

Seat No. _____

SUB: Biotechnology Engineering (BT)

Time: 1 Hour 30 minutes

Instructions:

1. Ensure that all pages are printed.
2. Use Black ball pen only
3. Change in option is not allowed
4. There is no negative marking
5. Use of non-programmable scientific calculator is allowed

1.	Which of the following statements about retro viruses and retro transport zones is/are false?			
	<ol style="list-style-type: none"> 1. they both use the enzyme reverse transcriptase to copy their RNA Genomes into dsDNA 2. the reverse transcriptase of retro viruses incorrect road transport zones in structural related to the transport says of DNA transport zones 3. retro viruses are infectious while retro transposons are endogenous mobile elements 4. Short target site duplications are characteristic of both types of elements, as well as DNA transposons, when they insert into chromosomal DNA. 5. Retro viruses and retro transposons have long terminal repeats linking there coding regions 			
	A	Only 2	B	Only 5
2.	C	3 and 4	D	1,2 and 4
	Which of the following species of denatured DNA will renature most rapidly in a solution, under appropriate conditions of ionic strength, pH and temperature?			
	A	Yeast nuclear DNA	B	Vaccinia virus DNA
3.	C	Human liver nuclear DNA	D	E.coli. DNA
	In a cross involving polygenic inheritance where three gene pair control plant height, the shortest and the tallest plants are 6 cm and 24 cm, respectively. What height should all F ₁ s display if homozygous 12 cm and 24 cm plants are crossed, assuming their environments are the same?			
	A	18 cm	B	24 cm
4.	C	12 cm	D	22 cm
	In a cross between two individuals with the genotypes AaBbccDdEeFf and AaBbCCDDeeff, the probability that an offspring will be heterozygous at all these loci is			
	A	1/16	B	1/32

	C	1/64	D	1/28
5.	In a diploid organism, the genes A,B and C are present on the same chromosome in that order. The AB interval is 10 map units and BC interval is 20 map units. In an AaBbCc heterozygous individual, what will be the proportion of gametes that carry the genotype AbC?			
	A	0%	B	1%
	C	20%	D	30%
6.	E.coli. DNA ligase uses NAD^+ as a cofactor. During the actual ligation reaction (joining of the 5' phosphate and 3' hydroxyl to form a phosphodiester bond), the leaving group is			
	A	NAD^+	B	NMN
	C	AMP	D	ATP
7.	With respect to Wobble hypothesis all of the following are correct except:			
	A	Guanine pairs with uracil	B	Anticodon show standard and non standard base pairing with codon at wobble position.
	C	An inosine nucleotide in the tRNA molecule can base pair with A,C and U in the mRNA	D	An inosine nucleotide in the mRNA molecule can base pair with A,C and U in the t-RNA
8.	Which statement about DnaB helicase is true?			
	A	DnaB moves in 5' to 3'	B	It is loaded onto lagging strand
	C	The statements A and B are correct	D	Statement A and B are incomplete.
9.	Okazaki fragments were prepared from E coli. Strain pBR322 plasmid. These fragments were then hybridized to ssDNA, prepared carefully by separating the two strands of the E coli chromosome and the plasmid. The okazaki fragments would anneal to.....			
	A	Both the strands of both-Chromosomes and plasmids	B	One strand of plasmid and both strand of chromosome
	C	One strand of chromosome, both strands of plasmid	D	One strand each of chromosome and plasmid
10.	The production of different RNA products from a single product by changes in usage of splicing junction is called			
	A	Alternative splicing	B	Transposons movement
	C	Chromo- walking	D	Chromosome jumping
11.	Each biological parent donates one of their two ABO alleles to their child. This statement is...			
	A	Incomplete to comment technically	B	Wrongly interpreted
	C	Absolutely correct	D	More information is needed.

12.	A genomic library is...		
	A	recombinant molecules collection with inserts containing whole genome of an organisms	B) recombinant molecules collection with expressions of all of the genes of an organism
	C	recombinant molecules collection with inserts containing all genes of an organism	D) None of these belongs to genomic library
13.	Expression vector should not contain following elements...		
	A	Unique restriction enzyme site	B Promoter sequence
	C	Replications with Two different origins	D Host cell selection by markers
14.	PCR setup requires components in combinations as...		
	A	DNA polymerase, dNTPs, 2 primers, template DNA	B DNA ligase, dNTPs, 2 primers, template DNA
	C	DNA polymerase, NTPs, 2 primers, template RNA	DNA ligase, NTPs, 2 primers, template RNA
15.	The cellular location of proteins can be identified by the method...		
	A	Use of labeled antibody to identify	B Separate cell compartments by screening and find an antibody corresponding it
	C	Place a reporter gene next to promoter of the gene encoding protein and get the location of reporter protein	D Use floursoecent dye to tag the protein with
16.	_____ culture involves isolating an immature zygotic embryo.		
	A	Ovule	B Anther
	C	Embryo	D Just in general- haploid
17.	Inhibition of root growth refers to role of following plant growth regulator(s).		
	A	Auxins	B Absicic acid
	C	Jasmonic acid	D ethylene
18.	Virus mediated transduction method and non-viral transfection methods are...		
	A	Ligation	B Restriction digestion
	C	Can not say by these two names of methods	D Gene delivery methods
19.	Name the technique used to distinguish between individuals of same species using only samples of their DNA, is....		
	A	Chromosome walking	B Chromosome jumping
	C	DNA typing	D None is appropriate from options given
20.	_____ organism has been genetically engineered using a foreign gene, usually belonging to a different species.		
	A	Transgenic, only	B Genetically modified, only
	C	Genetically engineered, only	D All of them

21.	The translation of genetic information into amino acid takes place on _____ and is mediated by _____.		
	A	Ribosomes and mRNA	B Ribosomes and tRNAs
	C	Lysozymes and mRNA	D Lysozymes and tRNAs.
22.	The protein coding regions of each mRNA is composed of contiguous, non-overlapping string of codons called an...		
	A	Blocked reading frames	B Polycistronic chain, only
	C	Open reading frames	D Ribosome binding sites, only
23.	Which organism would you choose to study tissue regeneration?		
	A	Birds	B Primates
	C	Mice	D Amphibia
24.	In animal cell culture , S-cells can be inadvertently distributed nonuniformly across the growth surface due to		
	A	Release of inhibitory substances by some cells	B Acid production by the cells
	C	Vibration, caused by opening and closing of the incubator or faulty motor or vibration from equipment itself	D Changes in Temperature gradient
25.	Which of the following is not often used for two- and three-dimensional constructs in tissue engineering?		
	A	Rayon	B Nylon
	C	Polygluteric acid	D poly-L-lactic acid
26.	Most cell lines grow well at pH _____.		
	A	5.2	B 7.4
	C	8.67	D 6.8
27.	What is not a disadvantage of serum-free media ?		
	A	Multiplicity of media	B Physiological variability
	C	Cell proliferation	D Reagent purity
28.	_____ & _____ give the most complete disaggregation but may damage the cells. In contrast _____ & _____, give incomplete disaggregation, but are less harmful.		
	A	Trypsin & pronase ; Collagenase & dispase.	B collagenase; Trypsin
	C	trypsin & collagenase; Dispase & pronase	D Trypsin & dispase ; Pronase & collagenase

29.	_____ culture can be used to support the growth of somatic embryos or natural embryos during plant tissue culture.			
	A	seed	B	Endosperm
	C	Embryo	D	callus
30.	Protoplast isolation through enzymatic methods require _____ for the cell wall.			
	A	Apical dominance	B	Stem
	C	Leaf	D	Auxiliary dominance
31.	Somaclonal variations generally happen due to _____.			
	A	Poin mutations	B	UV exposure
	C	Gross chromosomal anomalies	D	carcinogens
32.	Vitamins and plant hormones are sterilized by			
	A	filtering through 0.25 micron filters of cellulose acetate	B	autoclaving at 121 degree celcius for 15 minutes
	C	filtering through sterile 0.22 micron filters	D	fumigation over night
33.	The process of fumigation overnight belongs to....			
	A	Microwave treatment at 20W/sq cm	B	Autoclave at 121 degree celcius for 80 minute
	C	Dry heat at 180 degree celcius for 12-24 hours	D	Wet heat at 180 degree celcius for 12-24 seconds
34.	Somatic embryogenesis involves plant cells in culture to transition (in the correct order)			
	A	globular phase, heart shaped,cotyledonary phase, plantlet	B	globular phase, heart shaped,cotyledonary phase, rooting phase, plantlet
	C	heart shaped, globular phase, cotyledonary phase, plantlet	D	heart shaped, globular phase, cotyledonary phase, rooting phase, plantlet
35.	The Animal Biotechnology involves			
	A	production of valuable products in animals using rDNA technology	B	methods of preventing inbreeding in animals

	C	methods for giving correct nutrition to cattle for better milk production	D	protection of wild life through cloning
36.	Animal cell culture was widely used for the production of			
	A	artiminesin	B	inulin
	C	somatostatin	D	Monoclonal antibodies
37.	Recombinant proteins are			
	A	proteins synthesized in mutated cell lines	B	proteins synthesised in cells that are produced by protoplast fusion
	C	proteins synthesized by transgene in host cell by rDNA technology	D	proteins synthesized in animals
38.	Which of these conditions are required for cell fusion between plant cells?			
	A	Cytoplasts, Ca ²⁺ , High pH	B	Protoplasts, Ca ²⁺ , High pH
	C	Protoplasts, Ca ²⁺ , Low pH	D	Cytoplasts, Ca ²⁺ , Low pH
39.	The Fluid is a substance that follows....			
	A	Subjected to shear force always	B	sustains continuous deformation without shear
	C	Undergoes compressive and tensile force with shear	D	continuous deformation under shear force
40.	Blood plasma is a			
	A	Newtonian fluid	B	Bingham
	C	Casson	D	Pseudoplastic
41.	Blood is a			
	A	Bingham fluid	B	Casson Body
	C	Dilatant fluid	D	Newtonian fluid
42.	Baffles....			
	A	Increases flow	B	Increases speed of fluid permanently
	C	Reduces circular flow	D	None of the above
43.	Reynolds number 3700 belongs to			
	A	Turbulent	B	Laminar
	C	Transition	D	need more data to say

44.	Reactant which controls amount of products is _____.			
	A	Limiting	B	Deficient
	C	Non-deficient	D	Excess
45.	Cell growth belongs to which type of catalysis?			
	A	Tandem	B	Surface
	C	Homo	D	auto
46.	“The rate per quantity of enzyme or cells involved in the reaction”, this is applicable to which type of reaction rate?			
	A	Total	B	Specific
	C	Variable	D	volumetric
47.	Estimate Yield from Stoichiometry: $3C_6H_{12}O_6 + 8 O_2 + 2NH_3 \rightarrow 2C_5H_7O_2N + 8CO_2 + 14H_2O$			
	A	0.53 g cells / g glucose used	B	0.27 g cells / g glucose used
	C	0.42 g cells / g glucose used	D	0.51 g cells / g glucose used
48.	Thermodynamic point of view, which is extensive properties?			
	A	Mass	B	Temperature
	C	Solubility	D	fugacity
49.	_____ is the rate of oxygen transfer per unit volume of fluid.			
	A	K_A	B	N_A
	C	N_L	D	K_L
50.	The rate at which oxygen is consumed by cells in fermenters determines the rate at which it must be transferred from _____			
	A	Liquid to gas	B	Gas to liquid
	C	A and B both	D	Solid to gas
51.	_____ is referred as mass transfer coefficient.			
	A	C_A		C_{BL}
	C	K_{La}	D	C_{AL}^*

52.	The relationship between K'_{eq} and $\Delta G'^{\circ}$ is			
	A	$\Delta G'^{\circ} = R^* K'_{eq}$	B	$\Delta G'^{\circ} = RT \ln K'_{eq}$
	C	$\Delta G'^{\circ} = -R T K'_{eq}$	D	Not given
53.	NADP+ in its reduced form is			
	A	NADPH	B	NADH
	C	NADPH+	D	Not given any suitable options
54.	The second law of thermodynamics is all about...			
	A	Enthalpy	B	Entropy
	C	Free energy	D	Metabolism only
55.	Maximum energy per gram on oxidation is yielded from			
	A	Glycogen	B	Fat
	C	Starch	D	protein
56.	The acyl co-A formed in the cytosol is transported to			
	A	Mitochondrial matrix	B	Microsomes
	C	Endoplasmic reticulum	D	Remains in cytosol
57.	The unfolding of polypeptide chain to more random structure suggests ...			
	A	large negative ΔS	B	large positive ΔS
	C	large positive ΔH	D	large negative ΔH
58.	The energy from the photon do not affect all biomolecules. Is it?			
	A	Correct	B	Incorrect
	C	Only amino acids	D	Only fats
59.	The regulation of oxidative phosphorylation depends on			
	A	Magnitude of proton motive force	B	Magnitude of ion motive force
	C	Magnitude of electron motive force	D	cannot say
60.	Name the organelles where oxidative phosphorylation takes place...			
	A	Chloroplast	B	Melanin
	C	Kidney	D	Mitochondria

61.	Arrhenius equation is of the order...			
	A	First order	B	Second order
	C	Pseudo first order	D	Third order
62.	For exothermic reactions, which condition is applicable for equilibrium constant K...			
	A	K decreases with increasing temperature	B	K decreases with decreasing temperature
	C	Positive ΔH° rxn with increasing temperature; K increases	D	Positive ΔH° rxn with increasing temperature; K increases
63.	The half reaction goes an oxidation or reduction depends on..			
	A	Value of G	B	Value of E
	C	Value of temperature	D	E value of half reaction
64.	To overcome the limitation of reproducibility associated with 'Random amplification of polymorphic DNA', following techniques was discovered.			
	A	GC MS	B	Amplified fragment length polymorphism
	C	Single nucleotide polymorphism	D	Not sure of these methods
65.	Comparatively, the amount of DNA required is low in...			
	A	RAPD	B	RFLP
	C	AFLP	D	There is no phenomena like low DNA requirement
66.	In a genome, where some individuals have one nucleotide and others have a different nucleotide, These positions are referred to as...			
	A	RAPD	B	RFLP
	C	AFLP	D	DNA
67.	There is a difference in DNA and RNA in....			
	A	Property of replication	B	Presence of thymine base
	C	Presence of deoxyribose sugar	D	Described all options are equally valid.
68.	In recombinant DNA technology a plasmid vector is cleaved by			
	A	Modified DNA ligase	B	A heated alkaline solution
	C	The same enzyme that cleave the donor DNA	D	The different enzyme other than that cleave the donor DNA
69.	Plants developed in vitro culture from pollen grains are			

	A	Androgenic plants	B	Pollen plants
	C	Male plants	D	Sterile plants
70.	Which of the following is a protein sequence database...?			
	A	DDBJ	B	EMBL
	C	GenBank	D	PIR
71.	In liquid-liquid extraction biological extracts are affected by-			
	A	High viscosity fluid	B	High solid content
	C	Presence of surface active species	D	All the answers given are valid equally.
72.	Precipitation helps to...			
	A	Reduce volume of fermentation broth	B	Lessen the concentration of the desired product
	C	Lower the degree of purification	D	No response is sufficient
73.	Which is true about adsorption operation?			
	A	Denatures sensitive biomolecules	B	Does not denature sensitive biomolecules
	C	Desired product cannot be adsorbed from fermentation broth	D	Temperature correlations are needed
74.	In reverse phase chromatography, the stationary phase is made of..			
	A	non-polar	B	polar
	C	either non-polar or polar	D	none of these is real answer
75.	Ion exchange chromatography is based on the...			
	A	Electrical mobility of ionic species	B	Partition chromatography
	C	Partition chromatography	D	Electrostatic attraction
76.	The destruction of microorganisms by steam may be a ...			
	A	first order chemical reaction	B	zero order chemical reaction
	C	second order chemical reaction	D	none of these
77.	_____ is the measure of the osmotic pressure gradient of two solutions separated by a semi-permeable membrane.			
	A	Turgor pressure	B	tonicity

	C	Plasmolysis	D	plasmoptysis
78.	_____ enhances the immune response against the immunogen.			
	A	Avidity	B	adjuvants
	C	Haptens	D	paratope
79.	Tightly linked cluster of genes present in every vertebrate species, is called...			
	A	Major Histocompatibility Complex	B	Major Haptens Complex
	C	Major Histones Complex	D	Major H-Cell Complex
80.	A graft transplanted between individuals of different species is called....			
	A	Autograft	B	Syngraft
	C	Allogeneic graft	D	xenograft
81.	The eigen values of a real symmetric matrix are			
	A	Always zero.	B	always pure imaginary
	C	Either zero or pure imaginary	D	always real
82.	A is a 4 x 5 real matrix and $Ax = b$ is an inconsistent system of equations. The highest possible rank of A is			
	A	2	B	4
	C	3	D	5
83.	Given the matrix $A = \begin{bmatrix} 1 & 0 \\ 5 & 2 \end{bmatrix}$ then the eigen values are			
	A	1,2	B	3,5
	C	5,7	D	7,9
84.	The Taylor's expansion for $f(x) = 2\cos x - 4\sin x - 1$ is			
	A	$1 - 4x - x^2 + \frac{2x^3}{3} + \frac{x^4}{12} + \dots$	B	$1 - 4x - x^2 + \frac{2x^3}{3} + \frac{x^4}{24} + \dots$
	C	$1 - 4x - x^2 + \frac{2x^3}{3} - \frac{x^4}{24} + \dots$	D	$1 - 4x - x^2 - \frac{2x^3}{3} + \frac{x^4}{24} + \dots$
85.	For $0 \leq x < \infty$ the critical point of the function $f(x) = e^{-x} - 2 - e^{-2x}$ at			
	A	$x = \ln 4$	B	$x = \ln 2$
	C	$x = \ln 8$	D	$x = 0$
86.	If $u = x^2 \ln \frac{x-y+z}{x+y+z}$ then the value of $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} + z \frac{\partial u}{\partial z}$ is			

	A	u	B	$2u$
	C	$6u$	D	$8u$
87.	If $L = \lim_{x \rightarrow 0} \frac{\sin x - \tan x - x^2}{\tan x \sin x}$ then value of L is			
	A	0	B	-1
	C	-1/3	D	-1/4
88.	For a scalar function $f(x, y, z) = 2x^2 + y^2 + 5z^2$, the gradient at the point P(1,1,-1) is			
	A	$4\bar{i} + 2\bar{j} - 10\bar{k}$	B	$4\bar{i} + 2\bar{j} + 10\bar{k}$
	C	$4\bar{i} - 2\bar{j} + \bar{k}$	D	$4\bar{i} - 2\bar{j} - 10\bar{k}$
89.	The divergence of the vector field $2x^2z\bar{i} + 3xy^2\bar{j} + 4yz^2\bar{k}$ at a point (1,1,1) is			
	A	0	B	14
	C	18	D	12
90.	An unbiased coin is tossed an infinite number of times. The probability that the fifth head appears at the tenth toss is			
	A	0.234	B	0.345
	C	0.123	D	0.092
91.	A box contains 25 parts of which 7 are defective. Two are being drawn simultaneously in random manner from the box. The probability of both the parts being good is			
	A	42/125	B	51/100
	C	25/29	D	5/9
92.	A fair coin was tossed two times in succession and resulted in the following outcomes: (i) Head (ii) Head. The probability of obtaining "Tail" when the coin is tossed again is			
	A	0		0.5
	C	0.25		0.05
93.	Consider a differential equation $\frac{d^2y}{dx^2} - \frac{dy}{dx} - 6y = 0$ then the solution is			
	A	$y = c_1 e^{-2x} + c_2 e^{3x}$	B	$y = c_1 e^{2x} + c_2 e^{-3x}$
	C	$y = c_1 e^{-2x} + c_2 e^{-3x}$	D	$y = c_1 e^{2x} + c_2 e^{3x}$
94.	Solution of $(-2xy + 3x^2 + y^2)dx + (2xy - x^2)dy = 0$ is			
	A	$xy^2 + x^2y - x^3 = c$	B	$xy^2 + x^2y + x^3 = c$
	C	$xy^2 + x^2y + 2x^3 = c$	D	$xy^2 - x^2y + x^3 = c$
95.	Solution of the differential equation $y'' + y = e^{-3x}$ is			
	A	$y = c_1 \cos x + c_2 \sin x + \frac{e^{-3x}}{10}$	B	$y = c_1 \cos x + c_2 \sin x - \frac{e^{-5x}}{10}$
	C	$y = c_1 \cos x + c_2 \sin x + \frac{x}{10}$	D	$y = c_1 \cos x + c_2 \sin x - \frac{x}{10}$
96.	If imaginary part of an analytic function is $v(x, y) = 2xy$ then its real part is			
	A	$-x^2 + y^2$	B	$-x^2 - y^2$
	C	$x^2 + y^2$	D	$x^2 - y^2$
97.	If c is a simple closed curve given by $ z = 1$ then $\oint_c \frac{zdz}{z^2+10}$ is equal to			
	A	0	B	1
	C	$-2\pi i$	D	$2\pi i$
98.	Inverse Laplace transforms of $\frac{1}{s^2-5s+6}$ is			
	A	$e^{2t} + e^{3t}$	B	$e^{2t} - e^{3t}$
	C	$-e^{2t} + e^{3t}$	D	$-e^{2t} - e^{3t}$

99.	The points where the Newton-Raphson method fails are called?			
	A	floating	B	continuous
	C	non-stationary	D	stationary
100.	The 4th difference of a polynomial of degree 4 is			
	A	constant	B	zero
	C	4!	D	4
