

Manipal Institute of Technology, Manipal

(A Constituent Institute of Manipal University)



V SEMESTER B.E (BIOTECHNOLOGY)

END SEMESTER EXAMINATIONS, NOV/DEC 2015

SUBJECT: COMPUTATIONAL TECHNIQUES IN BIOTECHNOLOGY

[BIO 307]

REVISED CREDIT SYSTEM

Time: 3 Hours

MAX. MARKS: 50

Instructions to Candidates

✤ Answer ANY FIVE FULL the questions.

✤ Missing data may be suitable assumed.

1A.	The recent advancement of computational tools have helped test new conceptual approaches to understand biotechnological process in a sequential manner. Enlist the key steps involved in computation tools to improve and optimize toward biotechnology products.	5M
1B.	A simple mathematical models are constructed with the help of functional relationship between variables. Define the functional variables and explain the interaction and influence of each variable with an example.	3М
1C.	How the numerical tools could help in identifying the errors in experimental data.	2M
2A.	Write a C++ program, draw flow chart for the given problem statement using gauss-elimination method. The material balance carried out the system produces the following set of three simultaneous algebraic equations: $0.8 P + 0.02 Q + 0.06 R = 50$; $0.1 P + 0.83 Q + 0.12 R = 30$ and 0.1 P + 0.15 Q + 0.82 R = 20.	3+2=5M
2B.	The three equations are constructed for a chemical reaction, $80x+30z = 40$; $80y+10z = 27$ and $20x+20y+60z = 33$, find out x, y and z using gauss-seidel method,	5M

								ŀ	keg. No).										
प्रज्ञानं ब्रह्म Manipal		Mə	ini	i pa]] (A C	ns Cons	sti l stitu	tut ent]	e of Institut	Te e of	e ch Mani	no ipal	olc Un)gy iivers	, N ity)	/Ia	ni	pa	al	KNOWLEDGE IS PO
3A.	Wi us ba wh gro se	rite a ing cteri iere, owth c.	a C+ 4 th c ia in , t is n rate	orden a cu the e is y	r ogr r RI ultur time /=1 ;	ram K n re is e in at ti	n, dr neth s rep sec ime	r aw hod. pres c, an t=0.	flow cl The gr ented k d y is t Deterr	nart rowth by th he g nine	for th h rat e diff rowth the p	ne g e m ere n ra ooss	give nod ntia te c sible	en pro el of al equ of bao e gro	oble ce uati cter wth	em s ertair on d ria. 7 n rate	state $\frac{y}{tr} =$ The e at	eme pe t + init t=0	ent of y ial).2	3+2=5M
3B.	Fo 4 th	r pra ord	actic er R	cal va K me	alida etho	atio od a	n so Ind f	olve ind o	the dif out the	fere grov	ntial vth ra	equ ate c	atio of b	on (Q acter	ue ia (stio (y).	n 3	A)	by	5M
4A.	Write a C++ program, draw flow chart for curve fitting assuming that the user will define the data.									ne	3+2=5M									
4B.	Th are y= va	e nu	Imbe ven usii of nu nrs) oacte	er of in tl ng c imbe eria/i	bac he f curve er of unit	teri follo e fi ba	a pr owin tting cteri ume	esei g ta g me ia/ur	nt per u ible. Fi ethod fo nit volur 0 35	nit v t an or th ne a 1 50	rolum exp ne gi fter 8 2 68	e in one ven hrs 3 95	n a o entia da S.	cultui al cu ata a 4 138	re fl rve nd 5	lax a of esti	after the mate	x h foi e t	nrs rm he	5M
5A.	y(bacteria/unit volume)35506895136195290Write a C++ program for the given DNA sequence, which inputs the data first, followed by concatenating the DNA sequences, transcribing DNA into RNA and find the reverse compliment of a given DNA sequence.10MDNA1 = 'ACGGGAGGACGGGAAAATTACTACGGCATTAGC'DNA2 = 'ATAGTGCCGTGAGAGTGATGTAGTA'100																			
6A.	To ide yie	rec entify eld n	duce / the naxir	e the e sigi mum	e nu nific n. Ca	umb ant	var var you	of e iable list	experim es whic the var	ents h gr ious	anc eatly app	l tir infl roac	ne uer che	rese nces s ava	earc the aila	her pro ble 1	nee ces: to se	ed s a cre	to nd en	3М

Reg. No.											
----------	--	--	--	--	--	--	--	--	--	--	--



Manipal Institute of Technology, Manipal

(A Constituent Institute of Manipal University)



7M

INSPIRED BY LIFE

A nutrient recipe consisting of 12 experiments was designed by the software. Eight factors (A to H) were selected for initial screening, D & H assigned as dummy variable. Find out the significant parameters using ANOVA.

	Dura	•	P	^		-	-	<u>^</u>		Viold
	Run	A	В	C	D	E	F	G	н	rieid
	1	L	Н	L	Н	L	Н	Н	Н	0.07
	2	Н	Н	L	L	L	Н	L	Н	3.05
6D	3	Н	Н	L	L	Н	L	Н	L	2.01
О Б.	4	L	L	L	Н	Н	Н	L	L	0.33
	5	Н	L	Н	L	L	Н	Н	L	4.92
	6	L	L	Н	L	Н	Н	Н	Н	0.23
	7	Н	Н	Н	Н	Н	Н	L	L	3.93
	8	L	Н	Н	Н	L	L	Н	L	0.48
	9	Н	L	Н	Н	L	L	L	Н	6.44
	10	Н	L	L	Н	Н	L	Н	Н	4.8
	11	L	L	L	L	L	L	L	L	0.32
	12	L	Н	Н	L	Н	L	L	Н	0.02

[BIO 307]