75.	(3)	76.	(2)	77.	(3)
78.	(1)	79.	(1)	80.	(3) (4)	81.	(3) (4)	82.	(2)	83.	(1)	84.	(1)
85	(1)	86	(1) (2)	87	(1)	88	(3)	89	(2) (4)	90	(1)	91	(1) (4)
92	(1) (2)	93	(2) (1)	94	(1)	95	(3)	96	(4)	97	(3) (1)	98	$(\mathbf{i})$
<i>9</i> <u>2</u> .	(2) (1)	75. 100	(1)	101	$(\mathbf{T})$	102	(2)	103	(7)	104	(1) (3)	70.	(J)
<i>))</i> .	(1)	100.	$(\mathbf{J})$	101.	(+)	104.	(2)	105.	(4)	104.	$(\mathbf{J})$		