CENERAL APTITUDE   O. No. 1 - S CATEV ONE MARK Each     (a) 91   (b) 93   (c) 91   (c) 1   (c) 1 <tr< th=""><th>GENERAL APTITUDE   0.No. 1-5 Carry One Mark Each   each of the sentel than 117. The number is:   (a)   (b)   (c)   (c)</th><th>GENERAL APTITUDE O. No. 1-5 Carry One Mark Each         4. A number is as much greater than 75 as it is smaller than 117. The number is: (A) 91 (B) 93 (C) 89 (D) 96         (A) 91 (B) 93 (C) 89 (D) 96         Answer: (D)         2. The professor ordered to the students to go out of the class. 111 111 1V Which of the above underlined parts of the sentence is grammatically incorrect? (A) 1 (B) 1 (C) 11 (D) 1V         Answer: (B)         3. Which of the following options is the closest in meaning to the word given below: Primeval (A) Modern (B) Historic (C) Primitive (D) Antique Answer: (C)         4. Friendship, no matter how</th><th><u>forumonline</u></th></tr<>	GENERAL APTITUDE   0.No. 1-5 Carry One Mark Each   each of the sentel than 117. The number is:   (a)   (b)   (c)   (c)	GENERAL APTITUDE O. No. 1-5 Carry One Mark Each         4. A number is as much greater than 75 as it is smaller than 117. The number is: (A) 91 (B) 93 (C) 89 (D) 96         (A) 91 (B) 93 (C) 89 (D) 96         Answer: (D)         2. The professor ordered to the students to go out of the class. 111 111 1V Which of the above underlined parts of the sentence is grammatically incorrect? (A) 1 (B) 1 (C) 11 (D) 1V         Answer: (B)         3. Which of the following options is the closest in meaning to the word given below: Primeval (A) Modern (B) Historic (C) Primitive (D) Antique Answer: (C)         4. Friendship, no matter how	<u>forumonline</u>
O. No. 1- 5 Carry One Mark Each         (A) 91       (B) 93       (C) 89       (D) 96         (A) 91       (B) 93       (C) 80       (D) 96         (A) 1       (B) 11       (C) 111       (D) 17         (A) Modern       (B) Historic       (C) Primitive       (D) Antique         (A) Modern       (B) intimate       (C) secret       (D) pleasant         (A) cordial       (B) intimate       (C) secret       (D) pleasant         (B) Science:       (B) 111       (D) Money: Happiness         (A) Science:       (B) Science:       (B) Money: Happiness	O. No. 1 - 5 Carry One Mark Each   eater than 75 as it is smaller than 117. The number is:   (B) 93 (C) 89 (D) 96   the students to go out of the class.   erlined parts of the sentence is grammatically incorrect?   (B) II (C) III (D) IV   options is the closest in meaning to the word given below:   (B) Historic (C) Primitive (D) Antique   wit is, has its limitations.   (B) intimate (C) secret (D) pleasant   expresses a relationship similar to that expressed in the pair:   at (B) Wealth: Peace   dge (D) Money: Happiness	O. No. 1- 5 Carry One Mark Each         A number is as much greater than 75 as it is smaller than 117. The number is: <ul> <li>(A) 91</li> <li>(B) 93</li> <li>(C) 89</li> <li>(D) 96</li> </ul> . A number is as much greater than 75 as it is smaller than 117. The number is: <ul> <li>(A) 91</li> <li>(B) 93</li> <li>(C) 89</li> <li>(D) 96</li> </ul> . The professor ordered to the students to go out of the class.         III           . The professor ordered to the students to go out of the class.         III           . The professor ordered to the students to go out of the class.         III           . III         III         IV           Which of the above underlined parts of the sentence is grammatically incorrect?         (A) 1         (B) II         (C) III         (D) IV           answer:         (B)         II         (C) III         (D) Antique           . Which of the following options is the closest in meaning to the word given below:         Primeval         (A) Modern         (B) Historic         (C) Primitive         (D) Antique           . Modern         (B) intimate         (C) secret         (D) pleasant           . Modern         (B) intimate         (C) secret         (D) pleasant	
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Friendship, no matter $ion$ it is, has its limitations.         (A) cordial       (B) intimate       (C) secret       (D) pleasant         inswer:       (B)         Select the pair that best expresses a relationship similar to that expressed in the pair:         Medicine: Health         (A) Science: Experiment       (B) Wealth: Peace         (C) Education: Knowledge       (D) Money: Happiness	owit is, has its limitations.   (B) intimate   (C) secret   (D) pleasant   expresses a relationship similar to that expressed in the pair:    nt   (B) Wealth: Peace   exdge   (D) Money: Happiness	Friendship, no matter howit is, has its limitations.         (A) cordial       (B) intimate       (C) secret       (D) pleasant         nswer:       (B)         Select the pair that best expresses a relationship similar to that expressed in the pair:         Medicine: Health	
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<ul> <li>(A) cordial</li> <li>(B) intimate</li> <li>(C) secret</li> <li>(D) pleasant</li> <li>(B)</li> <li>(B)</li> <li>(C) secret</li> <li>(D) pleasant</li> <li>(D) pleasant<!--</td--><td><ul> <li>(B) intimate</li> <li>(C) secret</li> <li>(D) pleasant</li> </ul> expresses a relationship similar to that expressed in the pair: <ul> <li>nt</li> <li>(B) Wealth: Peace</li> <li>(c) Money: Happiness</li> </ul></td><td>(A) cordial (B) intimate (C) secret (D) pleasant <b>nswer: (B)</b> Select the pair that best expresses a relationship similar to that expressed in the pair: Medicine: Health</td><td></td></li></ul>	<ul> <li>(B) intimate</li> <li>(C) secret</li> <li>(D) pleasant</li> </ul> expresses a relationship similar to that expressed in the pair: <ul> <li>nt</li> <li>(B) Wealth: Peace</li> <li>(c) Money: Happiness</li> </ul>	(A) cordial (B) intimate (C) secret (D) pleasant <b>nswer: (B)</b> Select the pair that best expresses a relationship similar to that expressed in the pair: Medicine: Health	
Select the pair that best expresses a relationship similar to that expressed in the pair: Medicine: Health (A) Science: Experiment (B) Wealth: Peace (C) Education: Knowledge (D) Money: Happiness nswer: (C)	expresses a relationship similar to that expressed in the pair: nt (B) Wealth: Peace :dge (D) Money: Happiness	Select the pair that best expresses a relationship similar to that expressed in the pair: Medicine: Health	
Select the pair that best expresses a relationship similar to that expressed in the pair: Medicine: Health (A) Science: Experiment (B) Wealth: Peace (C) Education: Knowledge (D) Money: Happiness nswer: (C)	expresses a relationship similar to that expressed in the pair: nt (B) Wealth: Peace edge (D) Money: Happiness	Select the pair that best expresses a relationship similar to that expressed in the pair: Medicine: Health	
Select the pair that best expresses a relationship similar to that expressed in the pair: Medicine: Health (A) Science: Experiment (B) Wealth: Peace (C) Education: Knowledge (D) Money: Happiness nswer: (C)	expresses a relationship similar to that expressed in the pair: nt (B) Wealth: Peace edge (D) Money: Happiness	Select the pair that best expresses a relationship similar to that expressed in the pair: Medicine: Health	
Medicine: Health (A) Science: Experiment (B) Wealth: Peace (C) Education: Knowledge (D) Money: Happiness nswer: (C)	nt (B) Wealth: Peace dge (D) Money: Happiness	Medicine: Health	
<ul> <li>(A) Science: Experiment</li> <li>(B) Wealth: Peace</li> <li>(C) Education: Knowledge</li> <li>(D) Money: Happiness</li> </ul>	nt (B) Wealth: Peace edge (D) Money: Happiness		
<ul> <li>(C) Education: Knowledge</li> <li>(D) Money: Happiness</li> <li>(C)</li> </ul>	edge (D) Money: Happiness	(A) Science: Experiment (B) Wealth: Peace	
nswer: (C)		(C) Education: Knowledge (D) Money: Hanniness	
		nswer: (C)	

G	GATEFORUM Engineering Success	BT-GAT	E-2013	www.gateforumonline.com
		<b>Q.No. 6 - 10 Carry</b>	<u> Iwo Marks Each</u>	
6.	X and Y are two positive revalues of (X, Y) the function	eal numbers such that $f(X, Y) = 3X + 6Y$	$2X + Y \le 6$ and $X + 2Y$ will give maximum va	$Y \leq 8$ . For which of the following lue?
	(A) (4/3, 10/3)		(B) (8/3, 20/3)	
	(C) (8/3, 10/3)		(D) (4/3, 20/3)	
Ans	wer: (A)			Comments of the local distribution of the lo
		2 M		
7.	If $ 4X-7  = 5$ then the value	ues of $2 X  -  -X $ is:		
	(A) 2, 1/3 (H	<b>3</b> ) 1/2, 3	(C) 3/2, 9	(D) 2/3,9
Ans	wer: (B)			A CONTRACTOR

8. Following table provides figures (in rupees) on annual expenditure of a firm for two years 2010 and 2011.

Category	2010	2011
Raw material	5200	6240
Power & fuel	7000	9450
Salary & wages	9000	12600
Plant & machinery	20000	25000
Advertising	15000	19500
Research & Development	22000	26400

In 2011, which of the following two categories have registered increase by same percentage?

- (A) Raw material and Salary & wages
- (B) Salary & wages and Advertising
- (C) Power & fuel and Advertising
- (D) Raw material and Research & Development

## Answer: (D)

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	A firm is selling its product at Rs total profit of Rs. 500. Later, the increased to maintained the same	. 60 per unit. The total cost of proceed total cost increased by 30%. By profit level.	luction is Rs. 100 and firm is earn what percentage the price should
	(A) 5 (B) 10	(C) 15	(D) 30
SW	wer: (A)		
	Abhishek is elder to Savar.		
	Savar is younger to Anshul.		
	Which of the given conclusions is	s logically valid and is inferred from	m the above statements?
	(A) Abhishek is elder to Anshul		
	(B) Anshul is elder to Abhishek		
	(C) Abhishek and Anshul are of	the same age	
	(D) No conclusion follows		
ISW	wer: (D)		
	<u>BIOT</u>	TECHNOLOGY ENGINEERIN	<u>G</u>
	<u>Q.</u>	No. 1–25 Carry One Mark Each	
	Under alkaline conditions, DNA i	is more stable than RNA because	
	(A) RNA forms secondary struct	ures	
	(B) RNA is a single stranded mo	lecule	
	(C) RNA has uracil in place of th	hymidine	
	(D) RNA is susceptible to hydrol	lysis	
ISW	wer: (D)		
	Which one of the following modi	fications is common toboth protein	and DNA?
	(A) SUMOylation (B) Nit	rosylation (C) Methylation	(D) Ubiquitination
cu	ver: (C)		

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5.	Pro	tein A, which ha	s strong affinity to Fc reg	ion of immunoglobulin	, is extracted from
	(A)	Saccharomyces	cerevisiae	(B) Staphylococo	cus aureus
	(C)	Streptococcus p	oyogenes	(D) Streptococcu	s sanguis
Ansv	wer:	<b>(B</b> )			
4.	The	first humanized	monoclonal antibody app	proved for the treatmen	t of breast canceris
	(A)	Rituximab	(B) Cetuximab	(C) Bevacizumal	5 (D) Herceptin
Ansv	wer:	( <b>D</b> )			
_	<b>W</b> 71-	ich ann af tha fai	1	ataina daga NOT undan	as about surface of
5.	wn	Sor	(R) The	(C) Pro	(D) Tyr
Ang	(A)		( <b>b</b> ) III	(C) 110	(D) Tyl
AIIS		(C)			
6.	The	role of an aduva	unt isto		
	(A)	prolong the per	sistence of antigen	(B) cross link the	e antigen
	(C)	increase the siz	e of antigen	(D) avoid inflam	mation
Ansy	wer:	(A)	Ū.		
7.	End	logenous antigen	s are presented on to the	cell surface along with	
	(A)	) MHC-II		(B) MHC-I	
	(C)	Fcyreceptor		(D) Complement	receptor
Ansv	wer:	<b>(B</b> )			
8.	Hur	nan genome sequ	encing project involved	the construction of gen	omic library in
	(A)	Bacterial artific	ial chromosome	(B) pBR322	
	(C)	Bacteriophage		(D) pcDNA3.1	
A	wer•	( <b>A</b> )			

4

G	CATEFORUM Engineering Success	BT	-GATE-2013	www.gateforumonline.com
9.	The nucleotide analo	gue used in DNA seque	ncing by chain terminati	on method is
	(A) 1',3'-dideoxy nu	cleoside triphosphate	(B) 2',3'-dideoxy	nucleoside triphosphate
	(C) 2',4'-dideoxy nu	cleoside triphosphate	(D) 2',5'-dideoxy	nucleoside triphosphate
Answ	ver: (B)			
10				
10.	In nature, the horizon	ntal gene transfer across	bacteria is mediated by	
	(A) Gene cloning fo	llowed by transformatic	on	
	(B) Conjugation and	l transformation		
	(C) Conjugation on	У		
	(D) Transformation	only		
Answ	ver: (B)			
11.	Phylum proteobacter	ia is subdivided into $\alpha$ -	$\beta$ , $\beta$ , $\gamma$ , $\gamma$ , $\delta$ – and $\varepsilon$ – prot	eobacteria based on
	(A) G+C content		(B) 23S rRNA se	quences
	(C) tRNA sequence	\$	(D) 16S rRNA se	quences
Answ	ver: (D)			
12 <mark>.</mark>	Which of the followi	ng in an ABC transporte	er?	
	(A) Multidrug resist	ance protein	(B) Acetylcholine	e receptor
	(C) Bacteriorhodop	sin	(D) ATP synthase	e
Answ	ver: (A)			
13 <mark>.</mark>	The catalytic efficier	cy for an enzyme is def	ïnedas	
	(A) k <sub>cat</sub>	(B) $\frac{v_{max}}{1}$	(C) $\frac{k_{cat}}{k_{cat}}$	(D) $\frac{k_{cat}}{dt}$
		K <sub>cat</sub>	k <sub>m</sub>	V <sub>max</sub>
Answ	ver: (C)			
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Of the two diploid symany chromosomes v (A) 42 or 54 r: (B)	pecies, species I has 3 vould be found in an al (B) 46 or 50	36 chromosomes and spe llotriploid individual?	ccies II has 28 chromosomes. How
(A) 42 or 54 <b>r: (B)</b>	(B) 46 or 50	(C) 74 or 86	
r: (B)		(C) 74 01 80	(D) 84 or 108
The RNA primer synt	thesized during the ren	lication process in bacter	ia is removed by
(A) DNA gyrase	inesized during the rep	(B) Primase	
(C) DNA polymeras	el	(D) DNA polymer	rase II
(C) DIVA polymeras		(D) DIVA polylich	
1. (C)			
The suitable substitut	ion matrix to align clos	selv related sequences is	
(A) PAM 250 or BL	OSSUM 80	(B) PAM 40 or B	LOSSUM 80
(C) PAM 120 or BL	OSSUM 40	(D) PAM 250 or I	BLOSSUM 40
(C) 11101 120 01 DL		(D) 17101250 011	
[1 1] [			
If $P = \begin{bmatrix} 1 & 1 \\ 2 & 2 \end{bmatrix}$ , $Q = \begin{bmatrix} 1 & 1 \\ 2 & 2 \end{bmatrix}$	$\begin{bmatrix} 2 & 1 \\ 2 & 2 \end{bmatrix}$ and $\mathbf{R} = \begin{bmatrix} 3 & 0 \\ 1 & 3 \end{bmatrix}$	, whic <mark>h one</mark> of the follow	ing statements is TRUE?
(A) PO - PR	(B) OR - RP	(C) OP - RP	$(\mathbf{D}) \mathbf{PO} = \mathbf{OR}$
$(\mathbf{A}) \mathbf{I} \mathbf{Q} = \mathbf{I} \mathbf{K}$	$(\mathbf{D})  \mathbf{Q}\mathbf{R} = \mathbf{R}$	(C) $QI = M$	(D) TQ = QR
	<u> </u>		
If $u = log(e^x + e^y)$ , the	$\frac{\partial u}{\partial x} + \frac{\partial u}{\partial y} =$		
	5		
(A) $e^x + e^y$	(B) $e^x - e^y$	(C) $\frac{1}{e^{x} + e^{y}}$	(D) 1
r: (D)			
	The RNA primer synt (A) DNA gyrase (C) DNA polymeras r: (C) The suitable substitut (A) PAM 250 or BLA (C) PAM 120 or BL	The RNA primer synthesized during the rep (A) DNA gyrase (C) DNA polymeraseI r: (C) The suitable substitution matrix to align close (A) PAM 250 or BLOSSUM 80 (C) PAM 120 or BLOSSUM 40 r: (B) If $P = \begin{bmatrix} 1 & 1 \\ 2 & 2 \end{bmatrix}$ , $Q = \begin{bmatrix} 2 & 1 \\ 2 & 2 \end{bmatrix}$ and $R = \begin{bmatrix} 3 & 0 \\ 1 & 3 \end{bmatrix}$ (A) $PQ = PR$ (B) $QR = RP$ r: (A) If $u = log(e^{x} + e^{y})$ , then $\frac{\partial u}{\partial x} + \frac{\partial u}{\partial y} =$ (A) $e^{x} + e^{y}$ (B) $e^{x} - e^{y}$ r: (D)	The RNA primer synthesized during the replication process in bacteri (A) DNA gyrase (B) Primase (C) DNA polymeraseI (D) DNA polymeraseI r: (C) The suitable substitution matrix to align closely related sequences is (A) PAM 250 or BLOSSUM 80 (B) PAM 40 or B (C) PAM 120 or BLOSSUM 40 (D) PAM 250 or I r: (B) If $P = \begin{bmatrix} 1 & 1 \\ 2 & 2 \end{bmatrix}$ , $Q = \begin{bmatrix} 2 & 1 \\ 2 & 2 \end{bmatrix}$ and $R = \begin{bmatrix} 3 & 0 \\ 1 & 3 \end{bmatrix}$ , which one of the follow (A) $PQ = PR$ (B) $QR = RP$ (C) $QP = RP$ r: (A) If $u = log(e^x + e^y)$ , then $\frac{\partial u}{\partial x} + \frac{\partial u}{\partial y} =$ (A) $e^x + e^y$ (B) $e^x - e^y$ (C) $\frac{1}{e^x + e^y}$ r: (D)

G	GATEFORUM Engineering Success	BT-GATE-2013	www.gateforumonline.com
19.	Hypophosphatemia is manifested by an a normal male and an affected heterozy	X-linked dominant allele.What prog gous female will manifest the diseas	portion of the offsprings from se?
	(A) $\frac{1}{2}$ sons and $\frac{1}{2}$ daughters	(B) All daughters and ne	o sons
	(C) All sons and no daughters	(D) $\frac{1}{4}$ daughters and $\frac{1}{4}$	sons
Answ	ver: (A)		
20.	One of the eigen values of $P = \begin{bmatrix} 10 & -4 \\ 18 & -1 \end{bmatrix}$	$\begin{bmatrix} 4\\2 \end{bmatrix}$ is	
	(A) 2 (B) 4	(C) 6 (I	D) 8
Answ	ver: (C)		

**21.** A callus of 5 g dry weight was inoculated on semi-solid medium for growth. The dry weight of the callus was found to increase by 1.5 fold after 10 days of inoculation. The growth index of the culture is

-----

\_\_\_\_\_

### **Answer:** (0.5)

22. A chemostat is operated at a dilution rate of  $0.6 \text{ h}^{-1}$ . At steady state, the biomass concentration in the exit stream was found to be  $30 \text{ g} \text{ l}^{-1}$ . The biomass productivity (g l<sup>-1</sup>h<sup>-1</sup>) after 3h of steady state operation will be \_\_\_\_\_\_.

Answer: (D)

**23.** A batch bioreactor is to be scaled up from 10 to 10,000 liters. The diameter of the large bioreactor is 10 times that of the small bioreactor. The agitator speed in the small bioreactor is 450 rpm. Determine the agitator speed (rpm) of the large bioreactor with same impeller tip speed as that of the small bioreactor

Answer: (45)

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24. Calculate the percentage sequence identity for the pairwise alignment given below:

HELLO-

YELLOW

Answer: (B)

**25.** In a batch culture, the specific rate of substrate utilization is 0.25 g (g cell mass)-1 h-1 and specific rate of product formation is 0.215 g (g cell mass)-1 h-1. Calculate the yield of product from the substrate(Yp/s) \_\_\_\_\_\_.

\_\_\_\_\_

\_\_\_\_\_

**Answer:** (0.86)

# Q. No. 26 – 55 Carry Two Marks Each

26. Match the commercial microbial sources in Group I with the products in Group II.

Group I	Group II
P. Corynebacteriumlilium	1. 2,3-Butane di-ol
Q. Klebsiellaoxytoca	<b>2.</b> Poly-β-hydroxybutyric acid
<b>R.</b> Aspergillusniger	3. Glutamic acid
S. Alcaligeneseutrophus	4. Citric acid
(A) P-3,Q-1,R-2,S-4	(B) P-3,Q-1,R-4,S-2
(C) P-1,Q-3,R-2,S-4	(D) P-1,Q-3,R-4,S-2
nswer: (B)	

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### 27. Match the entries in the Group I with the elution conditions in Group II.

	Group I		Group II
Р.	Ion-exchange chromatography	1.	Isocratic solvent
Q	Hydrophobic column chromatography	2.	Ampholytes
R.	Gel filtration chromatography	3.	Increasing gradient of salt
S.	Chromatofocusing	4.	Decreasing gradient of polarity
(A)	P-4,Q-1,R-2,S-3		(B) P-4,Q-3,R-1,S-2
(C)	P-3,Q-4,R-1,S-2		(D) P-3,Q-4,R-2,S-1
wer:	( <b>B</b> )		

\_\_\_\_\_

28. Determine the correctness or otherwise of the following Assertion (a) and Reason (r).

Assertion: Immobilization of plant cells can enhance secondary metabolite production during bioreactor cultivation.

\_\_\_\_\_

**Reason:** Immobilization protects the plant cells from shear forces in the bioreactor.

- (A) Both (a) and (r) are true and (r) is the correct reason for (a).
- (B) Both (a) and (r) are true but (r) is not the correct reason for (a).
- (C) (a) is true but (r) is false.
- (D) (a) is false but (r) is true.

Answer: (A)

**29.** Match the cell structures in Group I with the organisms in Group II.

	Group I		Group II	
Р.	Endospores	1.	Methanobacterium	1
Q.	Bipolar flagella	2.	Treponema	
R.	Pseudomurine in cell wall	3.	Spirillum	
S.	Periplasmic flagella	4.	Clostridium	
(A)	P-4, Q-3, R-1, S-2		(B) P-4, Q	-3, R-2, S-1
(C)	P-3, Q-4, R-1, S-2		(D) P-4, Q-	-1, R-3, S-2

Answer: (A)

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30. Match the antibioticsinGroup Iwith the targets inGroup II.

	Group I		Group II
Р.	Sulfonamide	1.	Peptidoglycan synthesis
Q.	Quinolones	2.	Peptide chain elongation
R.	Erythromycin	3.	Folic acid biosynthesis
S.	Cephalosporin	4.	Topoisomerase
(A)	P-3, Q-4, R-1, S-2		(B) P-2, Q-4,
(C)	P-4, Q-1, R-2, S-3		(D) P-3, Q-4,
wer:	( <b>D</b> )		

31.

In nature, Agrobacterium tumefaciens mediated infection of plant cells leads to

- P. crown gall disease in plants
- Q. hairy root disease in plants
- R. transfer of T-DNA into the plant chromosome
- S. transfer of Ri-plasmid into the plant cell
- (A) S only (B) P and R only (C) Q and S only (D) Q only

**(B) Answer:** 

32. Match the entries inGroup I with the enzymes inGroup II.

Group I	Group II		
P. NAD+	1. Glutathione peroxidase		
Q. Selenium	2. Nitrogenase		
<b>R.</b> Pyridoxal phosphate	3. Lactate dehydrogenase		
S. Molybdenum	4. Glycogen phosphorylase		
(A) P-3, Q-2, R-4, S-1	(B) P-4, Q-1, I	R-3, S-2	
(C) P-3, Q-1, R-4, S-2	(D) P-3, Q-4, I	R-2, S-1	

**(C) Answer:** 

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**33.** Match the herbicides in Group Iwith the target enzymesin Group II.

	Group I		Group II	
P.	Glyphosate	1.	Nitrilase	
Q	Bromoxynil	2.	Acetolactatesynthetase	
R	Sulphonylureas	3.	Dehalogenase	
S.	Dalapon	4.	5-Enolpyruvyl shikimate	
(A)	P-4, Q-1, R-2, S-3	d.	(B) P-2, Q-1, R	4, S-3
(C)	P-4, Q-3, R-2, S-1		(D) P-3, Q-2, R	4, S-1
Answer:	(A)			

**<sup>34.</sup>** The activity of an enzyme was measured by varying the concentration of the substrate (S) in the presence of three different concentrations of inhibitor (I) 0, 2 and 4 mM.The double reciprocal plot given

below suggests that the inhibitor (I) exhibits



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**35.** Match the entries in Group Iwith the entries in Group II.

Group I		Group II	
P. RNAse P	1.	Polyadenylation	
Q. RNase H	2.	Splicing	
<b>R.</b> snRNAs	3.	Ribozymes	
S. CstF	4.	DNA-RNAhybrids	
(A) P-3, Q-4, R-2, S-1	ť.	(B) P-4, Q-3, ]	R-2, S-
(C) P-3, Q-2, R-1, S-4		(D) P-2, Q-4, 1	R-1, S-3
S. CstF           (A) P-3, Q-4, R-2, S-1           (C) P-3, Q-2, R-1, S-4	4.	DNA-RNAhybrids (B) P-4, Q-3, 1 (D) P-2, Q-4, 1	R-2 R-1

Answer: (A)

**36.** Determine the correctness or otherwise of the following Assertion (a) and Reason (r).

Assertion: UPGMA method produces ultrametric tree.

Reason: Sequence alignment is converted into evolutionary distances in UPGMA method.

\_\_\_\_\_

- (A) Both (a) and (r) are true and (r) is the correct reason for (a)
- (B) Both (a) and (r) are true and (r) is not the correct reason for (a)
- (C) (a) is true but (r) is false
- (D) (a) is false but (r) is true
- Answer: (B)

**37.** Match the entries in the Group Iwith the entries inGroup II.

	Group I		Group II	
Р.	Threading	1.	Gene duplication	1
Q.	FASTA	2.	Fold prediction	
R.	Profile	3.	НММ	
S.	Paralogs	4.	k-tuple	
(A)	P-2, Q-1, R-3, S-4	•	(B) P-2, Q-4, ]	R-3, S-1
(C)	P-3, Q-4, R-2, S-		(D) P-1, Q-4, 1	R-3, S-2

Answer: (B)

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38.	Evaluate $\lim_{x \to \infty} x \tan \frac{1}{x}$				
	(A) ∞	(B) 1	(C) 0	(D) –1	
Ansv	ver: (B)				
39.	The Laplace transform	m  of  f(t) = 2t + 6  is			
	(A) $\frac{1}{s} + \frac{2}{s^2}$	(B) $\frac{3}{4} - \frac{6}{s^2}$	(C) $\frac{6}{s} + \frac{2}{s^2}$	(D) $-\frac{6}{s} + \frac{2}{s^2}$	
Ansv	ver: (C)				
<b>40</b> .	The solution of the fo	llowing set of equat	ions is		
	$\mathbf{x} + 2\mathbf{y} + 3\mathbf{z} = 20$				
	7x + 3y + z = 13				
	$\mathbf{x} + 6\mathbf{y} + 2\mathbf{z} = 0$				
	(A) $x = -2, y = 2, z =$	=8	(B) $x = 2, y = -$	-3, z = 8	
	(C) $x = 2, y = 3, z = -$	-8	(D) $x = 8, y = 2$	z, z = -3	
Ansv	ver: (B)				
<b>41.</b>	The solution to $\frac{dy}{dy}$ +	$y \cot x = \csc x$ is			
	(A) $y = (c+x)\cot x$		(B)  y = (c+x)c	cosec x	
	(C) $y = (c+x) cosec$	x cot x	(D) $y = (c+x)^{-1}$	$\frac{\cos \sec x}{\cot x}$	
Ansv	ver: (B)				

13

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12.	A complete restriction digestion of a	circular plasmid (5000bp) was carr	ried out with
	HindIII, BamHI and EcoRI individua	lly. Restriction digestion yielded for	ollowing fragments.
	Plasmid + $HindIII \rightarrow 1200$ bp and	l3800bp	
	Plasmid + <i>Bam</i> HI→5000bp		
	$Plasmid + EcoRI \rightarrow 2500bp$		
	The number of sites for <i>Eco</i> RI, <i>Bam</i> H	IandHindIIIpresent on this plasmic	d are
	(A) EcoRI-2, BamHI-1, HindIII-2	(B) <i>Eco</i> RI-1, <i>Bam</i> H	I-1, <i>Hin</i> dIII-2
	(C) EcoRI-3, BamHI-2, HindIII-1	(D) EcoRI-2, BamH	I-2, <i>Hin</i> dIII-1
Insv	wer: (A)		
13.	The total number of fragments gene given below by Trypsin followed by (	rated by the complete and sequer	ntial cleavage of the polypeptic
	Phe-Trp-Met-Gly-Ala-Lys-Leu-Pro-M	let-Asp-Gly- <mark>Arg-Cys-Ala-Gln</mark>	
<b>Insv</b>	<mark>wer: (5)</mark>		
14.	In a genetic study, 80 people were	found to have alleles for poly	dactyly. Only 36 of them we
	polydactylous. What is the extent of p	enetrance percentage?	·
<b>\ns</b> v	wer: (C)		
Ansv	wer: (C)		
Ansv	wer: (C)		
Ansv 15.	One percent of the cars manufacture	d by a company are defective. W	That is the probability (upto for
Ansv 5.	<b>Wer:</b> ( <b>C</b> ) One percent of the cars manufacture decimals) that more than two cars are	d by a company are defective. W defective, if 100 cars are produced	hat is the probability (upto for 1?
Ansv 15. Ansv	wer: (C) One percent of the cars manufacture decimals) that more than two cars are wer: (C)	d by a company are defective. W defective, if 100 cars are produced	That is the probability (upto for 1?
Ansv 15. Ansv	wer: (C) One percent of the cars manufacture decimals) that more than two cars are wer: (C)	d by a company are defective. W defective, if 100 cars are produced	That is the probability (upto for 1?
Ansv 55. Ansv	wer: (C) One percent of the cars manufacture decimals) that more than two cars are wer: (C) The maximum cell concentration (g l-	d by a company are defective. W defective, if 100 cars are produced	That is the probability (upto for 1?
5. nsv	wer: (C) One percent of the cars manufacture decimals) that more than two cars are wer: (C) The maximum cell concentration (g l- 1.75 g l-1 and an initial glucose conce	d by a company are defective. W defective, if 100 cars are produced 1) expected in a bioreactor with in entration of 125 g l-1 is (Yx/s = 0.6	/hat is the probability (upto fo 1 ?         itial cell concentration of 5 g cell/g substrate)

GATEFORUM **BT-GATE-2013** www.gateforumonline.com A fed batch culture was operated with intermittent addition of glucose solution at a flow rate of 200 ml 47. h-1. The values of Ks,  $K_s, \mu_m$  and D are 0.3 g l<sup>-1</sup>, 0.4 h<sup>-1</sup> and 0.1 h<sup>-1</sup>, respectively. Determine the concentration of growth limiting substrate (gl-1) in the reactor at quasi-steady state \_\_\_\_\_. (0.1) Answer: \_\_\_\_\_ Common Data Questions: 48 & 49 A solution was prepared by dissolving 100 mg of protein X in 100 ml of water. Molecular weight of protein X is 15,000 Da; Avogadro's number = 6.022x 1023. 48. Calculate the molarity  $(\mu M)$  of the resulting solution. (B) 6.6 (C) 0.67 (D) 0.067 (A) 66.6 Answer: (A) 49. The number of moleculespresent in this solution is (B)  $6.023 \times 1019$  (C)  $4.015 \times 1019$  (D)  $0.08 \times 1019$ (A) 40.15 × 1019 (\*) Answer: -----**Common Data Questions: 50 & 51** 

The binding efficiency of three different receptorsR1, R2 and R3 were tested against a ligand using equilibrium dialysis, with a constant concentration of receptor and varying concentrations of ligand. The Scatchard plot of receptor titration with different concentration of ligand is given below:

(*r*is moles of bound ligand per moles of receptor and *c* is concentration of free ligand)



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0.	The number of liga	and binding sites present of	on receptors R1 and R3, r	respectively are
	(A) 1 and 4	(B) 1 and 1	(C) 4 and 1	(D) 2 and 2
nsw	ver: (D)			
1.	Which one of the r	eceptors has thehighestaf	finity for the ligand?	
	(A) R1	(B) R2	(C) R3	(D) R4
nsw	ver: (A)			
		Statement for Linker	Answer Questions: 52	& 53
	A DNA fragment of	of 5000bp needs to be isol	ated from <i>E.coli</i> (genome	e size 4x103kb) genomic library.
	C	I	Č	, , , , ,
52.	The minimum num	ber of independent recon	binant clones required to	prepresent this fragment in
	genomic library are	е	1	
	(A) $16 \times 10^2$	(B) $12 \times 10^2$	(C) $8 \times 10^2$	(D) $1.25 \times 10^2$
		$(D) 12 \times 10$		(D) 1.23 × 10
			<mark>-</mark>	
2	The number of ale	nes to represent this frage	ant in general library u	with a probability of 0.5% are
5.	(A) $5.0 \times 10^3$	(D) $4.5 \times 10^3$	(C) 2.6 × 10 <sup>3</sup>	$(D) 2.4 \times 10^3$
	(A) $5.9 \times 10$	(B) 4.5 × 10	$(C) 3.0 \times 10$	(D) $2.4 \times 10$
nsw	ver: (B)			



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# Statement for Linked Answer Questions: 54 & 55

During sterilization of a fermentation medium in a given bioreactor  $\nabla_{\text{heating}} = 12.56$ ,  $\nabla_{\text{cooling}} = 7.48$  and the total value of  $\nabla$  required for whole sterilization process is 52, where  $\nabla$  is the design criteria. 54. What is the value of  $\nabla$  holding? (B) 42.32 (A) 31.96 (C) 52.43 (D) 61.18 Answer: (A) ..... 55. What is the holding period (min) at a k value of 3.36min-1? (A) 10.6 (B) 9.5 (C) 8.4 (D) 7.2 **(B) Answer:**