General Aptitude (GA)

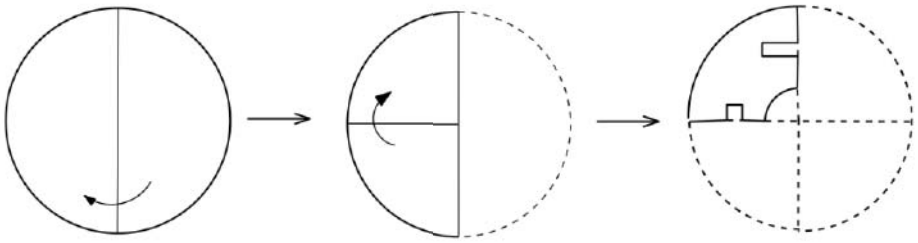
Q.1 – Q.5 Multiple Choice Question (MCQ), carry ONE mark each (for each wrong answer: – 1/3).

Q.1	**The ratio of boys to girls in a class is 7 to 3.** **Among the options below, an acceptable value for the total number of students in the class is:**
(A)	21
(B)	37
(C)	50
(D)	73

Q.2	**A polygon is convex if, for every pair of points, P and Q belonging to the polygon, the line segment PQ lies completely inside or on the polygon.** **Which one of the following is <u>NOT</u> a convex polygon?**
(A)	
(B)	
(C)	
(D)	

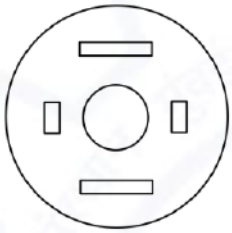
Q.3	**Consider the following sentences:** **(i) Everybody in the class is prepared for the exam.** **(ii) Babu invited Danish to his home because he enjoys playing chess.** **Which of the following is the CORRECT observation about the above two sentences?**
(A)	(i) is grammatically correct and (ii) is unambiguous
(B)	(i) is grammatically incorrect and (ii) is unambiguous
(C)	(i) is grammatically correct and (ii) is ambiguous
(D)	(i) is grammatically incorrect and (ii) is ambiguous

Q.4

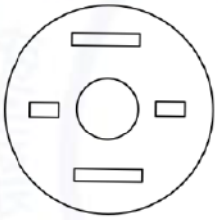


A circular sheet of paper is folded along the lines in the directions shown. The paper, after being punched in the final folded state as shown and unfolded in the reverse order of folding, will look like _____.

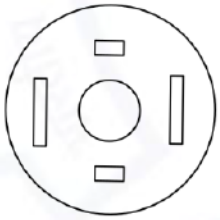
(A)



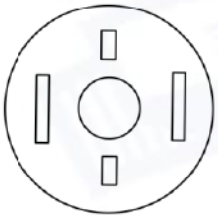
(B)



(C)



(D)



Q.5	_____ is to *surgery* as *writer* is to _____ **Which one of the following options maintains a similar logical relation in the above sentence?**
(A)	Plan, outline
(B)	Hospital, library
(C)	Doctor, book
(D)	Medicine, grammar

Q. 6 – Q. 10 Multiple Choice Question (MCQ), carry TWO marks each (for each wrong answer: – 2/3).

Q.6	**We have 2 rectangular sheets of paper, M and N, of dimensions 6 cm x 1 cm each. Sheet M is rolled to form an open cylinder by bringing the short edges of the sheet together. Sheet N is cut into equal square patches and assembled to form the largest possible closed cube. Assuming the ends of the cylinder are closed, the ratio of the volume of the cylinder to that of the cube is _____**
(A)	$\frac{\pi}{2}$
(B)	$\frac{3}{\pi}$
(C)	$\frac{9}{\pi}$
(D)	3π

Q.7

Items	Cost (₹)	Profit %	Marked Price (₹)
P	5,400	---	5,860
Q	---	25	10,000

Details of prices of two items P and Q are presented in the above table. The ratio of cost of item P to cost of item Q is 3:4. Discount is calculated as the difference between the marked price and the selling price. The profit percentage is calculated as the ratio of the difference between selling price and cost, to the cost $\left(\text{Profit \%} = \frac{\text{Selling price} - \text{Cost}}{\text{Cost}} \times 100\right)$.

The discount on item Q, as a percentage of its marked price, is _____

(A)	25
(B)	12.5
(C)	10
(D)	5

Q.8	There are five bags each containing identical sets of ten distinct chocolates. One chocolate is picked from each bag. The probability that at least two chocolates are identical is _____
(A)	0.3024
(B)	0.4235
(C)	0.6976
(D)	0.8125

Q.9	Given below are two statements 1 and 2, and two conclusions I and II. Statement 1: All bacteria are microorganisms. Statement 2: All pathogens are microorganisms. Conclusion I: Some pathogens are bacteria. Conclusion II: All pathogens are not bacteria. Based on the above statements and conclusions, which one of the following options is logically CORRECT?
(A)	Only conclusion I is correct
(B)	Only conclusion II is correct
(C)	Either conclusion I or II is correct.
(D)	Neither conclusion I nor II is correct.

Q.10	Some people suggest anti-obesity measures (AOM) such as displaying calorie information in restaurant menus. Such measures sidestep addressing the core problems that cause obesity: poverty and income inequality. Which one of the following statements summarizes the passage?
(A)	The proposed AOM addresses the core problems that cause obesity.
(B)	If obesity reduces, poverty will naturally reduce, since obesity causes poverty.
(C)	AOM are addressing the core problems and are likely to succeed.
(D)	AOM are addressing the problem superficially.

Biotechnology (BT)

Q.1 – Q.17 Multiple Choice Question (MCQ), carry ONE mark each (for each wrong answer: – 1/3).

Q.1	**Coronavirus genome consists of**
(A)	double-stranded DNA
(B)	double-stranded RNA
(C)	negative-sense single-stranded RNA
(D)	positive-sense single-stranded RNA

Q.2	**The enzyme that transcribes the eukaryotic genes encoding precursor ribosomal RNAs (pre-rRNAs) of 28S, 18S and 5.8S rRNAs is**
(A)	RNA polymerase I
(B)	RNA polymerase II
(C)	RNA polymerase III
(D)	RNA polymerase IV

Q.3	**Number of unrooted trees in a phylogeny of five sequences is**
(A)	3
(B)	15
(C)	105
(D)	945

Q.4	**Which one of the following methods is used to test the significance of a predicted phylogeny?**
(A)	Bootstrap
(B)	Maximum likelihood
(C)	Maximum parsimony
(D)	Minimum evolution

Q.5	**The Cartesian coordinates (x, y) of a point A with polar coordinates $\left(4, \pi/4\right)$ is**
(A)	$\left(\sqrt{3}, 2\sqrt{2}\right)$
(B)	$\left(2, 2\sqrt{3}\right)$
(C)	$\left(2\sqrt{2}, \sqrt{3}\right)$
(D)	$\left(2\sqrt{2}, 2\sqrt{2}\right)$

Q.6	**The order of genes present in a chromosome is as follows.** L M N O P Q Which one of the following rearrangements represents a paracentric inversion?
(A)	L O N M P Q
(B)	L M N P O Q
(C)	L M M N N O P Q
(D)	L M N O P Q

Q.7	**Which one of the following statements is INCORRECT about hybridoma production?**
(A)	Hybridoma cells can use hypoxanthine and thymidine
(B)	DNA synthesis in myeloma cells is blocked by aminopterin
(C)	Hybridoma cells are made to produce polyclonal antibodies
(D)	Polyethylene glycol is used to fuse myeloma cells to B-cells

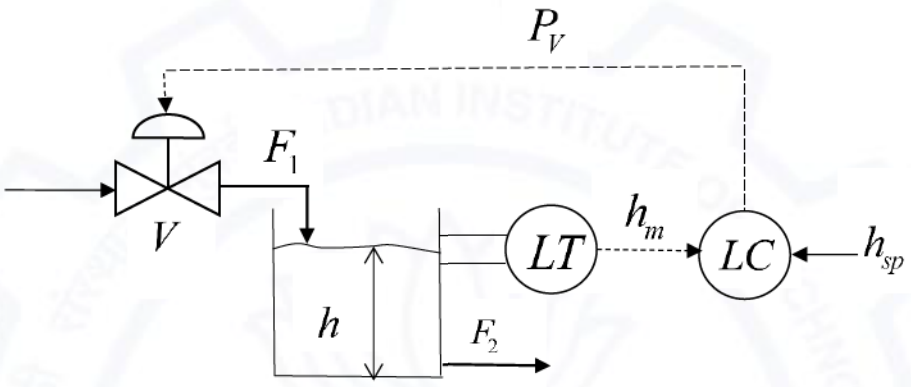
Q.8	$\frac{d}{dx}\left[\ln(2x)\right]$ **is equal to**
(A)	$1/2x$
(B)	$1/x$
(C)	$1/2$
(D)	x

Q.9	**Which one of the following techniques/tools is NOT used for inserting a foreign gene into a cell?**
(A)	DNA microarray
(B)	Electroporation
(C)	Gene gun
(D)	Microinjection

Q.10	**Under standard temperature (T) and pressure (P) conditions, $128\,g$ of an ideal gas molecule A occupies a volume of $1\,L$. The gas molecule A obeys the relationship $RT = 0.25PV$. R and V are universal gas constant and ideal gas volume, respectively. The molecule A is**
(A)	CO_2
(B)	H_2
(C)	N_2
(D)	O_2

Q.11	**CRISPR-Cas system is associated with**
(A)	adaptive immunity in eukaryotes
(B)	adaptive immunity in prokaryotes
(C)	innate immunity in eukaryotes
(D)	innate immunity in prokaryotes

Q.12	**The process by which intracellular macromolecules are supplied for lysosomal degradation during nutrient starvation is**
(A)	apoptosis
(B)	autophagy
(C)	phagocytosis
(D)	pinocytosis

Q.13	**The process and instrumentation diagram for a feedback control strategy to maintain the level (h) of a liquid by regulating a valve (V) in a tank is shown below. F_1 is inlet liquid flow rate, F_2 is outlet liquid flow rate, LT is the liquid level transmitter, LC is the liquid level controller, h_{sp} is the setpoint value of the liquid level, h_m is the measured value of the liquid level and P_V is the valve pressure.**  The manipulating variable(s) is/are
(A)	F_1 only
(B)	F_2 only
(C)	h_m and P_V only
(D)	h_{sp} and P_V only

Q.14	**A protein without its prosthetic group is known as**
(A)	apoprotein
(B)	hemoprotein
(C)	holoprotein
(D)	lipoprotein

Q.15	**The enzyme which adds phosphate group to the free 5′ terminus of a DNA sequence is**
(A)	adenosine kinase
(B)	alkaline phosphatase
(C)	polynucleotide kinase
(D)	terminal deoxynucleotidyl transferase

Q.16	**Which one of the following is CORRECT about microbial growth medium?**
(A)	Luria-Bertani broth is a synthetic medium
(B)	Nutrient broth is a defined medium
(C)	Sabouraud dextrose agar is a differential medium
(D)	Trypticase soy agar is a complex medium

Q.17	**The cellular process which utilizes RNA-induced silencing complex to block gene expression is**
(A)	RNA editing
(B)	RNA interference
(C)	RNA polyadenylation
(D)	RNA splicing

Q.18 – Q.19 Multiple Select Question (MSQ), carry ONE mark each (no negative marks).

Q.18	**Which of the following layer(s) is/are formed from the inner cell mass of the blastocyst?**
(A)	Ectoderm
(B)	Endoderm
(C)	Mesoderm
(D)	Trophectoderm

Q.19	**Which of the following cell organelle(s) is/are surrounded by a single phospholipid membrane?**
(A)	Golgi apparatus
(B)	Lysosome
(C)	Mitochondria
(D)	Nucleus

Q.20 – Q.25 Numerical Answer Type (NAT), carry ONE mark each (no negative marks).

Q.20	**The sum of the infinite geometric series** $1+\frac{1}{3}+\frac{1}{3^2}+\frac{1}{3^3}+\ldots$ **(rounded off to one decimal place) is _____.**

Q.21	**Three balls, colored in blue, green and red, are successively transferred from box** A **to box** B **in the order BLUE-GREEN-RED. The probability of a reverse transfer of the balls to the box** A **in the same order (rounded off to two decimal places) is _____.**

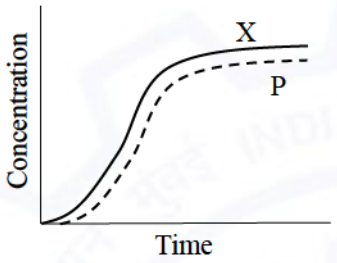
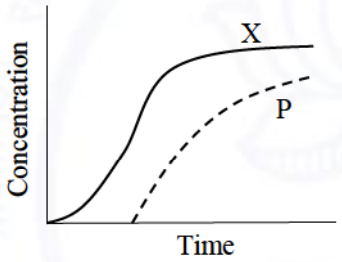
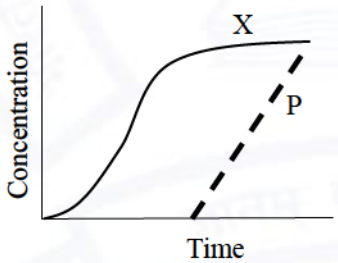
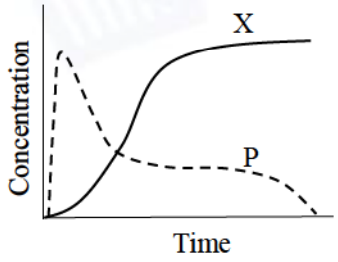
Q.22	**Decimal reduction time of a bacterial strain is** $20\ min$**. Specific death rate constant in** min^{-1} **(rounded off to two decimal places) is _____.**

Q.23	**The value of** $\lim_{x\to 0}\left[\frac{x-sin2x}{x-sin5x}\right]$ **(rounded off to two decimal places) is _____.**

Q.24	**A system consists of two reactors, connected by a valve. The first reactor (**$R1$**) contains an ideal gas** A **of volume** $5\ L$ **and the second reactor (**$R2$**) has an ideal gas** B **of volume** $10\ L$**. Initially, the valve is closed and pressure** P **in** $R1$ **and** $R2$ **are** 9 **and** $6\ atm$**, respectively. Later, when the valve is opened, the system reaches equilibrium. If the temperature** T **of both the reactors is maintained constant, the final equilibrium pressure in** atm **of the system is _____.**

Q.25	**The enzyme α-amylase used in starch hydrolysis has an affinity constant** (K_m) **value of** $0.005\ M$**. To achieve one-fourth of the maximum rate of hydrolysis, the required starch concentration in** mM **(rounded off to two decimal places) is _____.**

Q.26 – Q.34 Multiple Choice Question (MCQ), carry TWO mark each (for each wrong answer: – 2/3).

Q.26	**Which one of the following represents non-growth associated product formation kinetics in a bioprocess system? X and P denote viable cell and product concentrations, respectively.**
(A)	
(B)	
(C)	
(D)	

Q.27	**Match enzymes in Group I with their corresponding industrial application in Group II.** **Group I** — **Group II** P. Amylase — 1. Laundry detergent Q. Invertase — 2. Fruit juice clarification R. Pectinase — 3. Liquefaction of sucrose S. Xylanase — 4. Pulp and paper processing
(A)	P-2, Q-3, R-4, S-1
(B)	P-1, Q-3, R-2, S-4
(C)	P-1, Q-2, R-3, S-4
(D)	P-1, Q-4, R-2, S-3

Q.28	**Match separation methods in Group I with associated properties in Group II.** **Group I** — **Group II** P. Centrifugation — 1. Density Q. Dialysis — 2. Diffusivity R. Solvent extraction — 3. Size S. Ultrafiltration — 4. Solubility
(A)	P-4, Q-2, R-1, S-3
(B)	P-3, Q-1, R-2, S-4
(C)	P-1, Q-3, R-2, S-4
(D)	P-1, Q-2, R-4, S-3

Q.29	**Match the autoimmune diseases in Group I with the corresponding primarily affected organ in Group II.** **Group I** — **Group II** P. Hashimoto's disease — 1. Brain Q. Juvenile diabetes — 2. Pancreas R. Multiple sclerosis — 3. Skeletal muscle S. Myasthenia gravis — 4. Thyroid
(A)	P-1, Q-2, R-3, S-4
(B)	P-3, Q-1, R-2, S-4
(C)	P-4, Q-2, R-1, S-3
(D)	P-1, Q-2, R-4, S-3

Q.30	**Match hypersensitivity types in Group I with their corresponding condition in Group II.** **Group I** — **Group II** P. Type I — 1. Erythroblastosis fetalis Q. Type II — 2. Host reaction to bee venom R. Type III — 3. Systemic lupus erythematosus S. Type IV — 4. Tuberculin reaction
(A)	P-2, Q-3, R-1, S-4
(B)	P-3, Q-1, R-4, S-2
(C)	P-2, Q-3, R-4, S-1
(D)	P-2, Q-1, R-3, S-4

Q.31	**Which of the following combinations of plant hormones and their associated function are CORRECT?** **Hormone** — **Function** P. Abscisic acid — Breaks seed dormancy Q. Auxin — Induces cell division R. Ethylene — Stimulates ripening of fruits S. Gibberellin — Promotes seed dormancy
(A)	P and R only
(B)	P and S only
(C)	Q and R only
(D)	Q and S only

Q.32	**Which one of the following tools is used to compare all the possible six-open reading frames of a given nucleotide query sequence with all the available six-open reading frames of the nucleotide sequence database?**
(A)	BLASTN
(B)	BLASTX
(C)	TBLASTN
(D)	TBLASTX

Q.33	**In *Neurospora crassa*, a mutation in the *poky* gene results in a slow growth phenotype (poky). The results of four crosses are given below.** **(1) wild-type ♀ × wild-type ♂ → All progeny are wild-type** **(2) wild-type ♀ × poky ♂ → All progeny are wild-type** **(3) poky ♀ × wild-type ♂ → All progeny are poky** **(4) poky ♀ × poky ♂ → All progeny are poky** **Which one of the following explains the inheritance mode of poky?**
(A)	Episomal inheritance
(B)	Mendelian inheritance
(C)	Mitochondrial inheritance
(D)	X-linked inheritance

Q.34	**Tertiary structure of a protein consisting of α-helices and β-strands can be determined by**
(A)	circular dichroism spectroscopy
(B)	mass spectrometry
(C)	nuclear magnetic resonance spectroscopy
(D)	UV spectroscopy

Q.35 – Q.38 Multiple Select Question (MSQ), carry TWO mark each (no negative marks).

Q.35	**Which of the following statement(s) is/are CORRECT about *Agrobacterium tumefaciens*?**
(A)	It contains tumor inducing plasmid
(B)	It causes crown gall disease in dicotyledonous plants
(C)	It is a Gram-positive soil bacterium
(D)	It is used in generating transgenic plants

Q.36	**Which of the following antimicrobial agent(s) is/are growth factor analog(s)?**
(A)	5-Fluorouracil
(B)	Isoniazid
(C)	Sulfanilamide
(D)	Tetracycline

Q.37	**Which of the following chemical messenger(s) is/are derivative(s) of tryptophan?**
(A)	γ-amino butyric acid
(B)	Indole acetic acid
(C)	Melatonin
(D)	Serotonin

Q.38	**Which of the following nucleus/nuclei is/are NMR active?**
(A)	^{1}H
(B)	^{13}C
(C)	^{16}O
(D)	^{32}S

Q.39 – Q.55 Numerical Answer Type (NAT), carry TWO mark each (no negative marks).

Q.39	**In a Mendel's dihybrid experiment, a homozygous pea plant with round yellow seeds was crossed with a homozygous plant with wrinkled green seeds. F_1 intercross produced 560 F_2 progeny. The number of F_2 progeny having both dominant traits (round and yellow) is _____.**

Q.40	**A $0.1\,mL$ aliquot of a bacteriophage stock having a concentration of 4×10^{9} *phages* mL^{-1} is added to $0.5\,mL$ of *E. coli* culture having a concentration of 2×10^{8} *cells* mL^{-1}. The multiplicity of infection is _____.**

Q.41	**If the area of a triangle with the vertices $(k, 0)$, $(2,0)$ and $(0,-2)$ is 2 square units, the value of k is _____.**

Q.42	**In a chemostat with a dilution rate of 0.8 h^{-1}, the steady state biomass concentration and the specific product formation rate are 8 *mol* m^{-3} and 0.2 $(mol\ product)(mol\ \ biomass)^{-1}\ h^{-1}$, respectively. The steady state product concentration in *mol* m^{-3} is _____.**

Q.43	**If the values of two random variables (X, Y) are $(121, 360)$, $(242, 364)$ and $(363, 362)$, the value of correlation coefficient between X and Y (rounded off to one decimal place) is _____.**

Q.44	**The determinant of matrix $A=\begin{pmatrix} 1 & 1 & 1 & 1 \\ -1 & 1 & 1 & 1 \\ -1 & -1 & 1 & 1 \\ 1 & 1 & 1 & 3 \end{pmatrix}$ is _____.**

Q.45	**It is desired to scale-up a fermentation from $1L$ to $1000L$ vessel by maintaining a constant power-to-volume ratio. The small fermenter is operated at an agitator speed of 300 rotations per minute (rpm). If the value of scale up factor is 10, agitator speed in rpm (rounded off to the nearest integer) for the large fermenter is _____.**

Q.46	**The specific growth rate of a mold during exponential phase of its growth in a batch cultivation is $0.15\ h^{-1}$. If the cell concentration at $30h$ is $33\,g\,L^{-1}$, the cell concentration in $g\,L^{-1}$ (rounded off to the nearest integer) at $24h$ is _____.**

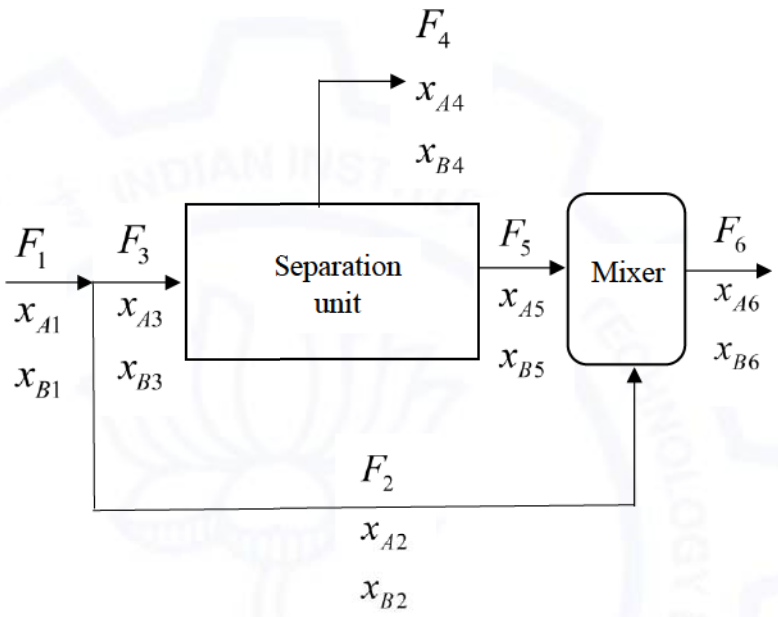
Q.47	**A sedimentation tank of height $100\ cm$ is used in a conventional activated sludge process to separate a suspension of spherical shaped granular sludge biomass of $0.5\ mm$ diameter. The viscosity of the liquid is $1\,cP$. The difference in density between the suspended biomass and the liquid is $0.1\,g\,cm^{-3}$. If the biomass reach their terminal velocity instantaneously, the biomass settling time in min (rounded off to two decimal places) is _____.**

Q.48	**In a random mating population, Y and y are dominant and recessive alleles, respectively. If the frequency of Y allele in both sperm and egg is 0.70, then the frequency of Y/y heterozygotes (rounded off to two decimal places) is _____.**

Q.49	**Calculate the following integral** $\int_0^{\pi^2/4} \sin\sqrt{x}\,dx =$ _____ .

Q.50

A feed stream (F_1) containing components A and B is processed in a system comprising of separation unit and a mixer as shown below in the schematic diagram. The mole fractions of the components A and B are x_A and x_B, respectively. If $F_1 + F_2 = 100\ kg\,h^{-1}$, the degrees of freedom of the system is _____.



Q.51

A batch cultivation of *E. coli* follows zeroth order Monod's growth kinetics. The cell growth is terminated when the residual dissolved oxygen concentration attains 10% of its saturation value and oxygen mass transfer coefficient $(k_L a)$ reaches its maximum value $(80\,h^{-1})$. The saturation value of dissolved oxygen concentration is $0.007\ kg\,m^{-3}$. If the maximum specific growth rate and yield coefficient (Y_{X/O_2}) are $0.2\ h^{-1}$ and $1.5\ (kg\ cells)(kg\ O_2)^{-1}$, respectively, then the final cell concentration in $kg\,m^{-3}$ (rounded off to two decimal places) at the end of the batch cultivation is _____.

Q.52	**Milk flowing through a stainless steel inner tube (40 mm inner diameter) of double tube-type heater is to be heated from 10 ^{o}C to 85 ^{o}C by saturated steam condensing at 120 ^{o}C on the outer surface of the inner tube. Total heat transferred (Q) is 146200 $kcal\ h^{-1}$ and the overall heat transfer coefficient is 750 $kcal\ h^{-1}\ m^{-2}\ ^{\circ}C^{-1}$. The total length of the heating tube in m (rounded off to one decimal place) is _____.**

Q.53	**A DNA solution of $50\ \mu g\ mL^{-1}$ concentration gives an absorbance of 1.0 at $260\ nm$. An aliquot of $20\ \mu L$ from a $50\ \mu L$ purified plasmid solution is diluted with distilled water to a total volume of $1000\ \mu L$. The diluted plasmid solution gives an absorbance of 0.550 at $260\ nm$. The concentration of the purified plasmid in $\mu g\ \mu L^{-1}$ (rounded off to two decimal places) is _____.**

Q.54	**The possible number of *Sal*I restriction sites in a 9 kb double-stranded DNA, with all four bases occurring in equal proportion (rounded off to the nearest integer) is _____.**

Q.55	**A bacterium produces acetic acid from ethanol as per the following reaction** $$2CH_3CH_2OH + 2O_2 \rightarrow 2CH_3COOH + 2H_2O$$ **The thermodynamic maximum yield of acetic acid from ethanol in $g\ g^{-1}$ (rounded off to two decimal places) is _____.**

END OF THE QUESTION PAPER

Graduate Aptitude Test in Engineering (GATE 2021)

Answer Keys and Marks for Subject/Paper: Biotechnology (BT)

Q. No.	Session	Question Type MCQ/MSQ/NAT	Section Name	Answer Key/Range	Marks	Negative Marks
1	5	MCQ	GA	C	1	1/3
2	5	MCQ	GA	A	1	1/3
3	5	MCQ	GA	C	1	1/3
4	5	MCQ	GA	A	1	1/3
5	5	MCQ	GA	C	1	1/3
6	5	MCQ	GA	C	2	2/3
7	5	MCQ	GA	C	2	2/3
8	5	MCQ	GA	C	2	2/3
9	5	MCQ	GA	C OR D	2	2/3
10	5	MCQ	GA	D	2	2/3
1	5	MCQ	BT	D	1	1/3
2	5	MCQ	BT	A	1	1/3
3	5	MCQ	BT	B	1	1/3
4	5	MCQ	BT	A	1	1/3
5	5	MCQ	BT	D	1	1/3
6	5	MCQ	BT	B	1	1/3
7	5	MCQ	BT	C	1	1/3
8	5	MCQ	BT	B	1	1/3
9	5	MCQ	BT	A	1	1/3
10	5	MCQ	BT	D	1	1/3

GATE 2021 Answer Key for Biotechnology (BT)

Q. No.	Session	Question Type MCQ/MSQ/NAT	Section Name	Answer Key/Range	Marks	Negative Marks
11	5	MCQ	BT	B	1	1/3
12	5	MCQ	BT	B	1	1/3
13	5	MCQ	BT	A	1	1/3
14	5	MCQ	BT	A	1	1/3
15	5	MCQ	BT	C	1	1/3
16	5	MCQ	BT	D	1	1/3
17	5	MCQ	BT	B	1	1/3
18	5	MSQ	BT	A; B; C	1	0
19	5	MSQ	BT	A; B	1	0
20	5	NAT	BT	1.5 to 1.5	1	0
21	5	NAT	BT	0.16 to 0.18	1	0
22	5	NAT	BT	0.10 to 0.13	1	0
23	5	NAT	BT	0.25 to 0.25	1	0
24	5	NAT	BT	7 to 7	1	0
25	5	NAT	BT	1.60 to 1.80	1	0
26	5	MCQ	BT	C	2	2/3
27	5	MCQ	BT	B	2	2/3
28	5	MCQ	BT	D	2	2/3
29	5	MCQ	BT	C	2	2/3
30	5	MCQ	BT	D	2	2/3
31	5	MCQ	BT	C	2	2/3
32	5	MCQ	BT	D	2	2/3
33	5	MCQ	BT	C	2	2/3

GATE 2021 Answer Key for Biotechnology (BT)

Q. No.	Session	Question Type MCQ/MSQ/NAT	Section Name	Answer Key/Range	Marks	Negative Marks
34	5	MCQ	BT	C	2	2/3
35	5	MSQ	BT	A; B; D	2	0
36	5	MSQ	BT	A; B; C	2	0
37	5	MSQ	BT	B; C; D	2	0
38	5	MSQ	BT	A; B	2	0
39	5	NAT	BT	315 to 315	2	0
40	5	NAT	BT	4 to 4	2	0
41	5	NAT	BT	0 to 0 OR 4 to 4	2	0
42	5	NAT	BT	2 to 2	2	0
43	5	NAT	BT	0.5 to 0.5	2	0
44	5	NAT	BT	8 to 8	2	0
45	5	NAT	BT	64 to 65	2	0
46	5	NAT	BT	13 to 14	2	0
47	5	NAT	BT	1.20 to 1.30	2	0
48	5	NAT	BT	0.41 to 0.43	2	0
49	5	NAT	BT	2 to 2	2	0
50	5	NAT	BT	6 to 6	2	0
51	5	NAT	BT	3.70 to 3.80	2	0
52	5	NAT	BT	23.0 to 24.0	2	0
53	5	NAT	BT	1.37 to 1.38	2	0
54	5	NAT	BT	2 to 2	2	0
55	5	NAT	BT	1.90 to 2.00	2	0