Exercise-1

**A Marked Questions are for Revision Questions.** 

### **ONLY ONE OPTION CORRECT TYPE**

	SECT	ON - A # PRINCIPL	ES OF BIOTECHNC	DLOGY	
1.	Utilization of living orga known as	anisms / systems, proce	esses for producing materials useful to human society is		
	(1) Applied biology	(2) Technology	(3) Biotechnology	(4) Biomedical engineering	
2.	Nobel Prize of 1978 for	restrication endonucleas	se technology was given	to	
	(1) Temin and Baltimor	е	(2) Milstein and Kohler		
	(3) Arber, Nathans and	Smith	(4) Holley, Khorana and	d Nirenberg	
3.	Genetic engineering wo	ould not have been possi	ble if one of these were	absent	
	(1) DNA polymerase		(2) Reverse transcripta	se	
	(3) DNA ligase		(4) RNA synthetase		
4.2	In the process of recor molecule known as-	nbinant DNA technology	, the isolated foreign DN	IA is inserted into another DNA	
	(1) DNA vector	(2) RNA vector	(3) Protein vector	(4) Cloning vector	
5.	To prevent recirculation	n of vector DNA and to in	crease the frequency of	production of recombinant DNA	
	(1) Reverse transcripta	se is used	(2) Alkaline phosphatases are used		
	(3) Acid phosphatases	are used	(4) All of them can be used		
6.2	"Molecular Scissors" us	sed in genetic engineerin	g is		
	(1) DNA polymerase		(2) DNA ligase		
	(3) Restriction endonuc	clease	(4) Helicase		
7.	How many types of res	triction endonucleases a	re present?		
	(1) Two types	(2) Three types	(3) Four types	(4) Five types	
8.2	The first restriction end	onuclease was			
	(1) Eco R-II	(2) Hind-II	(3) Hind-III	(4) Ava-I	
9.2	Identify the palindromic	sequence.			
	(1) 5'–CATTC – 3'	(2) 5' – AACTC –3'	(3) 5' GAATTC – 3'	(4) 5'-CTTCC-3'	
	3' GTAAG – 5'	3'–TTGAG – 5'	3' CTTAAG – 5'	3' GAAGG – 5'	
	eroti				
	3EC11	UN - D # PRUCESS			
1.24	The polymerase chain	reaction (PCR) is a powe	erful technique to		
	(1) Mutate genes		(2) Multiply genes		
	(3) Inhibit DNA synthes	is	(4) Induce protein synthesis		

2. Taq polymerase enzyme is used in
(1) restriction mapping (2) gene cloning (3) PCR (4) All of these

#### BIOTECHNOLOGY

- **3.** Which of the following is a method of gene transfer?
  - (1) Microinjection (2) Particle gun (3) Electroporation (4) All of these
- Large scale production of biotechonolgical products involves use of
   (1) Bioreactor/fermenter (2) Electrophoresis
   (3) RFLP
   (4) PCR
- 5. The process of making temporary/transitory opening in the cell membrane or introduce foreign DNA is
  - (1) electroporation

(3) Particle gun

- (2) Micro-injection
- (4) chemical mediated genetic transformation
- 6.# Identify A, B and C in the following figure.



Agarose gel electrophoresis

- (1) A = wells, B = Small DNA Bands, C = Large DNA Bands
- (2) A = wells, B = Large DNA Bands, C = Small DNA Bands
- (3) A = Large DNA Bands, B = wells, C = Small DNA Bands
- (4) A = Small DNA Bands, B = Large DNA Bands, C = wells
- 7. Match the following with their correct functions.

(a)	Down stream processing	(i)	Its function is similar to retroviruses & it connects / transforms normal cell into a tumor cell.
(b)	Agrobactrium tumeficians	(ii)	Here raw materials are converted into specific products & it provides optimal conditions for achieving this.
(c)	Biopiracy	(iii)	Process includes separation & purification before product is ready for marketing
(d)	Bioreactors	(iv)	Use of bioresources without proper authrisation from countries and people concerned.
(1) a	– iii, b – i, c – iv , d – ii		(2) a – i, b – iii, c – ii , d – iv

(4) a - iii, b - iv, c - i, d - ii

#### SECTION - C # APPLICATIONS OF BIOTECHNOLOGY IN AGRICULTURE

- 1. Hirudin is
  - (1) A protein produced by Hordeum vulgar, which is rich in lysine
  - (2) A toxic molecule isolated from Gossypium hirsutum, which reduced fertility
  - (3) A protein produced from transgenic Brassica napus, which prevents blood clotting
  - (4) An antibiotic produced by a genetically engineered bacterium Escherichia coli
- 2. Important objective of biotechnology in agriculture sector is
  - (1) To produce pest resistance varieties of plants
  - (2) To increase the nitrogen content
  - (3) To decrease the seeds number
  - (4) To increase the plants

(3) a – iii, b – i, c – ii , d – iv

3. Which country has decided to 'label' those GM foods that are found to be 'safe'

### BIOTECHNOLOGY

	(1) Brazil	(2) China	(3) iapan	(4) South Africa
		(_) •		
4.	Bt is resistant to (1) Virus (3) Bollworm		(2) Adverse environme (4) Herbicide	ntal conditions
5.	Crystals of Bt-toxin prod (1) Bacteria are resistan (3) Toxin is inactive	duced by some Bactria d nt to the toxin	o not kill the bacteria the (2) Toxin is immature (4) Bacteria encloses to	emselves because oxin in a special sac
6.	The most common trait (1) Insect resistance	that was improved in co (2) Drought resistance	mmercialized crops was (3) Nutritional quality	(4) Productivity
7.	<ul> <li>How many statements (a) Exonucleases mak</li> <li>(b) In biolistics, recomtungston.</li> <li>(c) Proteins encoded borer.</li> <li>(d) c-peptide is not predict of the statement of the s</li></ul>	are wrong? e cuts at specific positior binant DNA is directly in by genes cry I Ab and cry esent in the mature insulin (2) 1	ns within DNA. njected into the nucleus y II Ab control the bollwo n and is removed during (3) 3	without any coating of gold or rms while cry I Ac controls corn maturation (4) 2
0	In RNA interfrence, ger			
0.	(1) ssDNA	(2) dsDNA	(3) dsRNA	(4) ssRNA
	( ) = =			
SEC	FION - D # APPLICA	TIONS OF BIOTECHN		E, TRANSGENIC ANIMALS
SEC1	<b>FION - D # APPLICA</b> VNTRs are	TIONS OF BIOTECHN		E, TRANSGENIC ANIMALS
SEC1	<b>FION - D # APPLICA</b> VNTRs are (1) Variable number of (3) Variable noncistroni	tandem repeats	(2) Very narrow tanden (4) Valuable non-cistro	E, TRANSGENIC ANIMALS
SEC1 1. a	<b>FION - D # APPLICA</b> VNTRs are (1) Variable number of (3) Variable noncistroni The enzyme TPA or tis	tandem repeats in transposon repeats sue plasminogen activate	(2) Very narrow tanden (2) Very narrow tanden (4) Valuable non-cistro or is used for	<b>E, TRANSGENIC ANIMALS</b> In repeats nic transposonic regions
SEC1 1.24 2.	<b>FION - D # APPLICA</b> VNTRs are (1) Variable number of (3) Variable noncistroni The enzyme TPA or tise (1) Dissolving blood clo	tandem repeats in transposon repeats sue plasminogen activate	(2) Very narrow tanden (2) Very narrow tanden (4) Valuable non-cistro or is used for (2) Maintaining plasma	E, TRANSGENIC ANIMALS
SEC1 1.24 2.	<b>TION - D # APPLICA</b> VNTRs are (1) Variable number of (3) Variable noncistroni The enzyme TPA or tis (1) Dissolving blood clo (3) Clearing turbidity of	TIONS OF BIOTECHN tandem repeats in transposon repeats sue plasminogen activate ots juices	(2) Very narrow tanden (2) Very narrow tanden (4) Valuable non-cistro or is used for (2) Maintaining plasma (4) Stimulating thrombo	E, TRANSGENIC ANIMALS n repeats nic transposonic regions content oplastin production
SEC1 1. (a) 2. 3.	<b>TION - D # APPLICA</b> VNTRs are (1) Variable number of (3) Variable noncistroni The enzyme TPA or tis (1) Dissolving blood clo (3) Clearing turbidity of Giant Mouse has been (1) Tissue culture (3) Gene manipulation	TIONS OF BIOTECHN tandem repeats in transposon repeats sue plasminogen activate ts juices produced through	<ul> <li>(2) Very narrow tanden</li> <li>(4) Valuable non-cistro</li> <li>(2) Maintaining plasma</li> <li>(4) Stimulating thrombox</li> <li>(2) Gene differentiation</li> <li>(4) All of the above</li> </ul>	E, TRANSGENIC ANIMALS
SEC1 1.≥ 2. 3. 4.	<b>TION - D # APPLICA</b> VNTRs are (1) Variable number of (3) Variable noncistroni The enzyme TPA or tise (1) Dissolving blood clo (3) Clearing turbidity of Giant Mouse has been (1) Tissue culture (3) Gene manipulation Genetic diagnosis by D (1) Detects only mutant (2) Can be done only o (3) Involves hybridizatio (4) Utilizes restriction e	TIONS OF BIOTECHN tandem repeats in transposon repeats sue plasminogen activate juices produced through NA testing t and normal alleles. n eggs or sperms. on to ribosomal RNA nzymes and a polymorph	<ul> <li>(2) Very narrow tanden</li> <li>(4) Valuable non-cistro</li> <li>(2) Maintaining plasma</li> <li>(4) Stimulating thrombod</li> <li>(2) Gene differentiation</li> <li>(4) All of the above</li> </ul>	E, TRANSGENIC ANIMALS In repeats nic transposonic regions content oplastin production
<ul> <li>SEC1</li> <li>1. ∞</li> <li>2.</li> <li>3.</li> <li>4.</li> <li>5.</li> </ul>	<b>FION - D # APPLICA</b> VNTRs are (1) Variable number of (3) Variable noncistroni The enzyme TPA or tis (1) Dissolving blood clo (3) Clearing turbidity of Giant Mouse has been (1) Tissue culture (3) Gene manipulation Genetic diagnosis by D (1) Detects only mutant (2) Can be done only o (3) Involves hybridizatio (4) Utilizes restriction e Kohler and Milstein dev	TIONS OF BIOTECHN tandem repeats in transposon repeats sue plasminogen activate tand plasminogen activate bis juices produced through WA testing t and normal alleles. n eggs or sperms. on to ribosomal RNA nzymes and a polymorph veloped biotechnology fo	<ul> <li>(2) Very narrow tanden</li> <li>(4) Valuable non-cistro</li> <li>(2) Maintaining plasma</li> <li>(4) Stimulating thrombod</li> <li>(2) Gene differentiation</li> <li>(4) All of the above</li> </ul>	E, TRANSGENIC ANIMALS
<ul> <li>SEC1</li> <li>1.≥</li> <li>2.</li> <li>3.</li> <li>4.</li> <li>5.</li> </ul>	<b>TION - D # APPLICA</b> VNTRs are (1) Variable number of (3) Variable noncistroni The enzyme TPA or tis (1) Dissolving blood clo (3) Clearing turbidity of Giant Mouse has been (1) Tissue culture (3) Gene manipulation Genetic diagnosis by D (1) Detects only mutant (2) Can be done only o (3) Involves hybridizatio (4) Utilizes restriction e Kohler and Milstein dev (1) Modern vaccines	TIONS OF BIOTECHN tandem repeats in transposon repeats sue plasminogen activate tas juices produced through WA testing t and normal alleles. n eggs or sperms. on to ribosomal RNA nzymes and a polymorph veloped biotechnology fo	<ul> <li>(c) use and the second secon</li></ul>	E, TRANSGENIC ANIMALS In repeats nic transposonic regions content oplastin production
SEC1 1. a 2. 3. 4. 5.	<b>TION - D # APPLICA</b> VNTRs are (1) Variable number of (3) Variable noncistroni The enzyme TPA or tis (1) Dissolving blood clo (3) Clearing turbidity of Giant Mouse has been (1) Tissue culture (3) Gene manipulation Genetic diagnosis by D (1) Detects only mutant (2) Can be done only o (3) Involves hybridizatio (4) Utilizes restriction e Kohler and Milstein dev (1) Modern vaccines (3) Monoclonal antibod	TIONS OF BIOTECHN tandem repeats in transposon repeats sue plasminogen activate tas juices produced through WA testing t and normal alleles. n eggs or sperms. on to ribosomal RNA nzymes and a polymorph veloped biotechnology fo ies	<ul> <li>(c) using a second se</li></ul>	E, TRANSGENIC ANIMALS In repeats Inic transposonic regions Content Oplastin production

7.

8.

- (1) Foreign DNA in some of their cells (2) Foreign DNA in all of their cells (3) Foreign RNA in all of their cells (4) Both (1) and (3) On what Indian bioresource did Vandana Shiva's efforts get the patent cancelled? (1) Healing principle of turmeric (2) Anti-diabetes property of Bittergourd (3) Insecticides from Neem (4) Laxative property of animals Match the column: (a) Cloning vector (i) Restriction enzymes (b) Bt (ii) Amp<sup>R</sup> gene (c) Selectable maker (iii) pBR 322 (d) Molecular scissors (iv) insecticidal protein (1) a - iii, b - iv, c - ii, d - i(2) a - iii, b - ii, c - iv, d - i (3) a - iii, b - iv, c - i, d - ii (4) a - ii, b - iii, c - i, d - iv
- 9. The following technique is based on antigene antibody interaction and is used to detect pothogen either by two presence of antigens or by detecting the antibodies synthesised against the pathogen.
   (1) PCR (2) Southern blotting (3) Auto radio graphy (4) ELISA
- **10.** Which of the following statement regarding ADA (Adenosure deaminase difficiency) is wrong?
  - (1) Disorder caused due to detection of a gene
  - (2) It can cause by bone marrow transplant & by enzyme replacement therapy.
  - (3) Both these treatments are not completely unable

(4) Lymphocytes introduced are mortal & the patient does not requires periodic infusion of such genetically engineered lymphocytes.

- **11.** The two vitamins manufactured biotechnologically are:
  - (1) Vitamin  $B_{12}$  and Vitamin  $B_{6}$  (2) Vitamin  $B_{6}$  and Vitamin  $B_{2}$
  - (3) Vitamin  $B_{12}$  and Vitamin  $B_2$  (4) Vitamin  $B_{12}$  and Vitamin  $B_9$
- **12.** Identify the correct match:
  - Transgenic cow Rosie milk contained human protein [α-1-antitrypsin] and is nutritionally a more balanced product & used to control Emphysema.
  - (2) Bt-produces an inactive protein throughout its life cycle and this toxin gets activated in acidic pH of the gut.
  - (3) RNAi prevents translation of the mRNA of pathogen by silencing it due to complementry dsRNA molecule.
  - (4) Thermus aquaticus becomes inclive at high temperature & needs to be added in each cycle.
- **13.** How many statements are correct?
  - (a) Presence of recombinant DNA into the coding sequence of enzyme  $\beta$  galactosidase results into the production of blue coloured colonies in presence of chromogenic substance.
  - (b) The overhanging stretches called sticky ends are named so because they form phosphodiester bonds with the complementory cut counter parts
  - (c) Lysozyme, cellulase, chitinase are the enzymes that are used to break the cell open to release DNA along with other macromolecules.
  - (d) In mammals insulin is synthesized as a fully matured and functional hormone and is consisted of a single peptide chain.
  - (1) zero (2) 1 (3) 2 (4) 3

## Exercise-2

- Efforts to repeat the cloning of Dolly the sheep have been unsuccessful. The scientists who claim to have cloned Dolly have been challenged to produce additional evidence that Dolly is really derived from an adult cell (as originally claimed), rather than a fetal cells which might have contaminated the experiment (as the sceptics suggest). Which of the following could provide evidence that Dolly was created from an adult cell, rather than a fetal cell. (4<sup>th</sup> CBO)
  - (1) Dolly's DNA finger prints
  - (2) The heterozygosity of random pieces of Dolly's DNA
  - (3) The melting point of Dolly's DNA
  - (4) The length of Dolly's telomeres
- 2. The recently discovered antibiotic Griseofulvin is produced by
  - (1) Streptomyces (2) Pseudomonas
  - (3) Mycobacterium (4) Penicillium
- Which statement about the "foreign" genetic material in genetically modified (GM) crop plants or animals is false?
   (7<sup>th</sup> CBO)
  - (1) It must be inserted again in each generation
  - (2) It alters the phenotype of the GM plant or animal
  - (3) It may be subject to natural selection by weather, pests, and diseases
  - (4) It may be transferred to related non-crop plants or animals
- **4.** Which statement about genetically modified (GM) foods is false?
  - (1) Scientists have used genetic modification, in various forms, as a means of improving crop yields, crop quality, and pest resistance for many years
  - (2) Genetic modification includes products made by artificial mutagenesis and by non-natural crosses between unrelated species
  - (3) A major difficulty in labelling foods as "GM-free" is that it is virtually impossible to measure genetically modified DNA or protein molecules in most food made from GM crops
  - (4) The recent decision by McGain foods to stop processing GM potatoes means that they will eventually use less pesticides to produce the potatoes that are required to make fries
  - (5) A major environmental concern with GM crops is that engineered genes will escape into the environment, resulting in the origin of "superweeds" (aggressive undersirable plant species)
- 5. The goal of the polymerase chain reaction is to
  - (1) Speed up protein synthesis for the production new drugs
  - (2) Create many copies of a DNA sequence which is initially very rare
  - (3) Create many copies of messenger RNA molecules
  - (4) Investigate the properties of organisms which normally grow at very high temperatures
  - (5) Create DNA probes

(4<sup>th</sup> CBO)

(3<sup>rh</sup> NSEB)

(6<sup>th</sup> CBO)

(3<sup>rd</sup> ABO)

- 6. NaCl is harmful to most crop plants. A scientist at the University of Toronto genetically modified plant so that it could be grown in dry parts of the world where the available water has a high level of NaCl. This genetically modified plant crop with the high levels of NaCl by transporting salt into its vacuoles where it accumulates to abnormally high levels. Which feature would be observed in the genetically modified plant when compared to a non-modified plant (6thCBO)
  - (1) The leaves in the modified plant are more yellow in colour
  - (2) The modified plant has salt crystals on the surface of its leaves
  - (3) The cytosol (the material between the plasma membrane and the vacuole membrane, excluding the organelles) in the modified plant has a lower osmotic pressure
  - (4) The cytosol in the modified plant has a higher osmotic pressure
  - (5) The osmotic pressure is the same in both plants

# 7. Microinjection of desired genes into fertilized eggs results in (FINBO) (1) Cloned animals (2) Free maritns (3) Transgenic animals (4) recombinant mammals

- 8. Bacteria genetically engineered to express a gene from a plant will
  - (1) Synthesize a protein with the same sequence of amino acids as in the plant and, therefore, the protein will have the same structure and function as in the plant
  - (2) Synthesize a protein with essentially the same sequence of amino acids as in the plant with differences relating to different codon wobble rules between prokaryotes and eukaryotes
  - (3) Not be able to synthesize a protein due to the presence of exon splicing sequences in the DNA sequence from the plant
  - (4) Synthesize a protein with the same sequence of amino acids as in the plant but which may or may not have a different shape or function due to differences in post transcriptional processing
  - (5) Not be able to synthesize a protein due to the differences between prokaryote and eukaryote replication complexes in codon sequence recognition and amino acid polymerization.
- Gene therapy for deleterious mutations in blood cells is becoming possible by introducing normal genes into blood cell precursors in the laboratory and re-injecting these cells into the patient. Which of the following would not be associated with this kind of gene therapy research (5<sup>th</sup> CBO)
  - (1) Attempting to place the normal gene in a vector which will help the gene integrate into a chromosome
  - (2) Utilising virus vectors which have some of their own genes removed
  - (3) Utilising a suitably modified HIV virus
  - (4) Preventing transmission of the mutation to the next generation

# **Exercise-3**

#### PART - I : NEET / AIPMT QUESTION (PREVIOUS YEARS )

1.	Chemical knife / molect	ular scissor of DNA is			(AIPMT-1998)
	(1) Endonucleases	(2) Polymerases	(3) Ligases	(4) Transcripta	ises
2.	Giant Mouse has been	produced through			(AIPMT-2000)
	(1) Tissue culture	(2) Gene differentiation	(3) Gene manipulation	(4) All the abo	ve
3.	What is true for plasmic	Ł			(AIPMT-2001)
	(1) Found in viruses		(2) Contains genes for	vital activities	
	(3) Part of nuclear chro	mosome	(4) Widely used in gene	e transfer	

4.	<ul> <li>Introduction of genetically modified food is not desirable because</li> <li>(1) It will affect economy of developing countries</li> <li>(2) The products are less tasty</li> <li>(3) They are costly</li> <li>(4) There is, danger of entry of toxins and virus in food</li> </ul>				(AIPMT-2002)
5.	Ti-plasmid is used for n (1) <i>Azotobacter</i> (3) <i>Rhizobium</i> in legum	naking transgenic plants. inous root	It is obtained from (2) <i>Agrobacterium</i> (4) <i>Yeast</i>		(AIPMT-2004)
6.	In transgenics, the exp (1) Enhancer	ression of transgene in th (2) Transgene	ne target tissue is known (3) Promoter	by (4) Reporter	(AIPMT-2004)
7.	Production of human pr (1) Human chromosom (2) Mechanism of gene (3) Bacterial cell can un (4) Genetic code is univ	rotein in bacterial genetic e replicate bacterial cell regulation is identical in ndertake RNA splicing versal	engineering is possible humans and bacteria	because	(AIPMT-2005)
8.24	Golden rice is- (1) Producing petrol-like (3) Herbicide tolerance	e fuel	(2) Pest resistance (4) Alleviation of vitami	n A deficiency	(AIPMT-2006)
9.	Genetically engineered (1) <i>Trichoderma</i>	microorganism used suc (2) <i>Xanthomonas</i>	ccessfully in bioremediat (3) <i>Bacillus</i>	ion of oil spills is (4) <i>Pseudomo</i> l	<b>(AIPMT-2007)</b> nas putida
10.	The linking of antibiotic (1) DNA polymerase	resistance gene with the (2) Exonucleases	e plasmid vector became (3) DNA ligase	possible due to (4) Endonuclea	(AIPMT-2008) ases
11.	Human insulin is being (1) <i>Rhizobium</i>	commercially produced f (2) Saccharomyces	rom a transgenic specie (3) <i>Mycobacterium</i>	s of (4) Escherichia	<b>(AIPMT-2008)</b> a.
12.১	Cry 1 endotoxins obtair (1) Nematodes	ned from <i>Bacillus thuring.</i> (2) Mosquitoes	<i>iensi</i> s are effective agair (3) Bollworms	nst (4) Flies	(AIPMT-2008)
13.	A transgenic food crop is (1) Bt Soyabean (3) Flavr Savr Tomatoe	which may help in solvin s	g the problem of night b (2) Golden Rice (4) Starlink Maize	lindness in deve	loping countries (AIPMT-2008)
14.2a	Main objective of produ (1) Encourage eco-frier (2) Reduce herbicide ac (3) Eliminate weeds fro (4) Eliminate weeds fro	nction / use of herbicide re ndly herbicides ccumulation in food articl m the fields without the u m the fields without the u	esistant GM crops is to es for health safety ise of manual labour ise of herbicides		(AIPMT-2008)
15.	What is true about Bt to (1) The concerned <i>Bac</i> (2) The inactive protoxi (3) Bt protein exists as (4) The activated toxin	oxin <i>illus</i> has antitoxins. n gets converted into act active toxin inthe <i>Bacillu</i> s enters the ovaries of the	ive form in the insect gu s. pest to sterilise it and th	t us prevent its m	(AIPMT-2009)

16.24	<ul> <li>Transgenics plants are the ones (AIPMT- (1) Grown in artificial medium after hybridization in the field</li> <li>(2) Produced by a somatic embryo in artificial medium</li> <li>(3) Generated by introducing foreign DNA in to a cell and generating a plant from that cell</li> <li>(4) Produced after protoplast fusion in artificial medium</li> </ul>				(AIPMT-2009)
17.	Which one of the follow (1) <i>Penicillium expansu</i> (3) <i>Meloidogyne incogr</i>	ring is commonly used ir Im nita	a transfer of foreign DNA (2) <i>Trichoderma polys</i> (4) <i>Agrobacterium turn</i>	into crop p porum pefaciens	lants? <b>(AIPMT-2009)</b>
18.	The genetically-modifie (1) Enhancing shelf life (3) Drought-resistance	d (GM) brinjal in India h	as been developed for (2) Enhancing mineral (4) Insect-resistance	content	(AIPMT-2010)
19.	Some of the characteria (1) Medium yield, long (2) High yield and prod (3) High yield and resis (4) Long fibre and resis	stics of Bt cotton are fibre and resistance to b uction of toxic protein cry tance to bollworms tance to aphids	eetle pests ystals which kill dipteran	pests	(AIPMT-2010)
20.≿	An improved variety of (1) Gives high yield and (2) Is completely resista (3) Gives high yield but (4) Does not require ch	transgenic basmati rice d is rich in vitamin A ant to all insect pests an has no characteristic ar emical fertilizers and gro	d diseases of paddy oma owth hormones		(AIPMT-2010)
21.	Genetic engineering ha (1) Transgenic models (2) Transgenic Cow-Ro (3) Animals like bulls for (4) Transgenic mice for	is been successfully use for studying new treatme psie which produces high or farm work as they have testing safety of polio ve	d for producing ents for certain cardiac d a fat milk for making ghee e super power accine before use in hun	iseases e nans	(AIPMT-2010)
22.	Given below is a sample 5' — GAATTC 3' 3' — CTTAAG 5' (1) Replication complet (3) Start codon at the 5	e of a portion of DNA str ed ' end	rand. What is so special (2) Deletion mutation (4) Palindromic sequer	shown in it nce of base	(AIPMT Pre2011)
23.	There is a restriction er	ndonuclease called EcoF	RI. What does 'co' part in	it stand for	? (AIPMT Pre2011)
	(1) Colon	(2) Coelom	(3) coenzyme	(4) coli	
24.	Maximum number of ex (1) Fish	kisting transgenic animal (2) Mice	s is of (3) Cow	(4) Pig	(AIPMT Pre2011)
25.	Agarose extracted from (1) Spectrophotometry	n sea weeds finds use in (2) Tissue Culture	(3) PCR	(4) Gel el	(AIPMT Pre2011) ectrophoresis

26.	The process of RNA interference has been used in the development of plants resistant to (AIPMT Pre -2011)			
	(1) Nematodes	(2) Fungi	(3) Viruses	(4) Insects
27.	Silencing of mRNA ha (1) Bollworms	s been used in producir (2) Nematodes	ng transgenic plants resis (3) White rusts	tant to: (AIPMT Mains-2011) (4) Bacterial blights
28.	Which one of the follow (1) Recombinant DNA (3) Heavier isotope la	wing techniques made i \ techniques belling	t possible to genetically e (2) X-ray diffraction (4) Hybridization	ngineer living organism? (AIPMT Mains-2011)
29.	Read the following four (A) The first transgenic (B) Restriction enzyme (C) Downstream proce (D) Disarmed pathoge Which are the two stat (1) Statement (B) and (3) Statement (A) and	r statements (A-D) abo c buffalo, Rosie produce es are used in isolation essing is one of the step n vectors are also used ements having mistake (C) (C)	ut certain mistakes in two ed milk which was human of DNA from other macro os of R-DNA technology. in transfer of R-DNA into s? (2) Statement (C) and (4) Statement (A) and	of them <b>(AIPMT Mains-2011)</b> alpha-lactal bumin enriched. -molecules. the host. (D) (B)
30.	For transformation, mi (1) Silver or Platinum (3) Silicon or Platinum	cro-particles coated wi	th DNA to be bombarded (2) Platinum or Zinc (4) Gold or Tungsten	with gene gun are made up of: (AIPMT Pre2012)
31.	Yeast is used in the pr (1) Citric acid and lacti (3) Bread and beer	oduction of c acid	(2) Lipase and pecina (4) Cheese and butter	(AIPMT Pre2012) se
32.	<ul> <li>Which one single organism or the pair of organisms is correctly assigned to its or their named taxonomic group (AIPMT Pre2012)</li> <li>(1) Paramecium and Plasmodium belong to the same kingdom as that of Penicillium</li> <li>(2) Lichen is a composite organism formed form the symbiotic association of an algae and a protozoan</li> <li>(3) Yeast used in making bread and beer is a fungus</li> <li>(4) Nector and Anabaona are examples of protista.</li> </ul>			
33.	Which one of the follo nutrition (1) <i>Azotobacter</i>	owing microbes forms a (2) Aspergillus	symbiotic association wit (3) <i>Glomu</i> s	h plants and helps them in their (AIPMT Pre2012) (4) <i>Trichoderma</i>
34. 🔊	Which one is a <b>true</b> st (1) It is used to ligate i (2) It serves as a selec (3) It is isolated from a (4) It remains active at	atement regarding DNA ntroduced DNA in recip table marker virus high temperature	opolymerase used in PCF ient cell	(AIPMT Pre2012)
35.	Consumption of which	n one of the following	foods can prevent the k	ind of blindness associated with

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(AIPMT Pre.-2012)

(1) Flaver Savr' tomato (2) Canolla

(3) Golden rice

(4) Bt-Brinjal

- 36. PCR and Restriction Fragment Length Polymorphism are the methods for:
  - (1) Study of enzymes

- (2) Genetic transformation
- (3) DNA sequencing (4) Genetic Fingerprinting
- 37.# The figure below is the diagrammatic representation of the E.Coli vector pBR 322. Which one of the given options correctly identifies its certain component (s)? (AIPMT Pre.-2012)



(1) ori - orignal restriction enzyme

(2) rop-reduced osmotic pressure

- (4) amp<sup>R</sup>, tet<sup>R</sup> antibiotic resistance genes (3) Hind III, EcoRI - selectable markers
- 38.# The figure below shows three steps (A,B,C) of Polymerase Chain Reaction (PCR). Select the option giving correct 'identification together with what it represents? (AIPMT Mains.-2012)



#### **Options:**

- (1) B Denaturation at a temperature of about 98°C separating the two DNA strands.
- (2) A Denaturation at a temperature of about 50°C
- (3) C Extension in the presence of heat stable DNA polymerase
- (4) A Annealing with two sets of primers

39. The first clinical gene therapy was given for treating:

(AIPMT Mains.-2012)

- (1) Diabetes mellitus (2) Chicken pox (3) Rheumatoid arthritis (4) Adenosine deaminase deficiency
- 40. Which one of the following represents a palindromic sequence in DNA? (AIPMT Mains.-2012) (1) 5' - GAATTC - 3' (2) 5' - CCAATG - 3 3' - CTTAAG - 5' 3' - GAATCC - 5' (3) 5' - CATTAG - 3' (4) 5' - GATACC - 3'

3' - CCTAAG - 5' 3' - GATAAC - 5' 41. Tobacco plants resistant to a nematode have been developed by the introduction of DNA that produced (in the host cells). (AIPMT Mains.-2012) (1) both sense and anti-sense RNA (2) a particular hormone (3) an antifeedant (4) a toxic protein 42.2 Biolistics (gene-gun) is suitable for: (AIPMT Mains.-2012) (1) Disarming pathogen vectors (2) Transformation of plant cells (3) Constructing recombinant DNA by joining with vectors (4) DNA finger printing 43. In genetic engineering, the antibiotics are used: (AIPMT Mains.-2012) (1) as selectable markers (2) to select healthy vectors (3) as sequences from where replication starts (4) to keep the cultures free of infection 44. Which of the following is not correctly matched for the organism and its cell wall degrading enzyme? (NEET-2013) (1) Plant cells - Cellulase (2) Algae - Methylase (3) Fungi - Chitinase (4) Bacteria - Lysozyme 45. DNA fragments generated by the restriction endonucleases in a chemical reaction can be separated by: (1) Polymerase chain reaction (2) Electrophoresis (NEET-2013) (3) Restriction mapping (4) Centrifugation 46. The colonies of recombinant bacteria appear white in contrast to blue colonies of non-recombinant bacteria because of: (NEET-2013) (1) Insertional inactivation of alpha-galactosidase in non-recombinant bacteria (2) Insertional inactivation of alpha-galactosidase in recombinant bacteria (3) Inactivation of glycosidase enzyme in recombinant bacteria (4) Non-recombinant bacteria containing beta-galactosidase 47.2 Which enzyme/s will be produced in a cell in which there is a nonsense mutation in the lac Y gene? (NEET-2013) (1) Lactose permease (2) Transacetylase (3) Lactose permease and transacetylase (4) β-galactosidase 48. The first human hormone produced by recombinant DNA tecnology is (AIPMT-2014) (1) Insulin (2) Estrogen (3) Thyroxin (4) Progesterone 49. An analysis of chromosomal DNA using the Southern hybrization technique does not use: (AIPMT-2014) (1) Electrophoresis (2) Blotting (3) Autoradiography (4) PCR 50. In vitro clonal propagation in plants in characterized by: (AIPMT-2014) (1) PCR and RAPD (2) Northern blootting (3) Electrophoresis and HPLC (4) Microscopy

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(AIPMT-2015) (4) Fungi rerted into active toxin due to: (AIPMT-2015)
rerted into active toxin due to: (AIPMT-2015)
safety of introducing GM organisms (AIPMT-2015)
(Re-AIPMT-2015)
ated gene is meant for biosynthesis (Re-AIPMT-2015)
(4) Vitamin B
scovery of: (Re-AIPMT-2015) kers mes
ning is called: <b>(Re-AIPMT-2015)</b> (4) Transformer
of DNA fingerprinting available at (NEET-1-2016)
ain reaction /mes
(NEET-1-2016)
(4) DNase I
Nuclease can be joined to form a (NEET-2-2016)

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62.	Which of the following i (1) Expression	is not a component of do (2) Separation	wnstream processing? (3) Purification	(4) Preservatio	<b>(NEET-2-2016)</b> on
63.	Which of the following ( (1) Hind III	restriction enzymes prod (2) Sal I	uces blunt ends? (3) Eco RV	(4) Xho l	(NEET-2-2016)
64.	DNA- dependent RNA	polymerase catalyzes tr	anscription on the strand	d of the DNA wh	ich is called the (NEET-2-2016)
	(1) antistrand	(2) template strand	(3) coding strand	(4) alpha stran	d
65.	Which kind of therapy deficiency?	v was given in 1990 to	a four-year-old girl wit	h adenosine de	aminase (ADA) <b>(NEET-2-2016)</b>
	(1) Radiation therapy	(2) Gene therapy	(3) Chemotherapy	(4) Immunothe	erapy
66.	The process of separat (1) Upstream processir (3) Bioprocessing	tion and purification of exing	xpressed protein before r (2) Downstream proces (4) Postproduction proc	narketing is calle ssing cessing	ed (NEET-2017)
67.	What is the criterion for (1) The larger the fragm (2) The smaller the frag (3) Positive charged fra (4) Negatively charged	r DNA fragments movem nent size, the farther it m gment size, the farther it agment moves to farther fragments do not move	ent on agarose gel durin loves moves end.	g gel electropho	resis? (NEET-2017)
68.	A gene whose express (1) Selectable marker (3) plasmid	ion helps to identify trans	sformed cell is known as (2) Vector (4) Structural gene	:	(NEET-2017)
69.	DNA replication in bact (1) Durings S-phase (3) Prior to fission	eria occurs:	(2) Within nucleolus (4) Just before transcri	ption	(NEET-2017)
70.	The DNA fragments se	parated on an agarose g	gel can be visualised afte	r staining with	(NEET-2017)
	(1) Bromophenol blue		(2) Acetocarmine		
	(3) Aniline blue		(4) Ethidium bromide		
71	Which of the following lymphocytes?	g is commonly used as	s a vector for introduci	ng a DNA frag	ment in human (NEET-2018)
	(1) Retrovirus	(2) pBR322	(3) λ phage	(4) Ti plasmid	
72	In India, the organisa organisms for public us (1) Indian Council of M	tion responsible for as e is edical Research (ICMR)	sessing the safety of i	ntroducing gene	etically modified (NEET-2018)
	(2) Genetic Engineering	g Appraisal Committee (	GEAC)		
	(3) Research Committe	e on Genetic Manipulati	on (RCGM) ch (CSIR)		
73	Use of bioresources I concerned country and	by multinational compar- its people is called.	nies and organisations	without authori	sation from the (NEET-2018)
	(1) Bio-infringement		(2) Bioexploitation		
	(3) Biodegradation		(4) Biopiracy		

	Column-I		Column-II		
80.	Match the following	enzymes with their functio	ons:	(NEE	Г-2-2019)
	(1) Bioreactor	(2) BOD incubator	(3) Sludge digester	(4) Industrial c	oven
	large scale, for indus	strial production of enzym	es?	(NEE	Г-1-2019)
9.	Which one of the fol	owing equipments is esse	entially required for growi	ng microbes on a	I
	(3) Chilled ethanol	(4) N	lethanol at room tempera	ature	
	(1) Chilled chlorofor	m (2) ls	opropanol		
				(NEE	Т-1-2019)
78.	DNA precipitation ou	It of a mixture of biomoled	cules can be achieved by	treatment with:	
	(4) It is drought toler	ant, developed using Agr	obacterium vector		
	(3) It is pest resistan	t, with a gene from Bacillu	us thuringiensis		
	(2) It is Vitamin A er	nriched, with a gene from	daffodil		
	<ol><li>(1) It has yellow grai</li></ol>	ns, because of a gene int	roduced from a primitive	variety of rice	
7.	Which of the 'following	ng is true for Golden rice'	?	(NEE	Г-1-2019)
	(4) The enzyme cuts	a the sugar-phosphate ba	ackbolle at specific sites	on each strand	
	(3) The enzyme bind	the sugar-phosphate b	nd cuts only one of the tw	on each strand	
	(2) The enzyme cuts	DNA molecule at identic	al position within the DNA	A.	
	(1) The enzyme reco	ognizes a specific palindro	omic nucleotide sequence	e in the DNA	
	the incorrect statem	ent.		(NEE	Г-1-2019)
76.	Following statement	s describe the characteris	tics of the enzyme Restri	iction Endonuclea	ase. Identify
	(3) Moist surface of	midgut	(4) Alkaline pH of gut		
	(1) Acidic pH of ston	nach	(2) Body temperature		
75.	What triggers activation	tion of protoxin to active to	oxin of Bacillus thuringier	nsis in boll worm	(NEET-1-2
	(1) Co-667	(2) Basmati	(3) Lerma Rojo	(4) Sharbati S	onora
	India for a long time.	This is related to			(NEET-2
4	A 'new' variety of ric	e was patented by a fore	gn company, though suc	h. varieties have	been prese

	Column-l		Column-II
(a)	Restriction endonuclease	(i)	joins the DNA fragments
(b)	Restriction exonuclease	(ii)	extends primers on genomic DNA template
(c)	DNA ligase	(iii)	cuts DNA at specific position
(d)	Tag polymerase	(iv)	removes nucleotides from the ends of DNA

Select the correct option from the following:

(1) (a) - (iii), (b)- (i), (c)- (iv), (d)-(ii)

(2) (a) - (iii), (b)- (iv), (c)- (i), (d)-(ii)

- (3) (a) (iv), (b)- (iii), (c)- (i), (d)-(ii)
- (4) (a) (ii), (b)- (iv), (c)- (i), (d)-(iii)

81. The two antibiotic resistance genes on vector pBR 322 are for

- (1) Ampicillin and Tetracycline
- (2) Ampicillin and Chloramphenicol
- (3) Chloramphenicol and Tetracycline

(4) Tetracycline and Kanamycin

(NEET-2-2019)

82.	Exploitation of bioresources of a nation by multinational companies without authorization from the							
	concerned country is (1) Bioweapon	(2) Biopiracy	(3) Bioethics	(NEE I -2-2019) (4) Biowar				
83.	A selectable marker i	is used to :		(NEET-2-2019)				
00.	(1) help in eliminating	the non transformants	so that the transformants ca	an be regenerated				
	(2) identify the gene	( $\gamma$ ) identify the gene for a desired trait in an align organism						
	(3) select a suitable v	ector for transformation	in a specific crop					
	(4) mark a gene on a	chromosome for isolation	on using restriction enzyme					
84.	Exploration of molect	ular, genetic and species	s level diversity for novel pro	oducts of economic importance				
	(1) Biopiracy	(2) Bioenergetics	(3) Bioremediation	(NEE1-2-2019) (4) Bioprospecting				
85.	Given below are four	statements pertaining t	o separation of DNA fragm	ents using Gel electrophoresis.				
	Identify the incorrect	Identify the incorrect statements. (NEET-2-2019)						
	(a) DNA is negatively	(a) DNA is negatively charged molecule and so it is loaded on gel towards the						
	Anode terminal.							
	(b) DNA fragments travel along the surface of the gel whose concentration does not							
	affect movement of DNA.							
	(c) Smaller the size of DNA fragment, larger is the distance it travels through it.							
	(d) Pure DNA can be visualized directly by exposing to UV radiation.							
	Choose correct answer from the options given below:							
	(1) (a), (c) and (d)	(2) (a), (b) and (c)	(3) (b), (c) and (d)	(4) (a), (b) and (d)				
86.	An enzyme catalysin	g the removal of nucleot	ides from ends of DNA is :	(NEET-2-2019)				
	(1) DNA ligase	(2) Endonuclease	(2) Exonuclease	(4) Protease				
	PAF	RT - II : AIIMS QUES	TION (PREVIOUS YE	ARS)				
1.	Restriction enzymes			(AIIMS-2003)				
	(1) Are endonuclease	specific sites						
	(2) Make DNA compl							
	(3) Cut or join DNA fragments							
	(4) Are required in ve	ectorless direct gene tran	sfer					
2.	Cultivation of Bt cotto	on has been much in the	news.The prefix Bt means	(AIIMS-2004)				
	(1) "Barium-treated"	cotton seeds						
	(2) "Bigger thread" va	ariety of cotton with bette	er tensile strenght					
	(3) produced by DIOI (4) carrying an endot	echnology using restrict	non enzymes and ligases					
	(	onin gene nom bacillus i						

3.	An example of gene th	erapy is			(AIIMS-2004)				
	(1) production of inject	table hepatitis B vaccine							
	(2) production of vacci	nes in food crops like pot	tatoes which can be eate	n					
	(3) introduction of gen	e for adenosine deamina	se in persons suffering fr	om Severe Com	bined immuno-				
	deficiency (SCID)								
	(4) production of test t	ube babies by artificial in	semination and implantat	ion of fertilized e	ggs				
4.	What is the first step in	the Southern Blot techni	que		(AIIMS-2004)				
	(1) Denaturation of DN	A on the gel for hybridiza	tion with specific probe						
	(2) production of a grou	up of genetically identical	cells						
	(3) digestion of DNA by	v restriction enzyme							
	(4) isolation of DNA fro	m a nucleated cell such a	as the one from the scene	e of crime					
5.	Which one of the follow	ving is a correct statemer	nt		(AIIMS-2005)				
	(1) "Bt" in "Bt-cotton biotechnology	" indicates that it is	a genetically modified	organism proc	luced through				
	(2) Somatic hybridizat	ion involves fusion of two	complete plant cells car	ying desired ger	ies				
	(3) The anticoagulant	hirudin is being produced	I from transgenic Brassic	a napus seeds					
	(4) "Flavr Savr" variety	of tomato has enhanced	the production of ethyle	ne which improv	es its taste.				
6.	cDNA probes are copie	ed from the messenger R	NA molecules with the he	elp of	(AIIMS-2005)				
	(1) restriction enzymes		(2) reverse transcriptas	e					
	(3) DNA polymerase		(4) adenosine deamina	se					
7.	A plant expressing a ge	ene obtained from anothe	er organism is		(AIIMS-2005)				
	(1) Transgenic	(2) Clone	(3) Somaclonal variant	(4) Transformed	k k				
<b>8</b> .	Tumour inducing plasm	nid used in producing trar	nsgenic plants is that of		(AIIMS-2005)				
	(1) Escherichia coli		(2) Bacillus thuringiens	S					
	(3) Agrobacterium tum	efaciens	(4) Staphylococcus aur	eus					
9.2	Electroporation is				(AIIMS-2005)				
	(1) Making transient po	ores in cell membranes to	introduce gene construc	ts					
	(2) Fast passage of nu	trients through phloem si	eve pores by electric stim	nulation					
	(3) Opening of stomata by artificial light during night								
	(4) Purification of saline	e water with the help of m	nembrane system						
10.	Hirudin is				(AIIMS-2006)				
	(1) a protein produced	by Hordeum vulgare, whi	ich is rich in lysine		(				
	(2) a toxic molecule isolated from Gossvoium hirstutium, which reduces human fertility								
	(3) a protein produced from transgenic brassica napus, which prevents blood clotting								
	(4) an antibiotic produc	ed by a genetically engin	eered bacterium, Escher	ichia coli					
11.	Gene which suppresse	s other gene's activity bu	t does not lie on the sam	e locus is called	as				
	· · · · · · · · · · · · · · · · · · ·	<u>.</u>			(AIIMS-2007)				
	(1) epistatic	(2) supplementary	(3) hypostatic	(4) codominant					
12.	Cultivation of Bt cotton	has been much in the ne	ews. The prefix Bt means		(AIIMS-2008)				
	(1) Barium treated cotte	on seeds							
	(2) Carrying an endotoxin gene from Bacillus thuringiensis								

	<ul><li>(3) Produced by biotechnology using restriction enzymes and ligases</li><li>(4) Bigger thread variety of cotton with better tensile strength</li></ul>									
13.১	What is the first step in (1) Denaturation of DNA (2) Production of a grou (3) Digestion of DNA by (4) Denaturation of DNA	(AIIMS-2008)								
14.	National bird of India is(1) Psittacula(2) Passer domesticus(3) Pavo cristatus(4) Parakeet.									
15.	By all of the following w (1) making enzymes the (3) modifying the traget	vays bacteria becomes re at inactivate the drug cof the drug	esistant to antibiotic exce (2) becoming impermea (4) moving away from t	pt able to the drug he drug.	(AIIMS-2009)					
16.	Vitamin B <sub>6</sub> is also called	(4) retinol	(AIIMS-2010)							
17.	<ul><li>(1) Finantial</li><li>(1) Bt genes</li><li>(3) Cry genes</li></ul>	lasmic defense	(AIIMS-2014) genes							
18.	How are transformants (1) Presence of more th (2) Presence of alien D (3) Antibiotic resistance (4) Both (2) and (3)	selected from non-transf nan one recognition site i NA into the vector DNA r gene gets inactivated de	formants? n the vector DNA results into insertional ina ue to insertion of alien D	activation of sele NA	(AIIMS-2014) ctable marker					
19.24	Which of the following i (1) It is the first artificial (2) It is the most widely (3) It has two antibiotic (4) It does not have res	d Rodriguez	(AIIMS-2014)							
20.	Which one of the follow (1) 5'-GAATTC-3 3'-CTTAAG	ring gepresenta palindror (2) 5'-GAATTC-3 3'-GAATCC-5'	nic sequence in DNA? (3) 5'-CATTAC-3 5'-GATAAC-3'	(4) 5'-CATACC 3'-CCTAAG	<b>(AIIMS-2014)</b> -3 -5'					
21.	Which of the following i (1) PCR	s based upon principle o (2) ELISA	f antigen-antibody intera (3) r-DNA technology	ction (4) RNA	(AIIMS-2014)					
22.	Genes of interest can b (1) Resstriction enzyme (3) DNA probes	e seclected from a geno es	mic ligrary by using (2) Cloning vectors (4) Gene targets		(AIIMS-2014)					
23.	Choose the correct opt	(AIIMS-2015)								



A B C D

- (1) Hind I EcoR I  $amp^{R}$  ori
- (2) Hind I Bam H I kan<sup>R</sup> amp<sup>R</sup>
- (3) BamH I Pst I ori amp<sup>R</sup>
- (4) EcoR I Bam H I amp<sup>R</sup> Ori
- 24. Read the following four statements (1-4) about certain mistakes in two of them (AIIMS-2015)
  - 1. The first transgenic buffalo, Rosie produced milk which was human alphalactral albumin enriched
  - 2. Restrictin enzymes are used in isolation of DNA from other macro-molecules
  - 3. Downstream processing is one of the steps of R-DNA technology.
  - 4. Disarmed pathogen vectors are also used in transfer of R-DNA into the host.
  - Which are the two statements having mistakes
  - (1) Statement 2 and 3 (2) Statement 3 and 4
  - (3) Statement 1 and 3 (4) Statement 1 and 2
- 25. A transgenic food crop which may help in solving the problem of night blindness in develping countries is (AIIMS-2016)
  - (1) Golden rice (2) Bt soyabean (3) flavr- savr tomato (4) starlink maize
- **26.** An example of gene therapy is
  - (1) production of injectable hepatitis-B vaccine
  - (2) production of vaccines in food crops like potatoes which can be eaten
  - (3) introduction of gene for adenosine deaminase in persons suffering from Severe Combined Immuno Deficiency (SCID)
  - (4) production of test tube babies by artificial insemination and implantation of fertilised eggs

(AIIMS-2017)

28.

29.

30.\_

31.\_

#### **27.** Match the following columns

Column I

I.	Multigenes			(i) transposor	ons
II	Inducib	le genes	s (	(ii) insulin	
III.	Overlap	oping ge	nes (	(iii) B, E and k ∳ × 174	k in
IV. Structural genes				(iv) <i>sn</i> RNA	
			(	(v) globin gen	ne
			(	(vi) nitrate redu	ductase
	I	П	Ш	IV	
(1)	(i)	(iii)	(v)	(ii)	
(2)	(v)	(vi)	(iii)	(ii)	
(3)	(iv)	(v)	(vi)	(i)	
(4)	(i)	(ii)	(v)	(vi)	
cells   (1) ea (3) ea	oroducin arly embi arly child	g ADA i ryonic st hood	s introd tages	luced into cell a	at (AIIMS-2017 (2) Late embryonic stages (4) None of the above
The comp (1) ex (3) cc	prematu ensatory tragenic don bias	re term / mutatic suppres	ination on in tR ssion	of polypeptid NA. This geneti	ide synthesis due to stop codon can be overcome v etic phenomenon is called (AIIMS-2017 (2) intragenic suppression (4) true reversion
Whicł (1) It i (2) Sł (3) It i (4) It i	n of the f is not inh now high is used t is used i	ollowing nerited fr degree o detect n medic	g is inco rom par of poly t sex du o - lega	orrect about DN rents to offsprin /morphism uring fetal devel al suits	NA finger printing? (AIIMS-2018-II ing elopment
Full fo	orm of G enetic er	EAC is - ngineerir	– ng appr	roval committee	e (AIIMS-2018-I)

Column II

(2) Genetic engineering advisory council

(3) Genetic export approval committee

(4) Global environmental advisory committee

# Answers

(AIIMS-2017)

SEC	τιον - Δ												
1. 8.	(3) (2)	2. 9.	(3) (3)	3.	(3)	4.	(4)	5.	(2)	6.	(3)	7.	(2)
SEC	TION - B												
1.	(2)	2.	(3)	3.	(4)	4.	(1)	5.	(1)	6.	(2)	7.	(1)
SEC	TION - C												
1. 8.	(3) (3)	2.	(1)	3.	(3)	4.	(3)	5.	(3)	6.	(1)	7.	(4)
SEC	TION - D												
1. 8.	(1) (1)	2. 9.	(1) (4)	3. 10.	(3) (4)	4. 11.	(1) (3)	5. 12.	(3) (3)	6. 13.	(2) (2)	7.	(3)
						EXER	CISE	· 2					
1. 8.	(4) (1)	2. 9.	(4) (4)	3.	(1)	4.	(4)	5.	(2)	6.	(4)	7.	(3)
						EXER	CISE ·	3					
						PA	ART- I						
1. 8. 15. 22. 29. 36. 43. 50. 57. 64. 71. 78. 85.	<ul> <li>(1)</li> <li>(4)</li> <li>(2)</li> <li>(4)</li> <li>(4)</li> <li>(1)</li> <li>(1)</li> <li>(2)</li> <li>(1)</li> <li>(3)</li> <li>(4)</li> </ul>	2. 9. 16. 23. 30. 37. 44. 51. 58. 65. 72. 79. 86.	<ul> <li>(3)</li> <li>(4)</li> <li>(3)</li> <li>(4)</li> <li>(4)</li> <li>(4)</li> <li>(2)</li> <li>(3)</li> <li>(1)</li> <li>(2)</li> <li>(1)</li> <li>(2)</li> <li>(1)</li> <li>(3)</li> </ul>	3. 10. 17. 24. 31. 38. 45. 52. 59. 66. 73. 80.	<ul> <li>(4)</li> <li>(3)</li> <li>(4)</li> <li>(2)</li> <li>(3)</li> <li>(3)</li> <li>(2)</li> <li>(3)</li> <li>(2)</li> <li>(4)</li> <li>(2)</li> </ul>	4. 11. 25. 32. 39. 46. 53. 60. 67. 74. 81.	$(4) \\ (4) \\ (4) \\ (4) \\ (4) \\ (4) \\ (4) \\ (4) \\ (2) \\ (2) \\ (2) \\ (1) $	5. 12. 19. 26. 33. 40. 47. 54. 61. 68. 75. 82.	<ul> <li>(2)</li> <li>(3)</li> <li>(1)</li> <li>(3)</li> <li>(1)</li> <li>(4)</li> <li>(2)</li> <li>(1)</li> <li>(4)</li> <li>(2)</li> </ul>	6. 13. 20. 27. 34. 41. 48. 55. 62. 69. 76. 83.	<ul> <li>(4)</li> <li>(2)</li> <li>(1)</li> <li>(2)</li> <li>(4)</li> <li>(1)</li> <li>(1)</li> <li>(3)</li> <li>(3)</li> <li>(1)</li> </ul>	7. 14. 21. 28. 35. 42. 49. 56. 63. 70. 77. 84.	<ul> <li>(4)</li> <li>(3)</li> <li>(4)</li> <li>(1)</li> <li>(3)</li> <li>(2)</li> <li>(4)</li> <li>(3)</li> <li>(4)</li> <li>(2)</li> <li>(4)</li> <li>(2)</li> <li>(4)</li> </ul>
						PA	RT- II						
1. 8. 15. 22. 29.	(1) (3) (2) (3) (1)	2. 9. 16. 23. 30.	(2) (1) (3) (4) (3)	3. 10. 17. 24. 31.	<ul> <li>(3)</li> <li>(3)</li> <li>(4)</li> <li>(4)</li> <li>(1)</li> </ul>	4. 11. 18. 25.	(4) (4) (4) (1)	5. 12. 19. 26.	(3) (2) (4) (3)	6. 13. 20. 27.	(2) (3) (1) (2)	7. 14. 21. 28.	(1) (3) (2) (1)

### **Self Practice Paper (SPP)**

- 1. In gel electrophoresis which of the following compound is used in the staining of DNA
  - (1) Methyl bromide(3) Ethedium bromide

- (2) Ethyle ethane sulphonate(4) Ethyl bromide
- 2. Nucleic acid segment tagged with a radioctive molecule is called
  - (1) Clone (2) Probe (3) Plasmid

(4) Vector

3.#ര



Identify a, b, c,d, e, in the given diagram of E. coli cloning vector pBR 322.

	а	b	С	d	е
(1)	Bam HI	tet <sup>R</sup>	amp <sup>R</sup>	EcoRI	Hind I
(2)	EcoRI	amp <sup>R</sup>	Hind I	tet <sup>R</sup>	Bam HI
(3)	Ori	EcoRI	amp <sup>R</sup>	Bam HI	tet <sup>R</sup>
(4)	EcoRI	tet <sup>R</sup>	amp <sup>R</sup>	Bam HI	ori

- **4.** Choose the right combination of components required to set up a polymerase chain reaction (PCR) from the following:
  - (1) template DNA, two primers, dNTPs & DNA ligase
  - (2) template DNA, two primers, NTPs & DNA ligase
  - (3) template RNA, two primers, NTPs & Taq DNA polymerase
  - (4) template DNA, two primers, dNTPs & Taq DNA polymerase
- 5. Read the following four statements (A-D) about certain mistakes in two of them
  - (A) Retroviruses are not used as a vector in making transgenic animals by r-DNA technology
  - (B) Restriction enzymes are used in isolation of DNA from other macro-molecules
  - (C) Downstream processing is one of the steps of R-DNA technology
  - (D) Disarmed pathogen vectors are also used in transfer of R-DNA into the host
  - Which are the two statements having mistakes?
  - (1) Statement (B) and (C) (2) Statement (C) and (D)
  - (3) Statement (A) and (C) (4) Statement (A) and (B)

6.	Maximum number of existing transgenic animals is of:								
	(1) Fish	(2) Mice	(3) Cow	(4) Pig					

7.>Genetically engineered microorganism used successfully in bioremediation of oil spills is<br/>(1) Trichoderma(2) Xanthomonas(3) Bacillus(4) Pseudomonas putida

8.	<ul> <li>An example of gene therapy is</li> <li>(1) Production of injectable hepatitis B vaccine</li> <li>(2) Production of vaccines in food crop</li> <li>(3) Introduction of adenosine deaminase gene</li> <li>(4) Production of test tube babies through artificiant of the second seco</li></ul>	in infants affected with SCID
9.	DNA segment cleaved by EcoRI is (1) ATTCGA, TAAGCT (3) GCTTAA, CGAATT	(2) GAATTC, CTTAAG (4) GTTCAA, CAAGTT
10.	Ti-plasmid is used for making transgenic plants (1) Azotobacter (3) Rhizobium in leguminous root	s. It is obtained from (2) Agrobacterium (4) Yeast
11.	<ul> <li>Introduction of genetically modified food is not</li> <li>(1) It will affect economy of developing countrie</li> <li>(2) The products are less tasty</li> <li>(3) They are costly</li> <li>(4) There is, danger of entry of toxins and virus</li> </ul>	desirable because es s in food
12.	The enzymes which are commonly used in gen (1) Restriction endonuclease and polymerase (3) Restriction endonuclease and ligase	netic engineering are (2) Endonuclease and ligase (4) Ligase and polymerase
13.১	Crystals of Bt-toxin produced by some bacteria (1) Bacteria are resistant to the toxin (3) Toxin is inactive	a do not kill the bacteria themselves because (2) Toxin is immature (4) Bacteria encloses toxin in a special sac
14.	<ul> <li>Hirudin is</li> <li>(1) A protein produced by Hordeum vulgar, wh</li> <li>(2) A toxic molecule isolated from Gossypium I</li> <li>(3) A protein produced from transgenic Brassic</li> <li>(4) An antibiotic produced by a genetically eng</li> </ul>	ich is rich in lysine hirsutum, which reduced fertility a napus, which prevent blood clotting ineered bacterium Eschrichia coli
15.১	Taq polymerase enzyme is used in (1) restriction mapping (3) PCR	(2) gene cloning (4) All of these
16.	Genetic engineering would not have been pose (1) DNA polymerase (3) DNA ligase	sible if one of these were absent. (2) Reverse transcriptase (4) RNA synthetase
17.2a	Haploids are more suitable fro mutation studies (1) Haploids are more abundant than diploid (2) Haploids are reproductively more stable (3) All mutations whether dominant or recessiv	s because e are expressed in haploids

(4) Mutagens penetrate haploid more effectively than diploids

#### 18.^#



Select the correct option having correct labelling in above diagram.

- (1) i Denaturation, ii Primers, iii Annealing, iv DNA ligase, v Extension
- (2) i Heating, ii Anealing, iii, Primers, iv DNA Polymerase, v Amplification
- (3) i Dinaturation, ii Primers, iii Annealing, iv Taq DNA Polymerase, v Extension
- (4) i DNA, ii Denaturation, iii Primer, iv Annealing, v Extension.
- 19. In ECORI, What does 'I' part is it stands for
  - (1) Immigration
  - (2) Order in which enzymes were isolated from the strains of Bacteria
  - (3) Number of species
  - (4) Number of plasmid
- 20. Transgenic animals may be useful in
  - (1) Producing human protein (Alfa 1 antitrypsin) that is used in the treatment of emphysaema
  - (2) Producing Organs that may be used in organ transplantation in human
  - (3) Diagnosis of some disease like phenylketonuria & cystic fibrosis, Alzeimers, rhumatoid arthritis.
  - (4) All of the above
- 21. A method used to distinguish DNA of one individual from another is
  - (1) DNA sequencing
  - (2) cDNA
  - (3) hybridisation
  - (4) restriction fragment length polymorphism (RFLP).
- 22. The northern blot technique is used for the detection of (1) rRNA (2) mRNA (3) tRNA (4) RNA
  23. The southern blot technique is used for the detection of (1) DNA (2) RNA (3) Protein (4) RNA
- 24. Which of the following has been covered under the broad patent category?
  (1) *Triticum*(2) *Oryza*(3) *Pisum sativum*(4) *Brassica*
- **25.** Recombinant DNA technology can be used to produce quantities of biologically active form which one of the following products synthesized in *E.coli* 
  - (1) Luteining hormone (2) Ecdysone (3) Rifamycin (4) Interferon

26. Match the following: (a) Origin of replication (i) Vector (b) Restriction enzymes (ii) gene amplification (c) Plasmid DNA (iii) initiation of replication (d) PCR (iv) molecular seissors (1) a- (iii), b - (iv), c - (ii), d - (i) (2) a- (iii), b - (iv), c - (i), d - (ii) (3) a- (iv), b - (i), c - (iii), d - (ii) (4) a- (iv), b - (iii), c - (i), d - (ii) 27. In recombinant DNA technology which of the following tools are required: (a) restriction enzymes (b) polymerase enzyme (c) ligases (d) vector (3) b & d (1) a,b (2) a, c & d (4) all of these 28. In the naming of restriction enzymes second two latter represents. (2) species of prokaryotic cell (1) gene (3) strain (4) order in which enzymes are isolated 29. Choose the correct statements: (a) Each restriction endonuclease recognizes a specific pallindromic sequences in the DNA (b) Restriction endonucleases are used in genetic engineering to form recombinant molecule of DNA (c) Fragments can be separated by a technique known as gel electrophoresis (d) Separated DNA fragments can be visualised by staining with ethidium bromide in the visible light. (1) a, b & d (2) a, b & c (3) b, c & d (4) a, b, c & d 30. How many statements are correct: (a) Origin of replication is a sequence from where replication starts (b) Ori is responsible for controlling the copy number of linked DNA (c) For recovery of many copies of target DNA vector should have low copy number (d) Selectable marker helps in identifying & elimination transformants & selectively permitting the growth of non transformants. (1) 1 (2) 2(3) 3(4) 431.2 The process for transfer the recombinant DNA into the host, cells are bombarded with high velocity microparticles of gold or tungsten coated with DNA known as (1) treatment with Ca to make competent cell (2) Micro - injection (3) biolistics (4) electroporation 32. Arrange the following statements in particular order that how process of recombinant DNA technology takes place :-(a) isolation of desired DNA (b) ligation of DNA fragment into a vector (c) culturing the host cells in medium (d) isolation of desired DNA fragment (e) fragmentation of DNA by restriction enzyme (f) extraction of desired product (1) a,c,d,e,b,f (2) a,e,d,b,c,f (3) a,e,d,b,c,f (4) a,d,b,f,e,c 33. Thermostable enzyme which is utilised during amplification of DNA using PCR. (1) DNA ligase (2) Taq DNA polymerase (3) RNA polymerase (4) Restriction endonuclease

34.	At a time when the symptoms of the disease are not yet visible, very low concentration of a bacteria o virus can be detected by which technique -									ecteria or			
	(1) ge	l electro	phoresis	(2) PC	R		(3) El	(3) ELISA (4) gene therapy					
35.	The first clinical therapy was given in 1990 a girl for treating												
	(1) AE	DA defec	ciency	(2) All	DS		(3) Rheumatoid arthiritis (4) Thalassemia						
36.	Thern	nal cycle	is used i	n									
	(1) Ra	(3) Polymerase chain reaction						hemical nzvme c	reaction atalysed	reaction	าร		
27					ooring	has boon		o duo to	discovo	ny of			
57.	(1) Transposons (2) Endonucleases						(3) E	xonuclea	ases	(4) O	ncogene	s	
38.	With t	he help	of DNA li	gase do	onor DN	IA fragme	nt is joi	ned. It is	called				
	(1) Molecular cloning				(2) Ti	issue cul	ture						
	(3) Pr	otoplasn	nic fusior	l			(4) Ai	nnealing	or Ligat	ion			
39.	An ab	normal	gene is re	eplaced	by norr	nal gene.	It is ca	lled					
	(1) Gene therapy (2) Cloning					(3) M	(3) Mutation (4) None of the above				e above		
40.	Bt cot	ton has	been pro	duced b	у								
	(1) In	situ hyb	ridisation	of Bt ge	ene		(2) Northern blotting of Bt gene						
	(3) CI	oning of	Bt gene				(4) 50	(4) Southern blotting of Bt gene					
41.	In ger	netic eng	jineering	which is	s used t	o transfer	of genes from one cell to another						
	(I) VE 	CLUI		(2) FI									
42.2	I he e	nzymes	which ar	e comm	ionly us	ed in gen merase	etic engineering are (2) Endonuclease and ligase						
	(3) Re	estriction	endonuo	clease a	and liga	se	(4) Ligase and polymerase						
43.>	cDNA	is											
	(1) Ci	rcular DI	NA	(2) Co	oiled DN	IA	(3) Cytoplasmic DNA (4) Complementary DNA						
44.	DNA s	segment	cleaved	by Eco	RI is								
	(1) AT	TCGA,	TAAGCT	(2) GA	AATTC,	CTTAAG	G (3) GCTTAA, CGAATT (4) GTTCAA, CAAGTT						
45.	Extrac	chromos	omal DN	A used	as vect	or in gene	e clonin	g is					
	(1) Transposon (2) Intron						(3) Exon (4) Plasmid						
	en			<b>.</b>									
	Эг	<b>P</b> A	<b>N5W</b>	ers									
1. •	(3)	2.	(2)	3. 10	(4)	4.	(4) (4)	5.	(4)	6.	(2)	7.	(4)
о. 15.	(3)	9. 16.	(2) (3)	10.	(2) (3)	11.	(4)	12. 19.	(3)	13. 20.	(3)	21.	(3)
22.	(4)	23.	(1)	24.	(4)	25.	(4)	26.	(2)	27.	(4)	28.	(2)
29.	(2)	30.	(2)	31.	(3)	32.	(3)	33.	(2)	34.	(2)	35.	(1)
36. 43.	(3) (4)	37. 44.	(2) (2)	38. 45.	(4) (4)	39.	(1)	40.	(3)	41.	(1)	42.	(3)