Mechanism of Internal Assessment

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AY: 2023-2024

2023-ODD

SAPTHAGIRI COLLEGE OF ENGINEERING, BENGALURU-57

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DEPARTMENT OF BIOTECHNOLOGY

THIRDINTERNAL ASSESSMENT TEST

Subject	**: Biokinetics & Bioreaction Engineering**	**Subject Code :**	**21BT51**
Semester/Section	**: 5th Sem**	**Duration**	**: 1 hr**
Staff-In charge :	**Dr. Kavitha V Joshi**	**Max Marks**	**: 20**

Answer any two full questions choosing one full question from each Module

Main Question	Sub Question	Questions	Marks	Bloom's Taxonomy Level	Course Outcomes Mapped
		Module–4			
	a	Explain the microbial growth kinetics in a batch reactor.	5	L2	CO4
	b	Discuss on the factors affecting microbial growth in bioreactors.	5	L3	CO4
		OR			
2	**a.**	Derive the Monod model of growth kinetics with ideal reactor kinetics.	5	L2	CO4
	b.	Write a note on theoretical prediction of yield coefficients.	5	L3	CO4
		Module –5			
3	**a**	Explain the carbon requirements for media formulation.	5	L2	CO5
	b	Write a note on simple and complex media.	5	L3	CO5
		OR			
4	**a**	Elaborate on the oxygen requirements for preparation of media.	5	L3	CO5
	b	Discuss the role of nitrogen in media preparation.	5	L3	CO5

CO 4- To demonstrate the use of various scientific parameters to improve the performance of bioprocess.
CO 5 – To formulate a suitable media for maximized microbial growth and product yields by analyzing various parameters.

Accepted/Accepted with modification/Rejected

Course Coordinator

Module Coordinator

HOD

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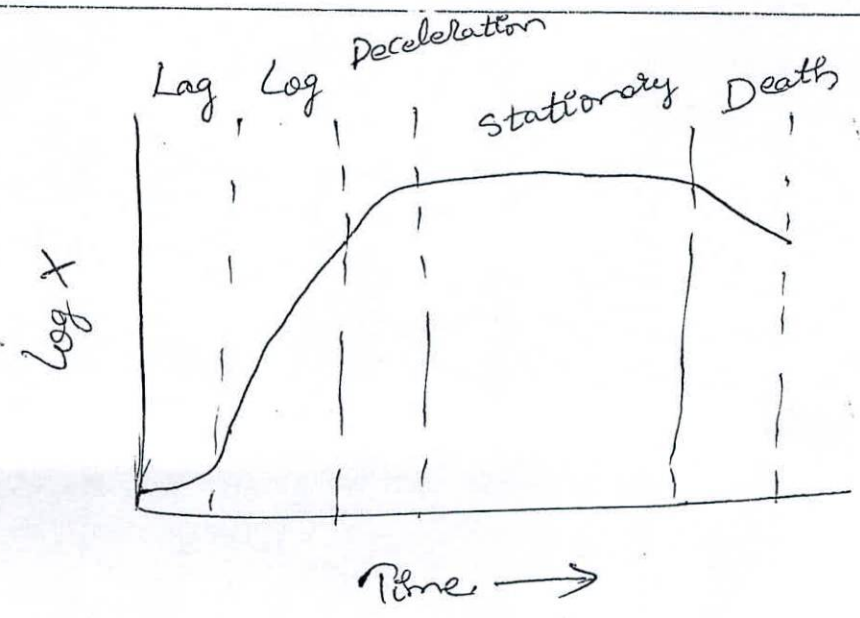
DEPARTMENT OF BIOTECHNOLOGY

SCHEME &SOLUTION

INTERNAL ASSESSMENT

Subject & Subject Code: BKRE 21BT51 IA FIRST/SECOND/THIRD ✓

Date/Day : Staff-In-Charge: Dr. KAVITHA. J.

Question Number	Solution	Marks Allocated
1 a)		2M
	Explanation on lag, exponential deceleration, stationary, death phase	3M
b)	Physical factors:- pH, temperature, Light	2.5M
	chemical factors :- Oxygen, nutrient content	(5M) 2.5M

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DEPARTMENT OF BIOTECHNOLOGY

SCHEME & SOLUTION

INTERNAL ASSESSMENT

Subject & Subject Code: IA FIRST/SECOND/THIRD

Date/Day : Staff-In-Charge:

Question Number	Solution	Marks Allocated
3.a)	$Y^{M}_{X/S}$ => Max yield of cell mass per unit mass of substrate consumed.	1M
	$Y_{X/ATP}$ => Amt of biomass synthesized per mole of ATP generated.	1M (5M)
	Y_{X/O_2} => Yields based on oxygen consumption.	1M
	RQ => Respiratory quotient	1M
	P/O => Ratio of phosphate bonds formed per unit of oxygen consumed.	1M
	Theoritical prediction methods for the above.	
	Carbon requirements => Need for a carbon source in a medium.	2M

Signature of the Staff In Charge | Signature Of Scrutinizer | Signature Of HOD

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DEPARTMENT OF BIOTECHNOLOGY

SCHEME &SOLUTION

INTERNAL ASSESSMENT

Subject & Subject Code: IA FIRST/SECOND/THIRD

Date/Day : Staff-In-Charge:

uestion umber	Solution	Marks Allocated
4.b)	Oxygen requirement based on type of micro organisms being handled.	2M (5M)
	Depends on the reaction conditions, aerobic, anaerobic & anoxic.	2M
	Various sources for media preparation.	1M

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SAPTHAGIRI COLLEGE OF ENGINEERING
Department of Civil Engineering
Internal Assessment Test –III

Subject: **Engineering survey**	Sub Code: **BCV302**	Name of the Course instructor
Semester/Section: **3rd SEM**	Max Marks: **25**	**Prof . Bhavya C H**
Duration: **60 Minutes**	Date: **15.02.2024**	Time: **3.00 PM to 4.00 PM**

Q. No	Answer any two full Questions choosing one from each module	Marks	BLT	CO's
	Module 3& 5			
1 a	Define Contours. Explain the Characteristics of Contours.	8	L_2	CO_3
b	Explain the applications of contours in civil engineering.	7	L_1, L_2	CO_3
	OR			
2 a	Define GPS. Explain the various types of GPS Receiver.	8	L_2	CO_5
b	Define Drone surveying. Explain the features of Drone Mapping and Surveying	7	L_1, L_2	CO_5
	Module 5			
3 a	Explain the advantages and applications of Drone surveying.	5	L_2	CO_5
b	Discuss briefly GIS applications in civil engineering.	5	L_3	CO_5
	OR			
4 a	Explain the various types of Drones.	5	L_2	CO_5
b	Explain the various applications of Remote sensing in Civil engineering Surveys.	5	L_1, L_2	CO_5

CO3: Student should be able to plot the contours, L/S & C/S for construction projects.
CO5: Student should be able to understand the necessary skills to carry out GPS & Drone surveying.

Signature of course Instructor

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DEPARTMENT OF CIVIL ENGINEERING

Question No.	Answer / Solution / Steps Involved (Brief)	Max. Marks	Marks Allotted
1) a	Contours → Imaginary line passing through Points of same elevation. -2- Characteristics 1) Slope b/t them is uniform -6- 2) It lies on same plane 3) Cannot c/s each other	-8-	-8-
b	Applications of contours. 1) To study the nature of the terrain 2) Helps us to select the sites & determine the catchment area -7-	-7-	-7-
2) a	GPS → Definition Various types of GPS - 2- A-GPS, assisted GPS -6- S-GPS, D-GPS, Non differential GPS	-8-	-8-
b	Drone survey → Definition -2- Features of Drone survey -5-	-7-	-7-
5) a	Advantages of Drone survey It requires less manpower -2½-	-5-	-5-

Course Co-ordinator

Scrutinizer

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Department of Computer Science & Engineering

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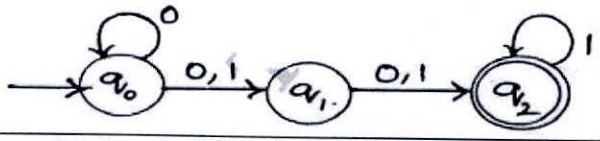
Question Bank

Subject: AUTOMATA THEORY & COMPILER DESIGN **Sub Code: 21CS51**
Semester: V A & B

Q No.	Questions	Marks	BLT	CO's
1.	Define the following terms with examples: i. Alphabet ii. Power of an alphabet iii. Concatenation, iv Languages	8M	L1	CO1
2.	Design a DFA to accept strings of a's and b's ending with 'bab'.	8M	L6	CO1
3.	Compare DFA, NFA an ε-NFA.	10M	L3	CO1
4.	Define deterministic FSM. Draw a DFSM to accept decimal strings which are divisible by 3	10M	L1	CO1
5.	Design a DFSM to accept each of the following languages : a. L = {W ∈ {0, 1}* : W has 001 as a substring} b. L = {W ∈ {a, b} * : W has even number of a's and even numberof b's}.	8M	L6	CO1
6.	Define NDFSM. Convert the following NDFSM to itsequivalent DFSM. 	8M	L1	CO1
7.	Design the NFA for the languages given below: a. abc, abd and aacd {Assume Σ= a, b, c, d }	4M	L6	CO1
8.	Design a DFA to accept the language L = {W / W is of even length	5M	L6	CO1

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SAPTHAGIRI COLLEGE OF ENGINEERING
Department of Electronics and Communication
Internal Assessment –I

Subject: Digital Communications Sub Code: 21EC51

Semester/Section: V/A & B Max Marks: 20

Duration: 60 Minutes Date: 02/01/2024

Note: **Answer any two full questions, choosing one from each part**

Q. No.	Questions	Marks	BLT	CO's
	Part – A			
1 a.	Explain the model of a spread spectrum digital communication system.	5	L1, L2	CO3
	Explain the effect of dispreading on a narrow band interference in DSSS. A DSSS signal is designed to have a power ratio (P_R/P_N) at the intended receiver is 10^{-2}. If the desired (E_b/N_o) = 10 for acceptable performance, determine the minimum value of process gain.	5		
2 a.	Explain the generation of Direct sequence spread spectrum signal with relevant waveforms and spectrum.	5	L2	
b.	Draw the 4 stage linear feedback shift register with 1st and 4th stage is connected to modulo-2 adder. Output of Modulo-2 adder is connected to 1st stage input. Find the output PN sequence with initial state 1000.	5	L2	CO3
	PART B			
3 a.	Prove that the entropy of zero memory source extension is given by $H(s^n) = n\,H(s)$	5	L2	
b.	A black and white TV picture consists of 256 lines of picture information. Assume that each line consists of 526 picture elements and each can have 255 brightness levels. Picture is repeated at the rate of 30 frames/sec. Calculate the average rate of information conveyed by TV picture.	5	L2	CO4
4 a.	State and explain the properties of entropy	5	L1, L2	
b.	A source emits an independent sequence of symbols from an alphabet of five symbols A, B, C, D and E with probabilities of (1/4),(1/8),(1/8), (3/16) and (5/16). Find the Shannon's binary code for each symbol and efficiency of the coding algorithm	5	L2	CO4

Students should be able to

CO1: Explain different spread spectrum schemes and compute the performance parameters.

CO2: Apply the fundamental concepts of information theory and perform source coding for a given message

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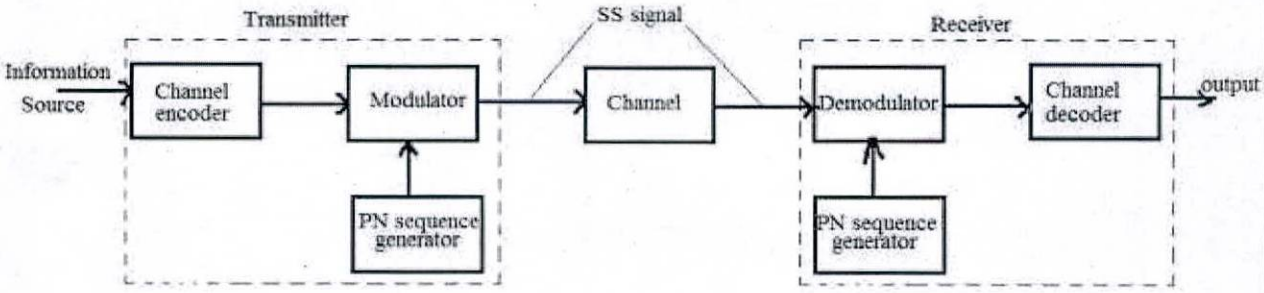
SAPTHAGIRI COLLEGE OF ENGINEERING

Department of Electronics & Communication Engineering

Scheme & Solution

Subject: **Digital Communications** **Internal Assessment Test-I** Sub Code: **21EC51**
Semester/Section: 5 A and B **Academic Year – 2023-24** Max Marks: 20
Duration: 60 minutes Date: 02/01/2024

Q No.	Solutions	Marks
1(a)	**Explain the model of a Spread Spectrum Communication System.** Block diagram + Explanation ------ 2 + 3  	5
1(b)	**Explain the Effect of Dispreading on a Narrow band Interference in DSSS. A DSSS signal is designed to have a power ratio P_R/P_N at the intended receiver is 10^{-2}. If the desired E_b/N_o = 10 for acceptable performance, determine the minimum value of process gain.** The effect of multiplying interference i(t) with c(t) is to spread the bandwidth of i(t) to the bandwidth of c(t) (which is very large) $I_O = \frac{\text{Average power of the Interference signal}}{W} = \frac{P_I}{W}$ The total power at the output of the demodulator is given by $I_O R_b = \frac{P_I R}{W} = \left[\frac{P_I}{(T_b/T_C)}\right] = \left[\frac{P_I}{L_C}\right] = \left[\frac{P_I}{PG}\right]$ The power of the interfering signal is reduced by an amount equal to bandwidth expansion factor (W/R) = L_C called as Process gain of the DSSS system. ➔ Given Jamming Margin $P_N/P_R = 10^2$ and $(E_b/N_o) = 10$. Using the relation $\frac{P_N}{P_R} = \left[\frac{PG}{(E_b/N_o)}\right] \Rightarrow PG = \frac{P_N}{P_R} \times \frac{E_b}{N_0} = 10^2(10) = 1000$	3 2
2(a)	**Explain the generation of Direct sequence spread spectrum signal with relevant waveforms and spectrum.** Figures + explanation = 3 + 2	

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Variable p_k varies continuously from 0 to 1 and entropy function vanishes at both $p_k = 0$ and at $p_k = 1$

2) The entropy is a symmetrical function of its arguments

$H(p_k, (1 - p_k)] = H((1 - p_k), p_k]$ for all k = 1, 2 … q

3) Extremal Property – Entropy attains a maximum value when all the source symbols become equiprobable.

$H(s)_{max} = Log_2(q)$ bits/ message symbol where q is the number of symbols in message

Or The upper bound on entropy is given by $H(s)_{max} = Log_2(q)$ bits/ message symbol **5**

4) Source Efficiency - It is the ratio of entropy of the source to its maximum entropy.

$\eta_s = \frac{H(s)}{H(s)_{max}}$

5) Source Redundancy - $R_{\eta s} = 1 - \eta_s$

4b **A source emits an independent sequence of symbols from an alphabet of five symbols A, B, C, D and E with probabilities of (1/4),(1/8),(1/8), (3/16) and (5/16). Find the Shannon's binary code for each symbol and efficiency of the coding algorithm.**

p_i	α_i	l_i	Code(l_i)	$[\alpha_i]_{li}$
$\left(\frac{5}{16}\right)$	0	2	0.0000	00
$\left(\frac{4}{16}\right)$	$\left(\frac{5}{16}\right)$	2	0.0101	01
$\left(\frac{3}{16}\right)$	$\left(\frac{9}{16}\right)$	3	0.1000	100
$\left(\frac{2}{16}\right)$	$\left(\frac{12}{16}\right)$	3	0.1100	110
$\left(\frac{2}{16}\right)$	$\left(\frac{14}{16}\right)$	3	0.1111	111

Length of the code $l_i \geq \log\left(\frac{1}{p_i}\right)$	
$\left(\frac{5}{16}\right)$	$l_1 \geq \log\left(\frac{1}{p_1}\right) \geq \log\left(\frac{16}{5}\right) \geq 1.67$; Choose $l_1 = 2$
$\left(\frac{4}{16}\right)$	$l_2 \geq \log\left(\frac{1}{p_2}\right) \geq \log\left(\frac{16}{4}\right) \geq 2$; Choose $l_2 = 2$
$\left(\frac{3}{16}\right)$	$l_3 \geq \log\left(\frac{1}{p_2}\right) \geq \log\left(\frac{16}{3}\right) \geq 2.41$; Choose $l_3 = 3$
$\left(\frac{2}{16}\right)$	$l_4 \geq \log\left(\frac{1}{p_2}\right) \geq \log\left(\frac{16}{2}\right) \geq 3$; Choose $l_4 = 3$
$\left(\frac{2}{16}\right)$	$l_5 \geq \log\left(\frac{1}{p_2}\right) \geq \log\left(\frac{16}{2}\right) \geq 3$; Choose $l_5 = 3$

5

$$L = \sum_{i=}^{5} P_i l_i = 2.43 \quad and \quad H(s) = \sum_{i=}^{5} P_i Log_2\left(\frac{1}{P_i}\right) = 2.2272$$

Efficiency $\eta_c = \frac{H(s)}{L} = 91.37\%$

Course co-ordinator:

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Moderator:

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Department of Electrical & Electronics Engineering

Internal Assessment Test – I (2023-2024)

Subject: Power Electronics
Semester / Section: 5th A&B
Duration: 60 minutes

Sub. Code: 21EE54
Max Marks: 20
Date:

Note: **Answer ANY TWO full questions, choosing ONE from each part.**

Q No.	Questions	Marks	RBT	CO's
	PART -A			
1 a.	Explain reverse recovery characteristics with neat diagram.	5	L2	CO1
b.	Discuss some of the important advantages and disadvantages of PE.	5	L2	CO1
	OR			
2 a.	The reverse recovery time of a diode is trr = 3 μs and the rate of fall is d i/ d t = 30 A / μ s . Find the stored charge of the diode and peak reverse current.	5	L4	CO1
b.	What are the peripheral effects of power electronic circuits?	5	L2	CO1
	PART -B			
3 a.	Explain 1 phase full wave rectifier with r load.	5	L2	CO1
b.	What are the types of diodes?	5	L2	CO1
	OR			
4 a.	Discuss the switch specifications.	5	L2	CO1
b.	Derive output voltage, output current, and efficiency of 1 phase full wave rectifier.	5	L2	CO1

Revised Bloom's Taxonomy (RBT) Levels: L2 – Understanding, L3 – Applying, L4 - Analyzing

CO1: To give an overview of applications power electronics, different types of power semiconductor devices, their switching characteristics.

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Department of Electrical & Electronics Engineering

SCHEME & SOLUTION

Sem. & Sec.: V - A & B Academic Year: 2023-24 Date of Test: 03/01/24

Subject: Power Electronics Subject Code: PEC 21EE51

Duration: 1 hr Max. Marks: 20

INTERNAL ASSESSMENT TEST - I

Q. No.	Solutions	Marks Allocated
	Part A.	
1.a	Neat digram of Reverse Recovery characteristics with parts labelled.	2M
	Definition of Reverse Recovery Time 'trr'	1M
	Derivation of expression for I_{RR}	2M
b.	4 Advantages of Power Electronics	2.5M
	4 Disadvantages of Power Electronics	2.5M
	OR	
2.a	$t_{rr} = 3\mu s$. $di/dt = 30A/\mu s$.	
	$\therefore Q_{RR} = \frac{1}{2} \frac{di}{dt} t_{rr}^2$.	

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Q. No.	Solutions	Marks Allocated

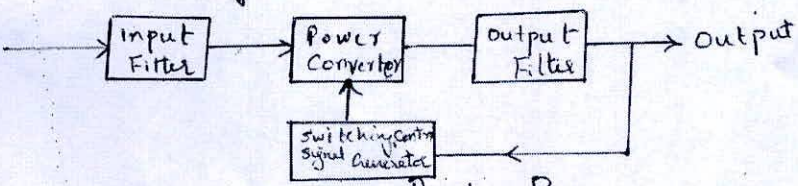
$$= \frac{1}{2} \cdot 3 \cdot (30)^2 = 135\,\mu C$$

$$I_{RR} = \sqrt{2\, Q_{RR} \cdot \frac{di}{dt}}$$

$$= \sqrt{2 \times 135 \times 30} = 90\,A$$

2.b. 4 Peripheral Effects of P.E circuits — 2.5M

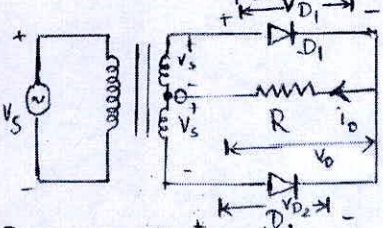
Block diagram — 2.5M



Part - B.

3.a Explanation of 1φ full wave rectifier with R load

- Rectifier with centre tapped transformer [Mid point Rectifier] [Neat Diagram] — 2.5M
- Rectifier with 4 diodes [Bridge Rectifier] [Neat Diagram] — 2.5M



a) Full wave Rectifier with centre Tapped Transformer.

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Q. No.	Solutions	Marks Allocated
3b.	Types of Diodes :- Fast Recovery diodes, General Purpose diodes, Schottky diodes, Si-Carbide diodes.	5 M
	OR	
4a	10 switch Specifications	5 M
4b	Derivation of V_{dc} Derivation of I_{dc} Derivation of P_{dc} Derivation of P_{ac} Derivation of η	5M

$$V_{dc} = \frac{1}{\pi}\int_0^{\pi} V_m \sin\omega t\, dt$$

$$= \frac{V_m}{\pi}\left[-\cos\omega t\right]_0^{\pi}$$

$$= \frac{V_m}{\pi}\left[-1-1\right]$$

$$= \frac{2V_m}{\pi} = 0.6366V_m$$

Avg. load current $I_{dc} = \frac{V_{dc}}{R} = \frac{0.6366V_m}{R}$

Output dc power, $P_{dc} = \frac{(V_{dc})^2}{R} = V_{dc} I_{dc}$

$$= \frac{(0.6366V_m)^2}{R}$$

Output AC power,

$P_{ac} = V_{rms} \cdot I_{rms}$

where $V_{rms} = 0.707\, V_m$

$I_{rms} = \frac{0.707V_m}{R}$

$\therefore P_{ac} = \frac{(0.707V_m)^2}{R}$

$\therefore \eta = \frac{P_{dc}}{P_{ac}} = \frac{(0.6366V_m)^2}{(0.707V_m)^2} = 81\%$

Prepared by	Verified by	Approved
Aparna Das		
Course coordinator	Module Coordinator	HOD, EEE

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SAPTHAGIRI COLLEGE OF ENGINEERING

#14/5, Chikkasandra, Hesaraghatta Main Road, Bangalore-57
(Affiliated to VTU, Belgavi & Approved by AICTE-New Delhi)
(ISO 9001:2015 & ISO 14001:2015 certified Institution, Accredited by NBA and NACC with "A" Grade)

Department of Information Science and Engineering

Internal Assessment Test – 2

Subject: Data Structures and Applications | **Sub Code: BCS304**
Semester/Section: 3rd 'A' & 'B' | **Max Marks: 25**
Duration: 1 hour | **Date: 19/01/2024**

Note: Answer any two full questions, choosing one from each module (section)

Question No.	Questions	Marks	BLT	CO's
	Module-2			
1 a.	Explain queue and state the limitation of ordinary queue. How do you overcome the limitation by specifying the required C-statements and diagrammatic representation using an example?	7	L2	2
b.	Construct linked stacks using appropriate functions.	6	L3	3
	OR			
2 a.	Explain Circular queue using dynamic arrays with the function.	6	L2	2
b.	Write C functions to add two polynomials using circular list with header node.	7	L1	3
	Module-3			
3 a.	List out the difference between singly linked list and doubly linked list. Write the functions to perform following operations on doubly linked circular list. i. Insertion into doubly linked circular list. ii. Deletion from doubly linked circular list.	6	L1	3
b.	Define Binary tree with an example. Explain C recursive routine to traverse the tree using inorder.	6	L2	4
	OR			
4 a.	Write a functions for following operations on Circular linked list. i. Inserting at the front of the list ii. Counting the length of the Circular linked list.	6	L1	3
b.	Demonstrate inorder traversal of a threaded binary tree with suitable functions.	6	L3	4

CO2:	**Apply Arrays, Stacks and Queue data structures to solve the given problems.**
CO3:	**Use the concept of linked list in problem solving.**
CO4:	**Develop solutions using trees and graphs to model the real-world problem.**

Course Coordinator | **Module Coordinator** | **HOD**

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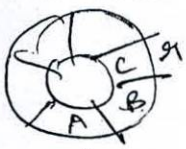
SAPTHAGIRI COLLEGE OF ENGINEERING
DEPARTMENT OF INFORMATION SCIENCE AND ENGINEERING

SCHEME & SOLUTION

INTERNAL TEST II

Semester: 3rd 'A' & 'B' Subject: Data Structures Subject Code: BCS304
Date: 19/1/24 Time: 10:30 to 11:30 Duration: 1 hr Max Marks: 25
Staff Name: Ambika. S Signature

QS. No.	Solutions	Marks Allocated

1a	A queue is an ordered list in which insertions and deletions take place at different ends. The end is rear where we add new elements & that from which old elements are deleted is called the front.
	When rear index is equal to Max-Queue-size-1 even if queue is empty after deleting all elements of queue we will not be allowed to utilize the memory space as it is linear.
	We can obtain more efficient queue called as circular queue.
	 
	
	void add(element item)
	{
	rear = (rear+1) % MAX_QUEUE_SIZE
	if (front == rear)
	queuefull();
	queue[rear] = item;
	}
		3M
		2M

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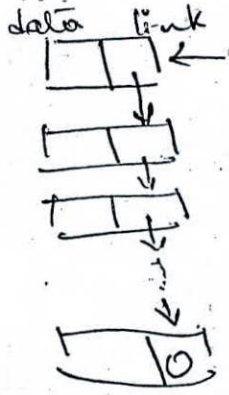
23

Qs. No.	Solutions	Marks Allocated

```
element deleteq()
{
  element item;
  if (front == rear)
    return queueEmpty();
  front = (front+1) % Max_Queue_Size;
  return queue[front];
}
```

2M

1b. Linked Stacks:




```
void push(int i, item)
{ stackPointer temp;
  MALLOC(temp, sizeof(*temp));
  temp->data = item;
  temp->link = top[i];
  top[i] = temp
}
```

3.

```
element pop(int i)
{ stackPointer temp = top[i];
  element item;
  if (!temp)
    return stackEmpty();
  item = temp->data;
  top[i] = temp->link;
  free(temp);
  return item;
}
```

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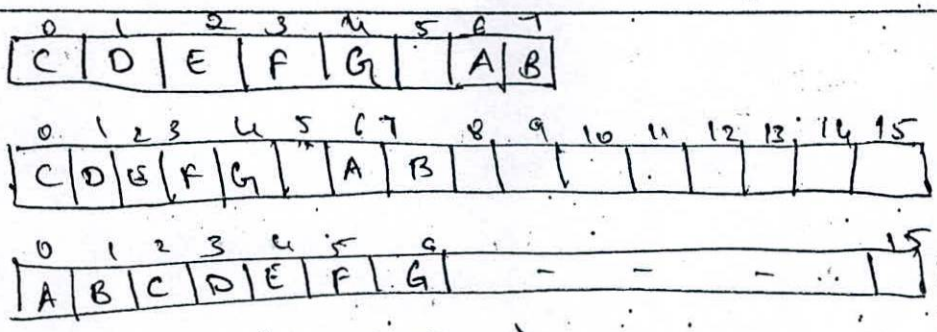
Qs. No.	Solutions	Marks Allocated
2a.		


```
void addq(element *item)
{ rear = (rear+1) % capacity
  if (front == rear)
    queuefull();
  queue[rear] = item;
}
void queuefull()
{
 element *newQueue;
MALLOC(newQueue, 2*capacity*sizeof(*queue));
int start = (front+1) % capacity;
if (start < 2)
copy(queue+start, queue+start+capacity-1, newQueue);
else
{
copy(queue+start, queue+capacity, newQueue);
copy(queue, queue+rear+1, newQueue+capacity-start);
}
front = 2*capacity-1;
rear = capacity-2;
capacity *= 2;
free(queue);
queue = newQueue; }
```

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Qs. No.	Solutions	Marks 'A Hocated

```
2b. polyPointer cpadd (polyPointer a,
                       polyPointer b)
{
  polyPointer startA, c, lastC;
  int sum, done = FALSE;
  startA = a;
  a = a -> link;
  b = b -> link;
  c = getNode();
  c -> expon = -1; lastC = c;
  do {
    switch (COMPARE (a -> expon, b -> expon))
    {
      case -1: attach (b -> coef, b -> expon, &lastC);
               b = b -> link;
               break;
      case 0 : if (startA == a) done = TRUE;
               else {
               sum = a -> coef + b -> coef;
               if (sum) attach (sum, a -> expon, &last
                a = a -> link ; b = b -> link;
               }
               break;
      case 1 : attach (a -> coef, a -> expon, &last C),
               a = a -> link;
    }
  } while (!done);
  lastC -> link = c;
  return c; }
void attach (float coefficient, int exponent, polyPointe
                                              *ptr)
{
  polyPointer temp;
  MALLOC (temp, sizeof (*temp));
  temp -> coef = coefficient;
  temp -> expon = exponent;
  (*ptr) -> link = temp;
  *ptr = temp; }
```

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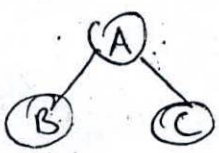
Page No.

Qs. No.	Solutions	Marks Allocated

3a.	Singly linked list holds data and a link to the next component. While in a doubly linked list, every node includes a link to the previous node.
	void dinsert (nodepointer node, nodepointer newnode)
	{
	newnode -> llink = node;
	newnode -> rlink = node -> rlink;
	node -> rlink -> llink = newnode;
	node -> rlink = newnode;
	}
	void ddelete (nodepointer node, nodepointer deleted)
	{
	if (node == deleted)
	printf("Deletion of header node not permitted \n");
	else {
	deleted -> llink -> rlink = deleted -> rlink;
	deleted -> rlink -> llink = deleted -> llink;
	free (deleted);
	}}	

3b.	Binary tree is a finite set of nodes that is either empty or consists of a root & two disjoint binary trees called left subtree & right subtree.  BAC void inorder (tree Pointer ptr) { if (ptr){ inorder (ptr -> leftchild); Printf ("%d", ptr -> data); inorder (ptr -> rightchild); }}	

Qs. No.	Solutions	Marks Allocated

4a.

```
void insertfront (listpointer *last,
        listpointer node)
{ if (!(*last))
  { *last = node;
    node->link = node;
  }
  else
    node->link = (*last)->link;
    (*last)->link = node; }}
int length (listpointer last)
 { listpointer temp;
   int count = 0
   if (last) { temp = last;
   do { count ++;
        temp = temp->link;
      } while (temp != last);
   }
   return count; }
```

4b.

```
void tinorder (threadedpointer tree)
{ threadedpointer temp = tree;
  for (;;) { temp = insucc(temp);
             if (temp == tree) break;
             printf ("%3c", temp->data);
  }}
threadedpointer insucc(threadedpointer tree)
{ threadedpointer temp;
  temp = tree->rightChild;
  if (!tree->rightthread)
     while (temp->leftthread)
        temp = temp->leftChild;
  return temp;
```

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DEPARTMENT OF MECHANICAL ENGINEERING

THERMO FLUIDS ENGINEERING

Internal Assessment Test-I

SEM / Sec: 5th **Date:** 02/12/2023
Time: 1-hour **Max. Marks:** 25

Note: Answer any one full question from each Module

Q. No.	Module -1	Marks	RBT	CO's
1(a)	Explain the following with respect to I C Engines; i) Indicated Power ii) Brake Power iii) Specific Fuel Consumption iv) Brake Thermal Efficiency v) Relative Efficiency	05	L2	CO1
(b)	Draw the Heat Balance Sheet for a single cylinder, 4-stroke diesel engine having bore of 300 mm, 450 mm stroke and brake drum diameter of 1.22 m subjected to one hour performance test. Note the following observations made; Mass of Fuel used = 8.8 kg, Calorific Value = 41800 kJ/kg, Average Speed = 200 rpm, Mean Effective Pressure = 5.8 bar, Brake load = 1860 N, Mass of cooling water used = 650 kg, Cooling water temperature rise = 22°C.	10	L3	CO1
	OR			
2(a)	Explain the following with respect to reciprocating air compressors; i) Applications of compressed air ii) Compressor Efficiency iii) Clearance Ratio iv) Effective Swept Volume v) Condition for minimum Power Consumption	05	L3	CO1
(b)	Derive an expression for volumetric efficiency and limitations of a Single stage air compressor.	10	L2	CO1
	Module -2			
3(a)	Explain the following with respect to Refrigeration; i) Refrigerator Capacity ii) Refrigeration Effect iii) Refrigerant Flow Rate iv) COP v) Power Consumption	05	L1	CO2
(b)	Explain the working of Vapour Absorption Refrigeration system with neat schematic sketch.	05	L3	CO2
	OR			
4(a)	Explain the following with respect to Psychrometrics; i) Specific Humidity ii) Degree of Saturation iii) Dew Point Temperature iv) Wet bulb Temperature v) Enthalpy of Moist Air	05	L2	CO2
(b)	Explain the working of summer air conditioning system for Hot & Dry outdoor conditions with the help of a neat sketch.	05	L2	CO2

Course Outcome

CO1 : **Able to determine performance parameters of IC Engines and Reciprocating air compressors**

CO2 : **Able to determine performance parameters of Refrigerators and air conditioners**

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DEPARTMENT OF MECHANICAL ENGINEERING

SCHEME & SOLUTIONS
(Academic Year 2023-24)

IA TEST NO.	Course / Course code	Semester / Sec
01	Thermo-Fluids Engineering 21ME52	5/A

Question No.	Answer / Solution / Steps Involved (Brief)	Max. Marks	Marks Allotted
1 a	Explanation of Indicated Power Brake Power, Specific fuel consumption, Brake Thermal efficiency and Relative efficiency — 5×1	05	05
b	$BP = 2\pi NT = 23.76$ kW — 1 $IP = (P_{MI} LAn)k = 30.75$ kW — 1 $\eta_{mech} = 77.08$ — 1 $Q_s = m_f \cdot C.V = 367840$ kJ/hr $BP = 85547$ kJ/hr — 2 $Q_w = m_w C_{pw} \Delta T_w = 59860$ kJ/hr $Q_g = Q_s - BP - Q_w = 222433$ kJ/hr	05	05
2 a	Explanation of compressed air applications, compressor efficiency, Clearance ratio, effective swept volume, condition for minimum Power consumption — 5×1	05	05
b	$\eta_V = \frac{V_{es}}{V_s} = 1 - c\left[\left(\frac{P_2}{P_1}\right)^{1/n} - 1\right]$ — 5 where $c = \frac{V_c}{V_s}$	05	05
			30