

Yeshwantrao Chavan College of Engineering, Nagpur

Session: 2021-2022 EVEN

Course Name: Operating Systems

Degree Name: B.E.

Registration No.: 20010610

Branch Name: Information Technology

Bundle No.: 21013

Semester: IV

Seat No.: 283002

Q.No.	Marks	Examiner-1		Examiner-2		Examiner-3	
		Marks Obtained	Page No.	Marks Obtained	Page No.	Marks Obtained	Page No.
Q.1.A	4.00	NA	44				
Q.1.B	3.00	0.50	18				
Q.2.A	4.00	4.00	16				
Q.2.B	3.00	2.00	19				
Q.3	6.00	3.50	3				
Q.4	7.00	7.00	8				
Q.5.A	4.00	1.00	11				
Q.5.B	3.00	1.50	13				
Q.6.A	4.00	4.00	15				
Q.6.B	2.00	1.00	15				
Total	40	25	NIL		NIL		NIL

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Nagar Yuwak Shikshah Sanstha's
Yeshwantrao Chavan College Of Engineering
(An Autonomous Institution Affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

END SEMESTER EXAMINATION

**Examinee should follow the instructions given overleaf
(TO BE FILLED IN BY EXAMINEE CORRECTLY AND LEGIBLY)**

Name of Programme : B.E./ M.Tech./ B.E.(PTDP)		Exam : ODD ESE/ODD RESIT/EVEN ESE/ EVEN RESIT/Summer Term
Branch : IT		Academic Year : 2021-2022
Semester : 4 th	Course Code : IT2255	Course Name : operating system
No. of Questions Answered :	No. of Pages : 44	Date : 27/06/2022

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(TO BE FILLED IN BY THE VALUER IN RED INK)

Grand Total in Words.....

Name of Valuer..... Signature

I have seen the valued answer book and the marks awarded to me are as above.

Date : Signature of Student (Only after valuation) Name & signature of answer book showing authority

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INSTRUCTIONS TO EXAMINEE

1. No supplements/ additional Answer book will be provided.
2. Before writing the Roll No. on the answer book the examinee shall observe the condition of the answer book. If found bad, containing loose pages, pages are not serially numbered etc. then he / she shall bring the discrepancy to the notice of the Invigilator / Examination-In-Charge immediately and obtain new answer book.
3. Each examinee shall write neatly the Name of the Examination, Roll No., Course code, Course name, Branch, Registration No. and date etc.
4. Examinee shall use only BLACK or BLUE ink for writing answers. He/she shall not write his/ her name or signature or any identification mark anywhere in the answer book.
5. No paper wastage is allowed. This will be considered as misconduct under institution rules. Rough notes and answer desired to be CANCELLED should be crossed through and write CANCELLED over them.
6. Examinee shall not write anything on the question paper supplied to him/her.
7. No Examinee shall be allowed either to leave his / her seat or to submit the answer book before completion of one hour from the starting of the examination.
8. Examinee shall be allowed to leave the hall only after handing over his/her answer book to the Invigilator. The Examinee who has submitted the answer book and left the examination hall will not be allowed to enter the Examination Hall again.
9. Examinee shall sign the Attendance Sheet.
10. The Examinee using unfair- means / creating nuisance / using obscene language / violence / threat at the centre to the person involved in conduct of examination etc. shall be liable for punishment by the Examination Committee as per Institution rules.

Q3.

i) Race condition.

→ Race condition is situation which occurs in critical section.

It is happened when multiple threads are executed in a critical section problem but they are in different order of execution.

e.g. When we give two commands simultaneously like copy and delete.
this is Race condition

ii) Critical section.

→ A critical section is a section of code in which only one process can be executed at a time.

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iii) Semaphore.

⇒ Semaphore is a integer variable used to solve critical section problem.

In semaphore there are two atomic operations, wait and signal in which wait decrements the value of argument s when it is positive ($s \geq 0$).

And signal increments the value of argument s.

{ s (wait)

 s -- ;

}

{ s (signal)

 s ++ ;

y

Q4.

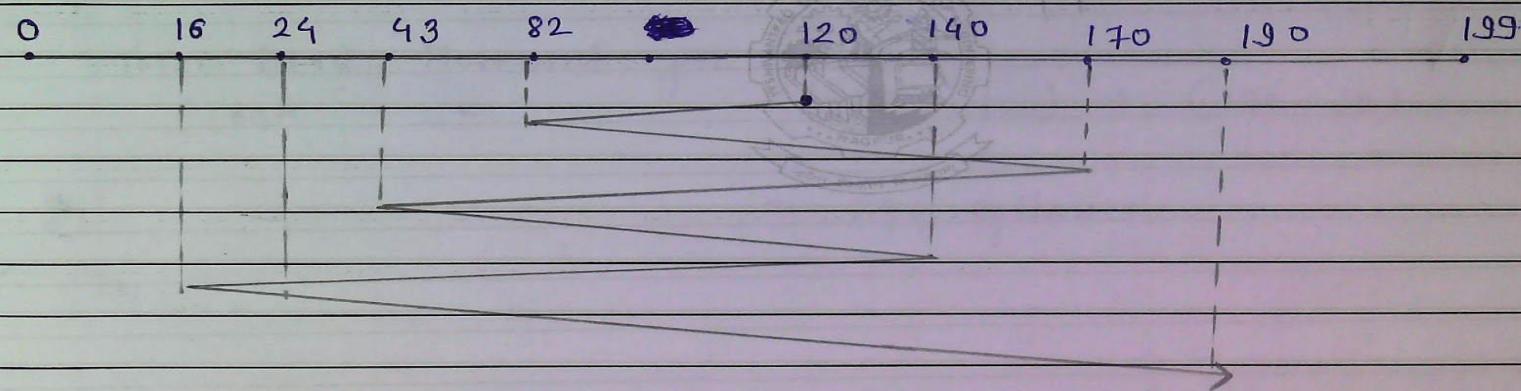
Given is, disk has 200 cylinders (0 to 199).

The current Head pointer is at 120. And previous request was at 90.

∴ The direction is from Left to Right.

82, ~~43~~, 170, 43, 140, 24, 16, 190.

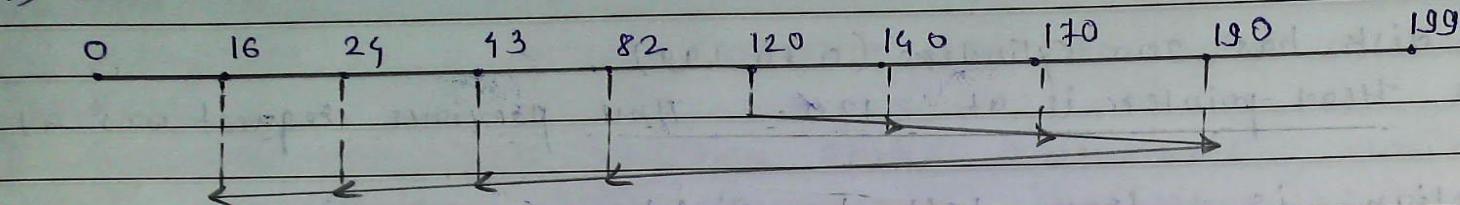
i) FCFS



$$\begin{aligned}
 \text{THM for} &= (120 - 82) + (170 - 82) + (170 - 43) + (140 - 43) + (140 - 16) \\
 &\quad + (190 - 16) \\
 &= 648 \text{ cylinders.}
 \end{aligned}$$

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ii) SSTF

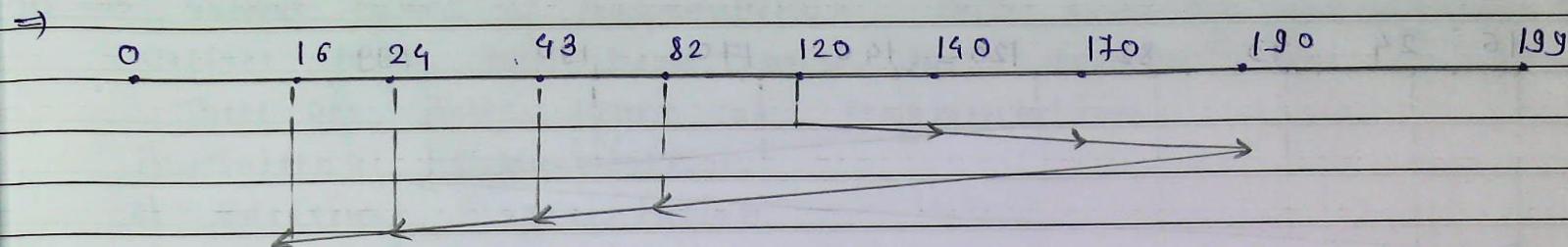


$$\begin{aligned}\therefore \text{THM for SSTF} &= (190 - 120) + (190 - 16) \\ &= 244 \text{ cylinders}\end{aligned}$$

iii)



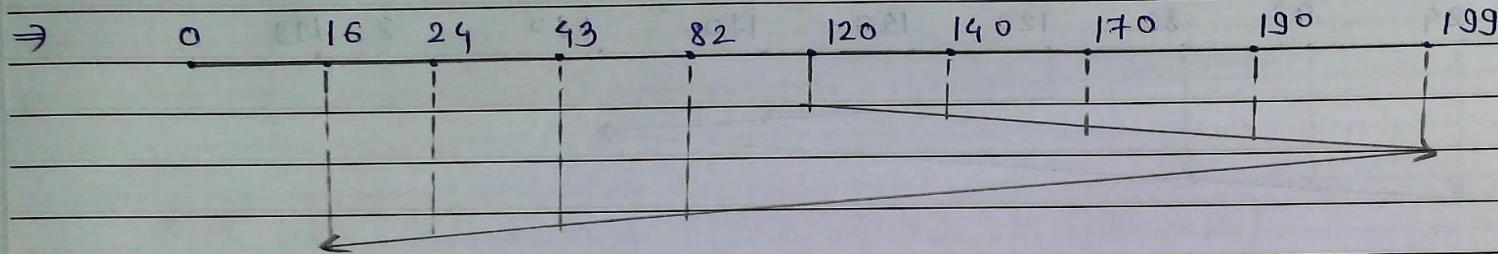
iii) LOOK.



$$\begin{aligned} \text{Total Head Movement for} \\ \text{LOOKS} &= (190 - 120) + (190 - 16) \\ &= 294 \text{ cylinders.} \end{aligned}$$

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i) SCAN



$$\begin{aligned}\text{Sum of SCAN} &= (199 - 120) + (199 - 16) \\ &= 262 \text{ cylinders}\end{aligned}$$

Q5.

A) \Rightarrow Various types of fragmentation, their memory management schemes, suffers from each type and their remedy are as follows.

There are three types of fragmentation.

- i) Internal fragmentation.
- ii) External fragmentation.
- iii) Table fragmentation.

i) Internal fragmentation.

\Rightarrow # The Memory Management for internal fragmentation are.

- paged segmentation.

Remedy \Rightarrow Dynamic memory allocation.

ii) External fragmentation

\Rightarrow • The Memory Management for External fragmentation are

- segmentation
- paging.

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iii) Table fragmentation

→ There are no remedies for Table fragmentation.

Q 5

(B)

P

i)

⇒

Q 5.

(B) \Rightarrow Given Main Memory partitions are,
 100 KB, 500 KB, 200 KB, 300 KB, 600 KB (in order)

processes 212 KB, 417 KB, 112 KB, 426 KB (in order).
 (Assuming Dynamic Memory Allocation).

i) First Fit

- $\Rightarrow P_1$ is allocated to blocks of 500 KB
- P_2 is allocated to blocks of 600 KB
- P_3 is allocated to blocks (500 - 212) KB

P_4 will wait

	100 KB
212 KB	
112 KB	$500 - 212 = 288 \text{ KB}$
288 KB	200 KB
	300 KB
417 KB	600 KB
	$600 - 417 = 183 \text{ KB}$

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ii) Best Fit

⇒ Process

P₁ allocated to blocks of 300 KB

P₂ allocated to blocks of 500 KB

P₃ allocated to blocks of 200 KB

P₄ allocated to blocks of 600 KB

	417 KB	500 KB
	112 KB	200 KB
	212 KB	300 KB
	426 KB	600 KB

iii) Worst fit.

⇒

P₁ allocated to blocks of 600 KB

P₂ allocated to blocks of 500 KB

P₃ allocated to blocks of (600 - 212) KB

P₄ will wait.

— —

100 KB
417 KB
500 KB
200 KB
300 KB
212 KB
600 KB
112 KB
600 - 388 = 212 = 388

Q 6.

$$\text{H} \Rightarrow 1, 2, 3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 7, 6, 3, 2, 1.$$

No. of teams = 3.

1) FIFO

f_3		3	3	3	8	5	5	5	1	1	1	+	6	6	6	6
f_2		2	2	2	2	1	1	+	2	2	2	2	7	7	7	1
f_1	1	1	+	4	4	4	4	6	6	6	8	3	3	3	3	2

Number of page faults = 14 Hits = 3

2) Optimal

14

$$\therefore \text{Number of page faults} = \underline{\underline{10}} \quad \text{Hits} = 7$$

Q 6.

(B)

3) LRU

\Rightarrow

f_3	-	3	3	8	1	1	*	2	2	2	2	2	6	6	6	1
f_2		2	2	2	2	2	2	6	6	6	6	8	3	3	3	3
f_1	1	1	*	4	4	5	5	5	1	1	*	7	7	*	2	2

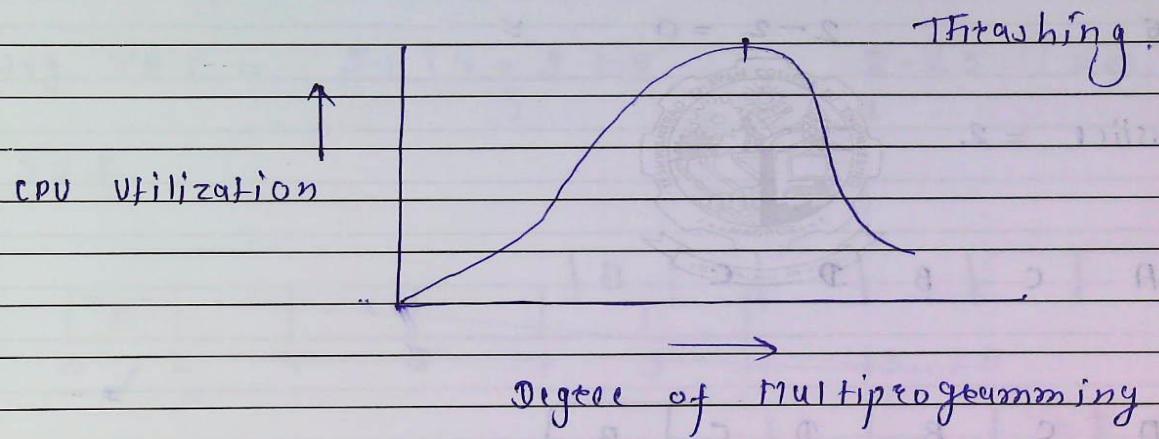
$$\text{Number of page faults} = 14$$

$$\text{Number of hits} = 3$$

Q 6.

(B) \rightarrow Thrashing.

\rightarrow The Thrashing is a condition or situation in which, system is spending a major portion of its time on servicing the page faults but the actual time required for this is very less.



Thrashing can be prevented by using

- local replacement policies.

Q2.

(A) \Rightarrow Process

AT

BT

A

0

$$3 - 2 = 1$$

B

1

$$6 - 2 = 4 - 2 = 2 - 2 = 0$$

C

4

$$4 - 2 = 2$$

D

6

$$2 - 2 = 0$$

(B) Round Robin slice = 2

 \Rightarrow

Request \rightarrow A | B | A | C | B | D | C | B |

Queue

A	B	A	C	B	D	C	B
0	2	4	5	7	9	11	13

We know. $TAT = CT - FT$

$$TAT \text{ for } A = 5 - 0 = 5 \text{ sec.}$$

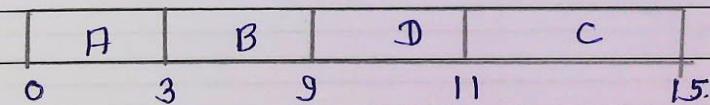
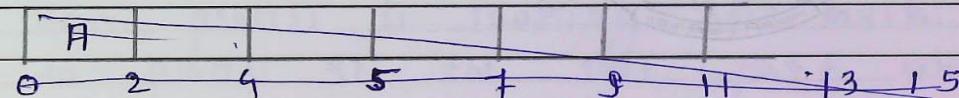
$$\dots B = 15 - 1 = 14 \text{ sec.}$$

$$\dots C = 13 - 9 = 4 \text{ sec.}$$

$$\dots D = 11 - 6 = 5 \text{ sec.}$$

$$\therefore \text{Avg TAT} = \frac{5+14+9+5}{4} = 8.25 \text{ sec.}$$

① SJF
⇒



$$\therefore \text{Avg TAT} = \frac{3+8+11+5}{4} = 6.75.$$

The Avg TAT for SJF is 6.75 sec.

Avg TAT for RR is 8.25 sec.

SJF give lowest average Turn Around Time.

$$\begin{aligned} \therefore FT \text{ for } A &= 3 - 0 = 3 \\ \text{for } B &= 9 - 1 = 8 \\ \text{for } C &= 15 - 9 = 11 \\ \text{for } D &= 11 - 6 = 5 \end{aligned}$$

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Q1.

- B) \Rightarrow • In symmetric multiprocessing, a process can be divided into two similar parts (equal)
• While in asymmetric multiprocessing, a process can not be divided into equal parts...

The advantages of multiprocessing are -

- More than one process can be executed simultaneously.

Q20 (B).

short term.

⇒ When the process is ready to execute is stored at starting of the execution queue

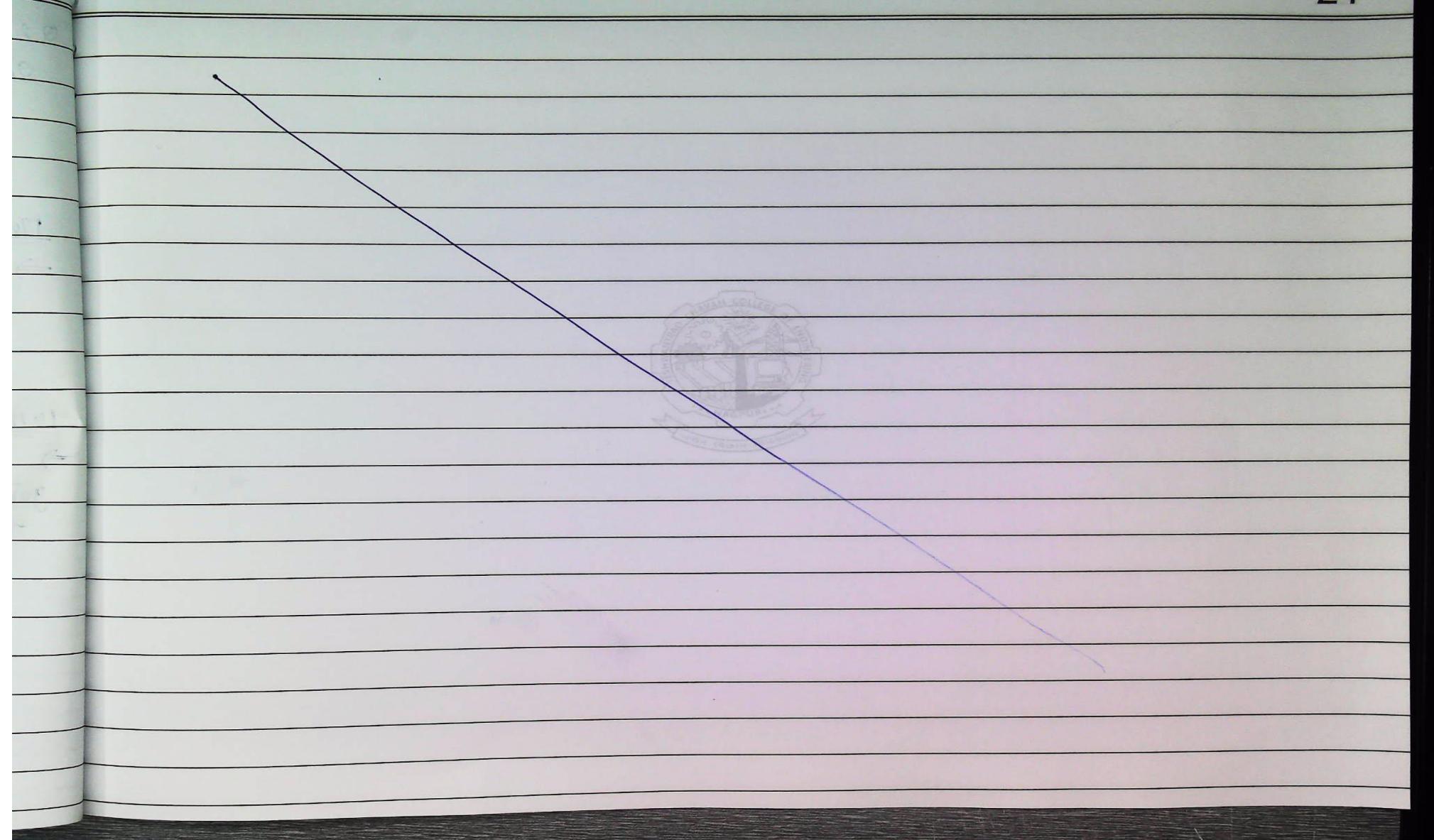
medium - term

⇒ When process need some resource while executing it placed further in executing queue

long term

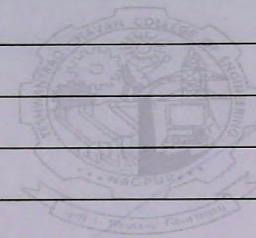
⇒ When process is looking how much time to get ready is going to placed at the last part which once is execute.
So we introduced long term scheduling.

Spurk

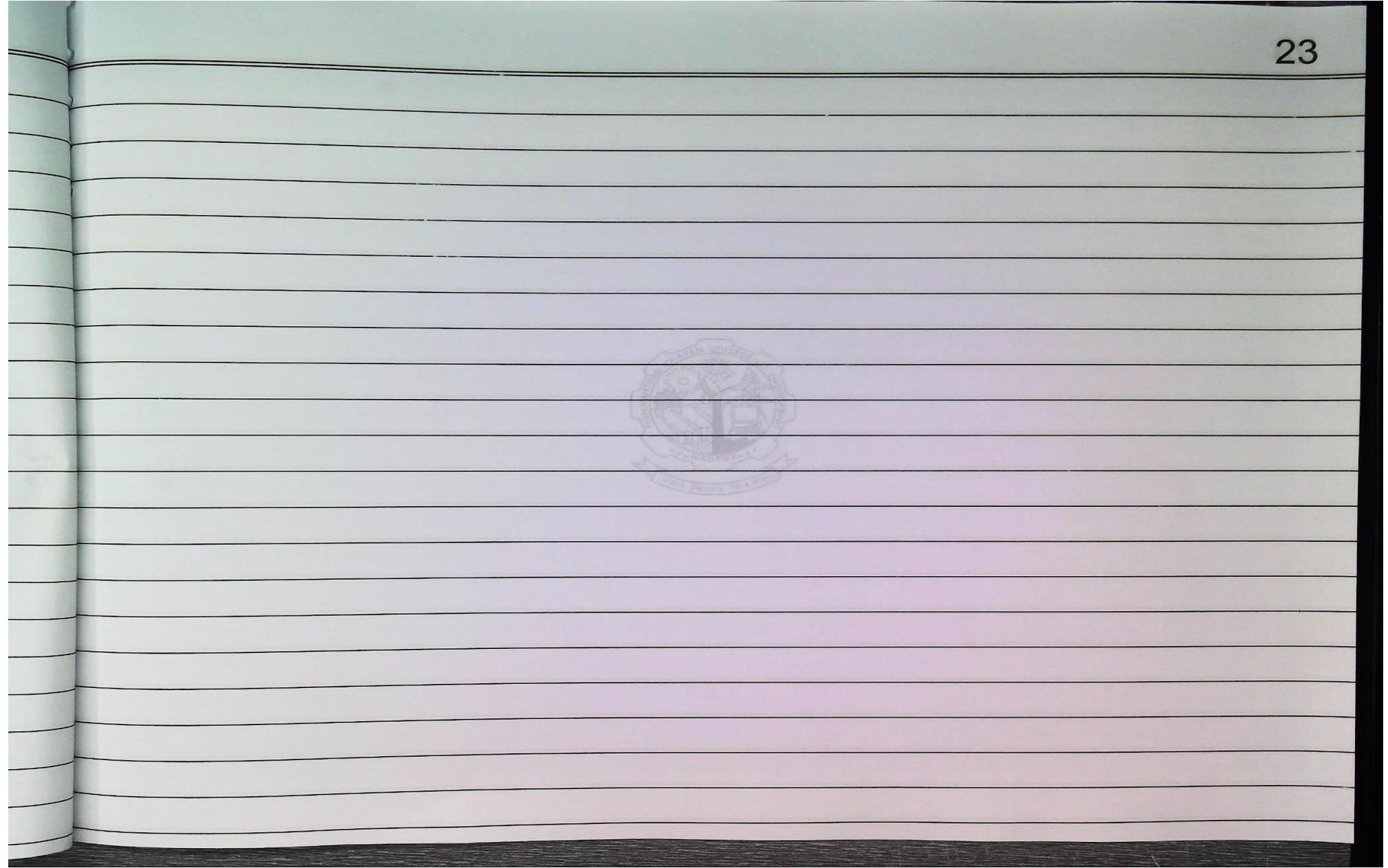
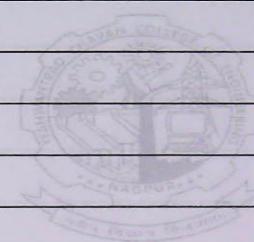


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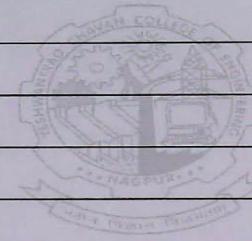


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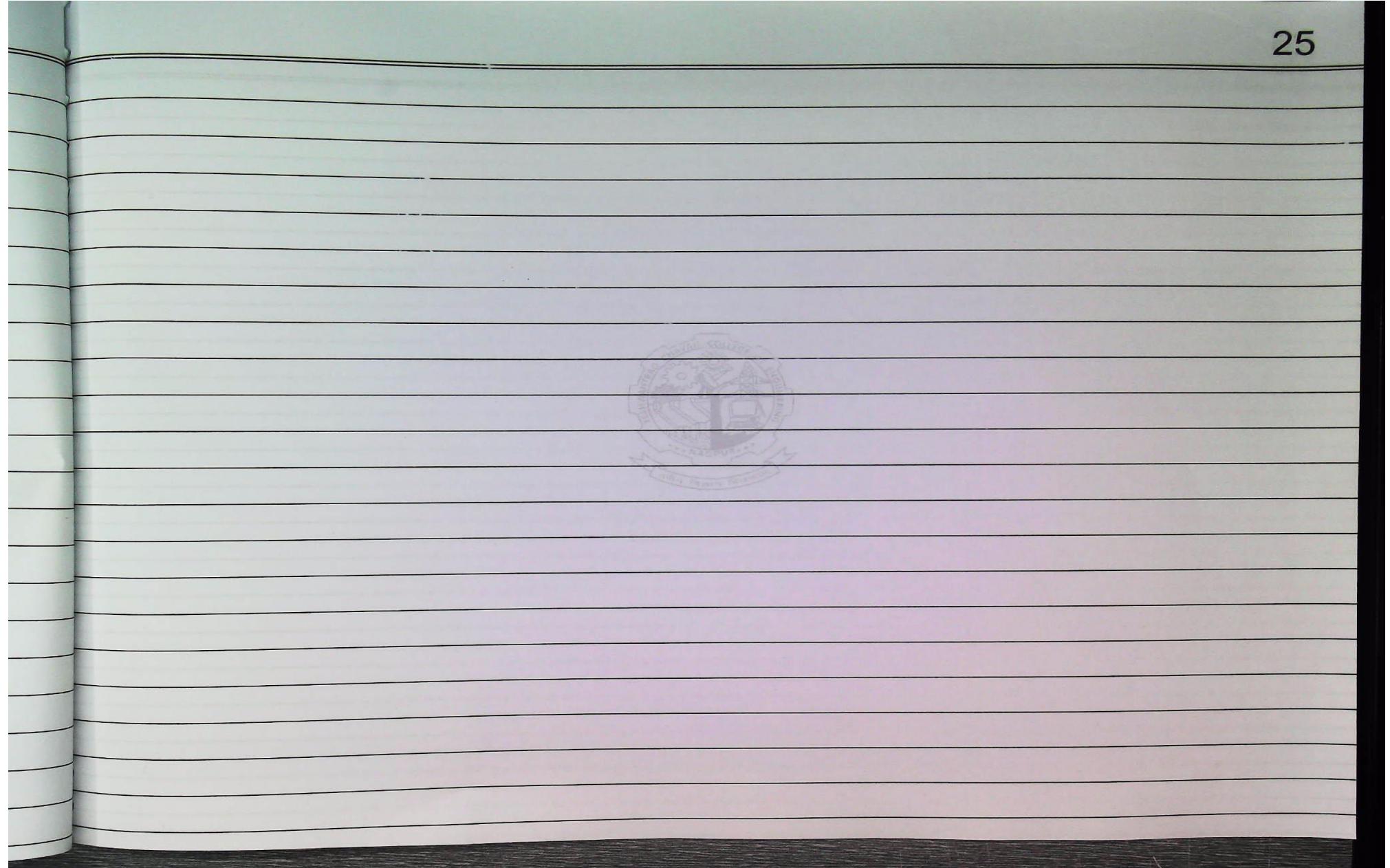
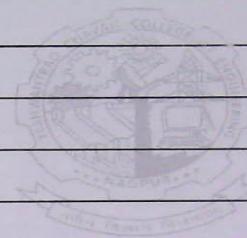


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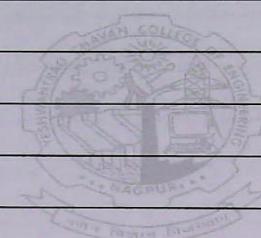


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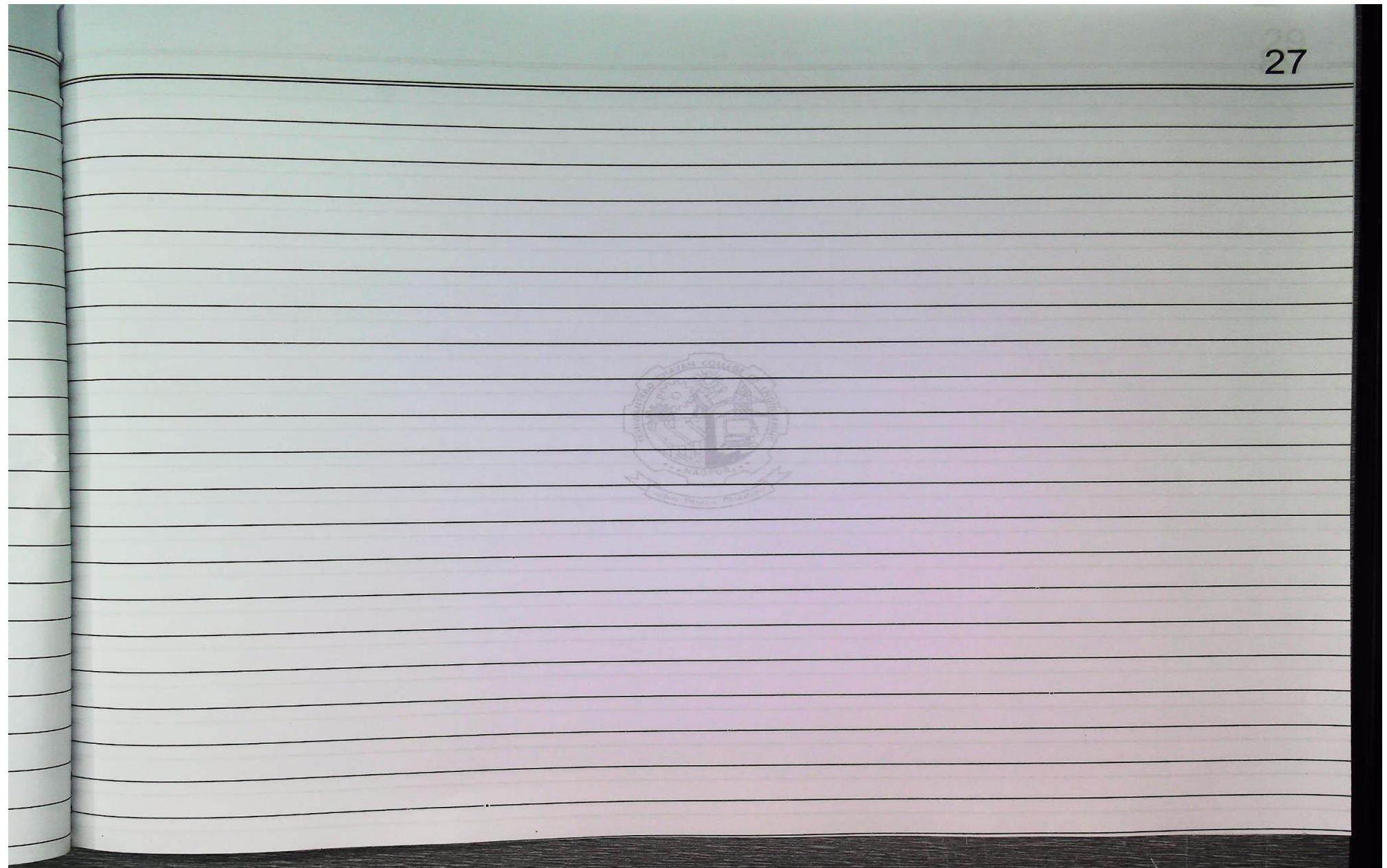
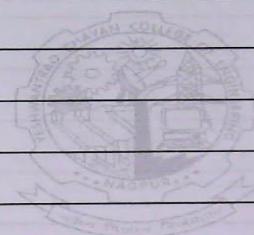


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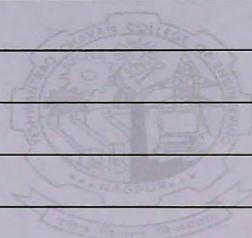


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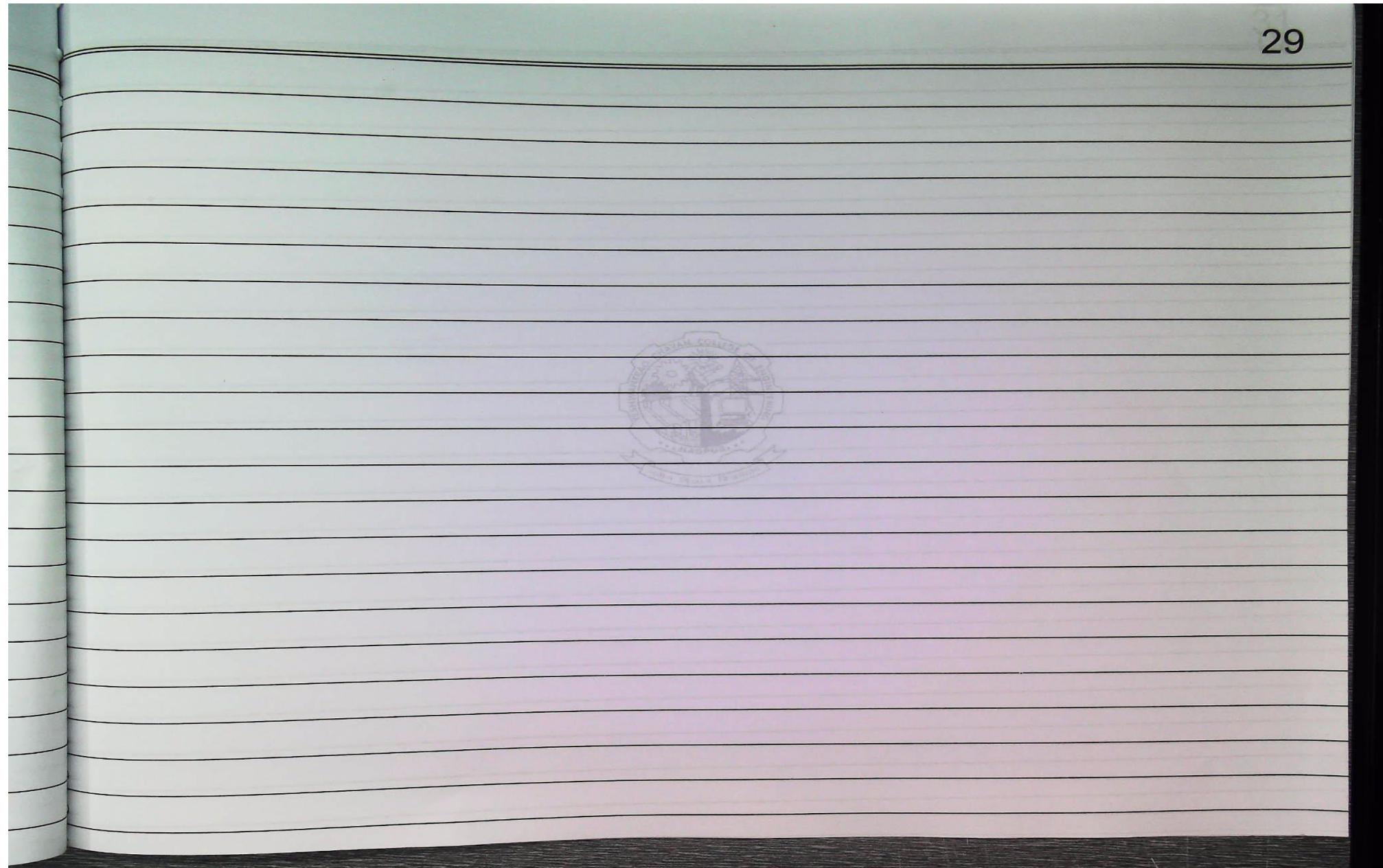
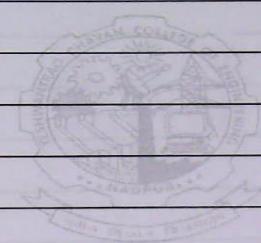


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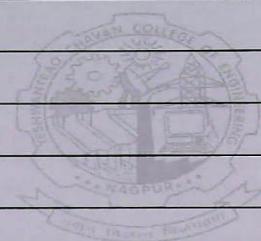


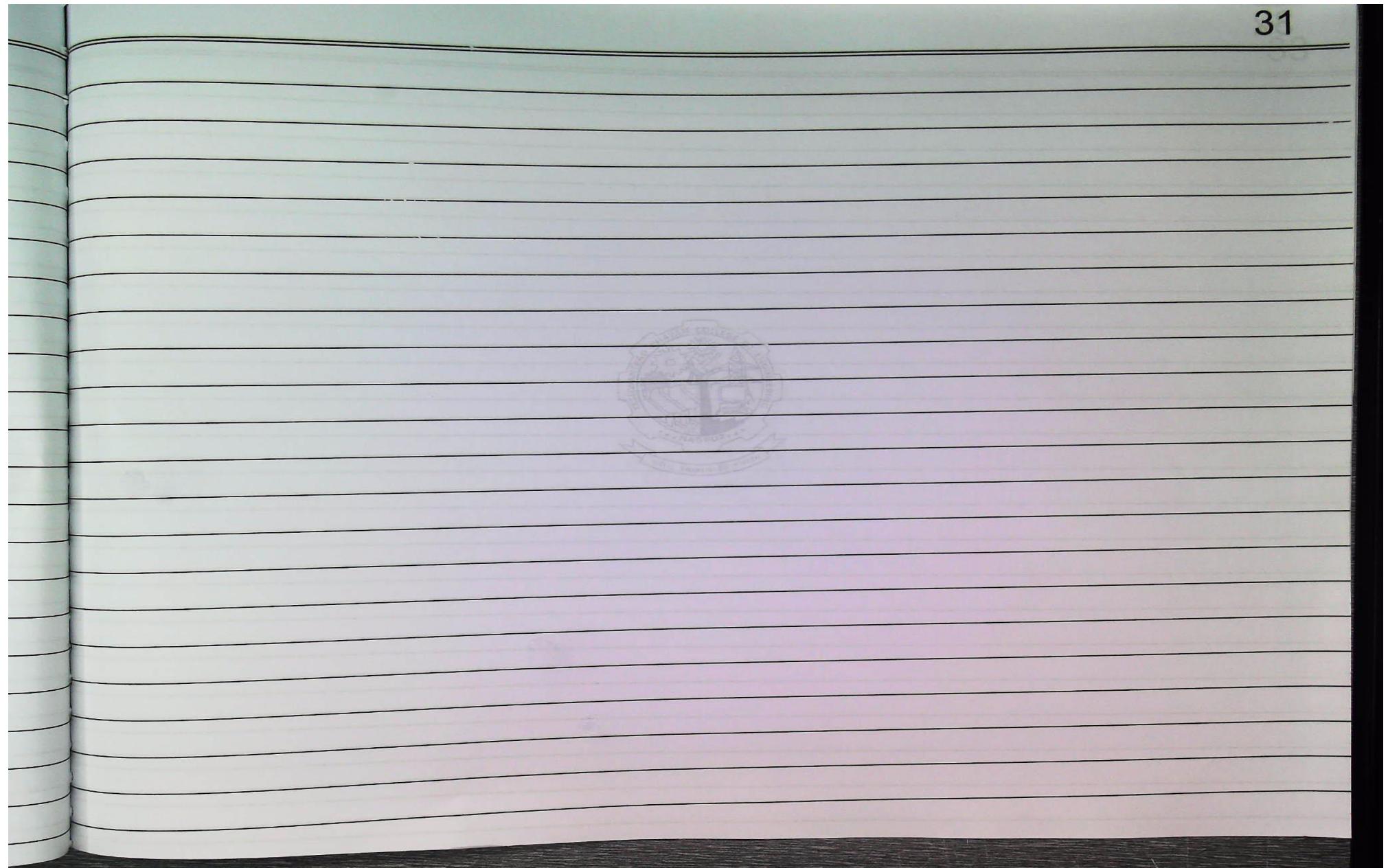
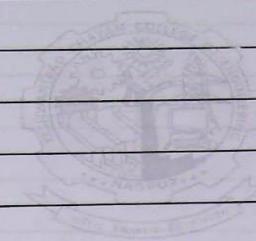
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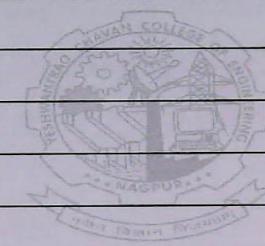
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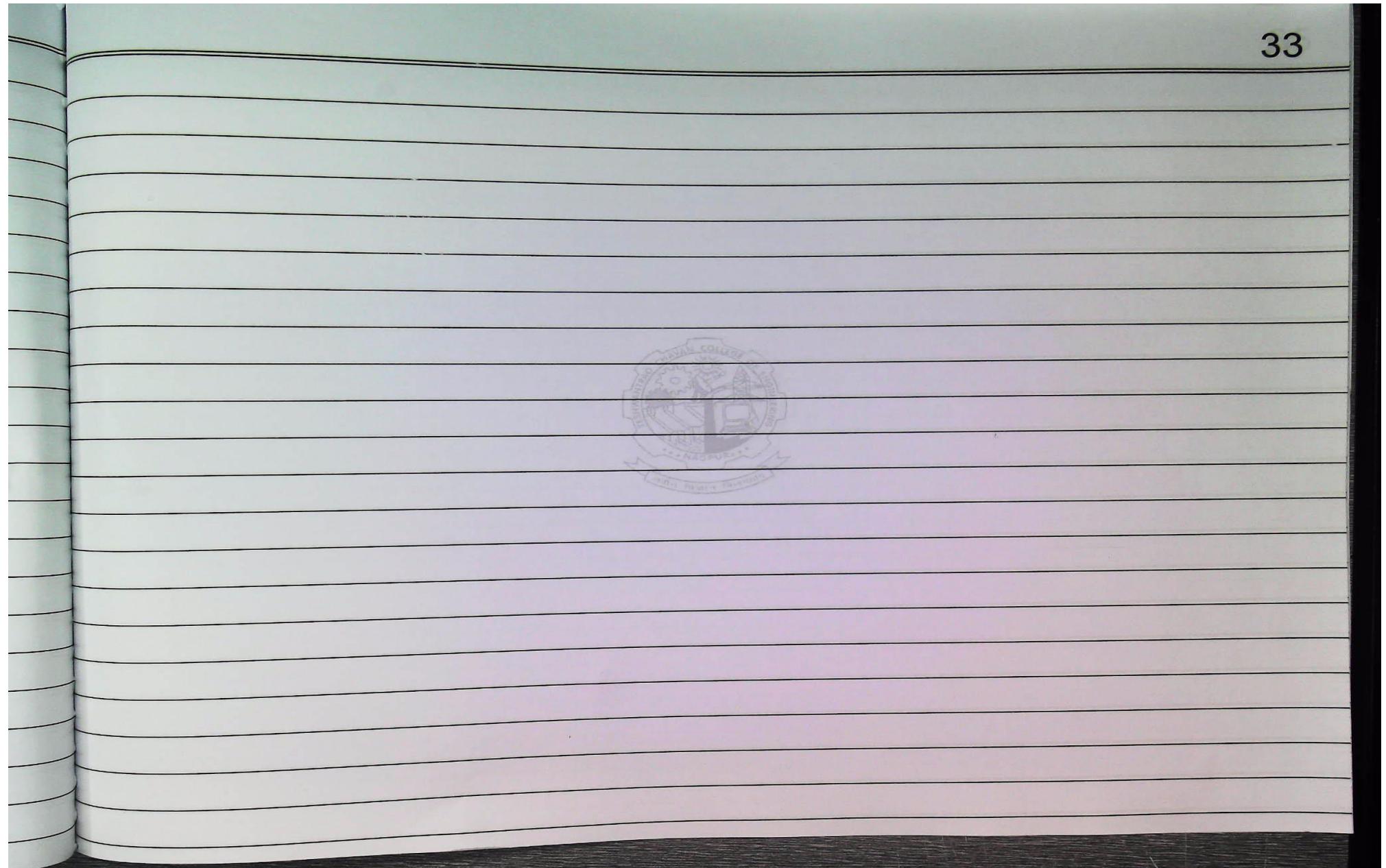
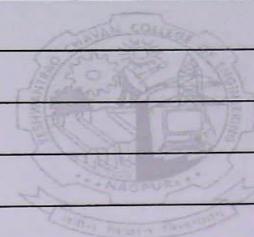
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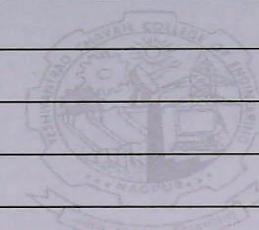


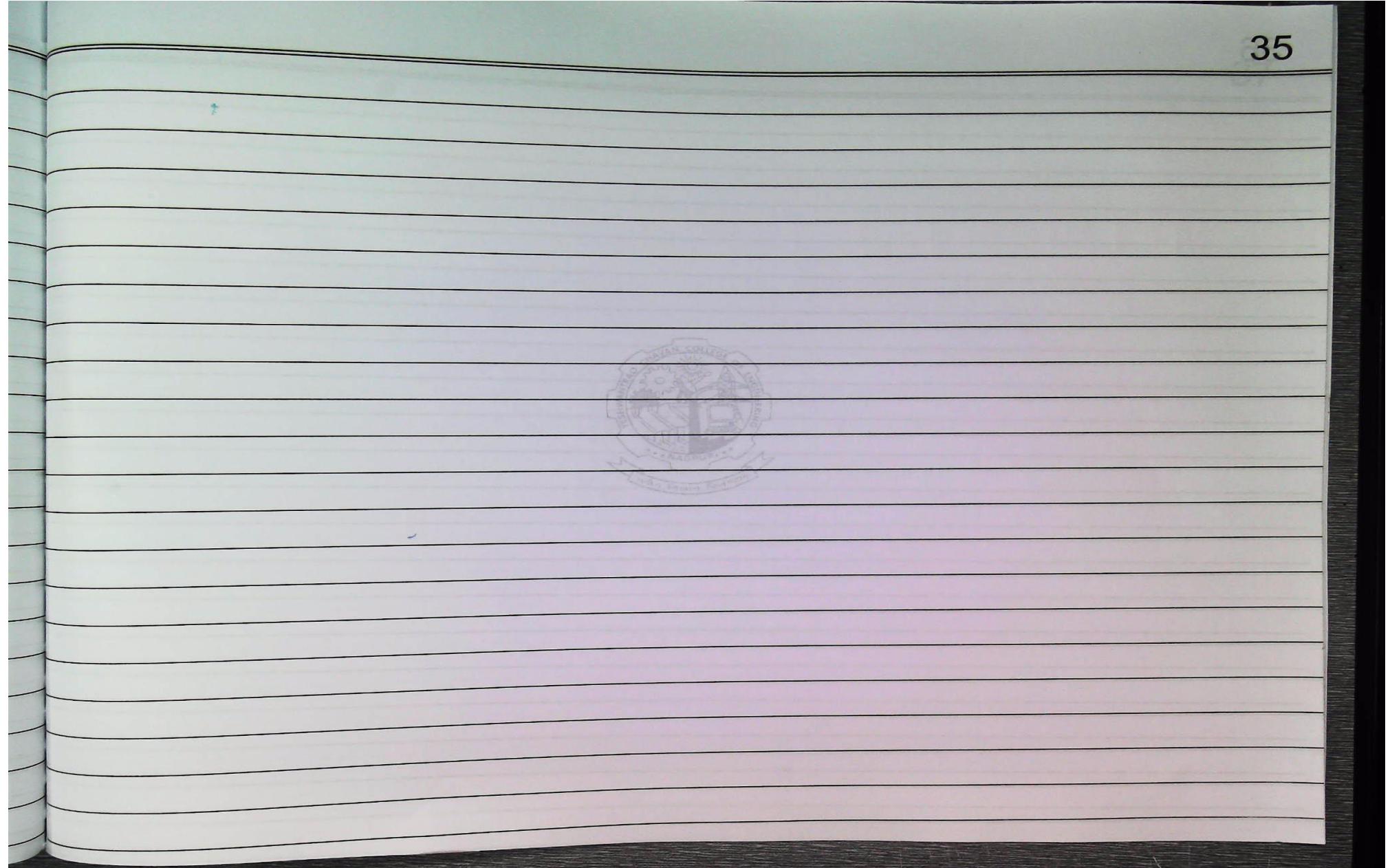
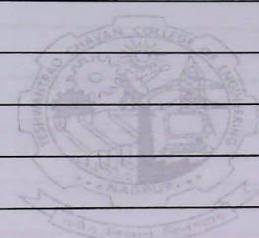
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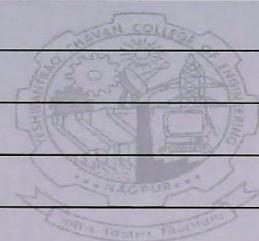
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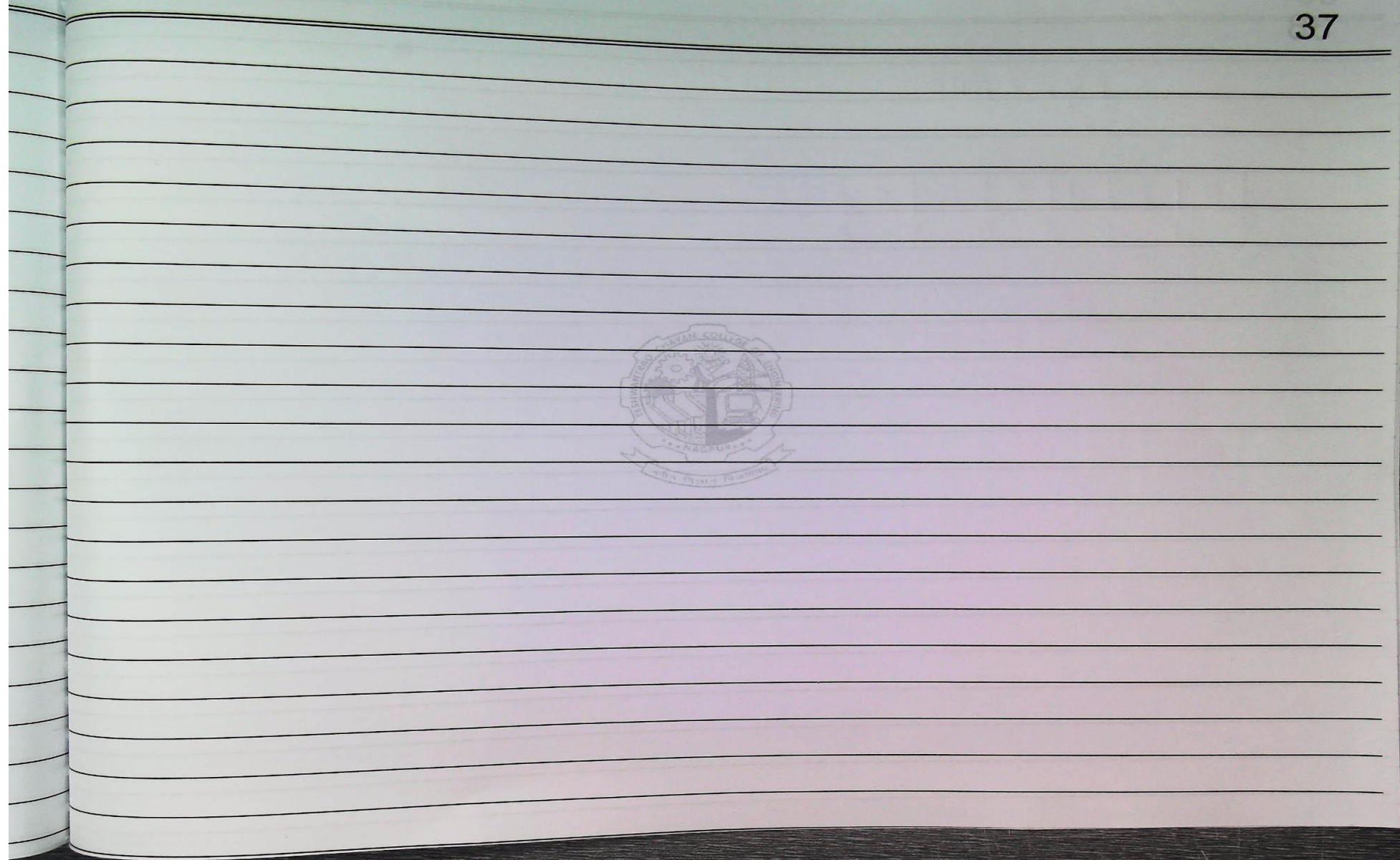
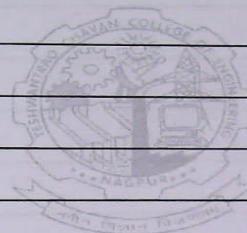


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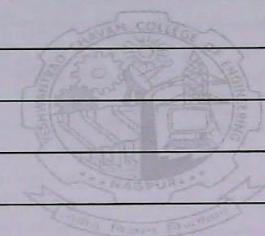


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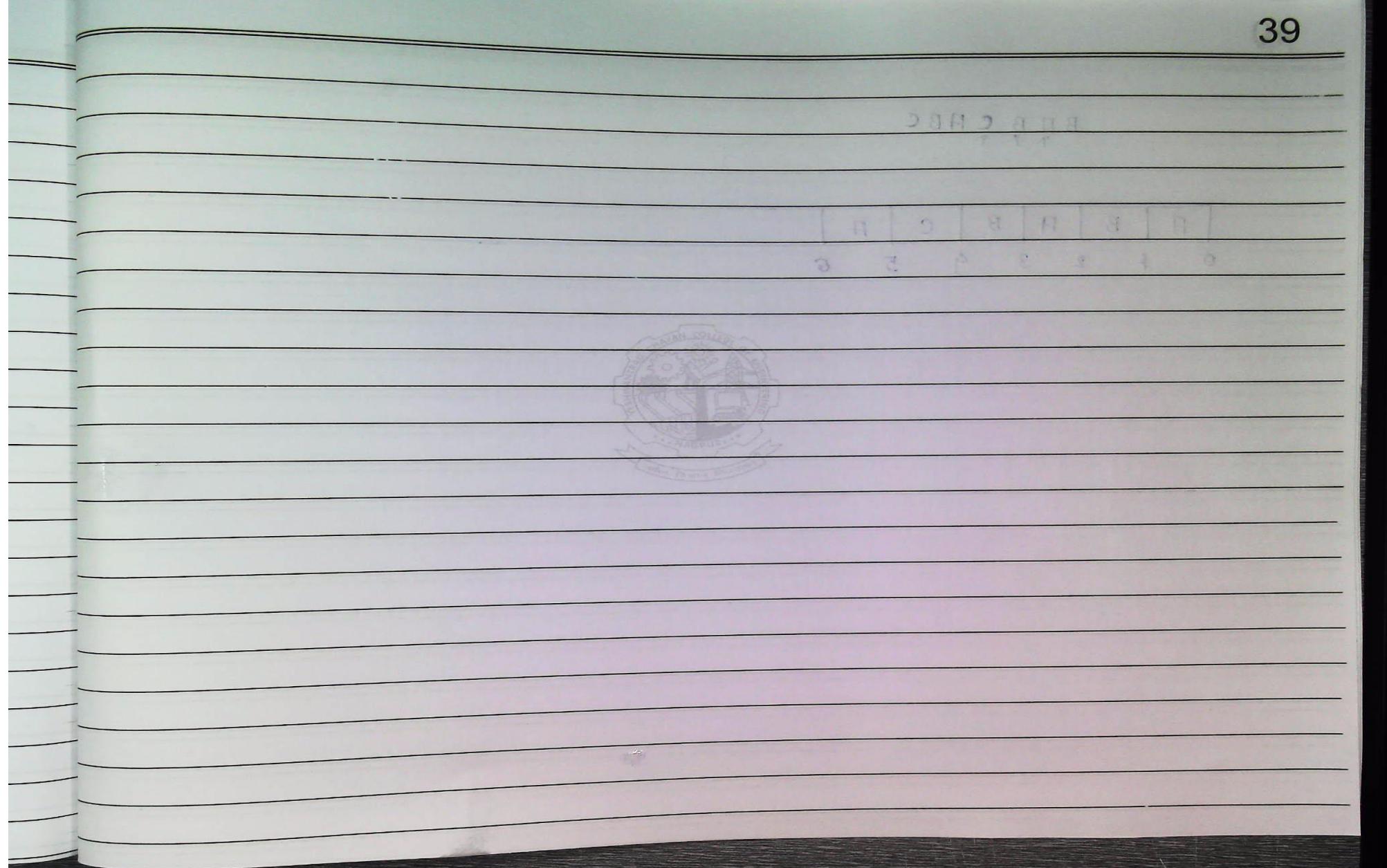
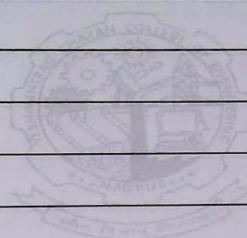
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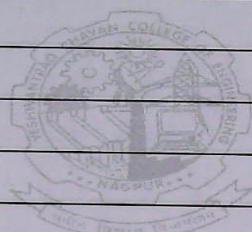
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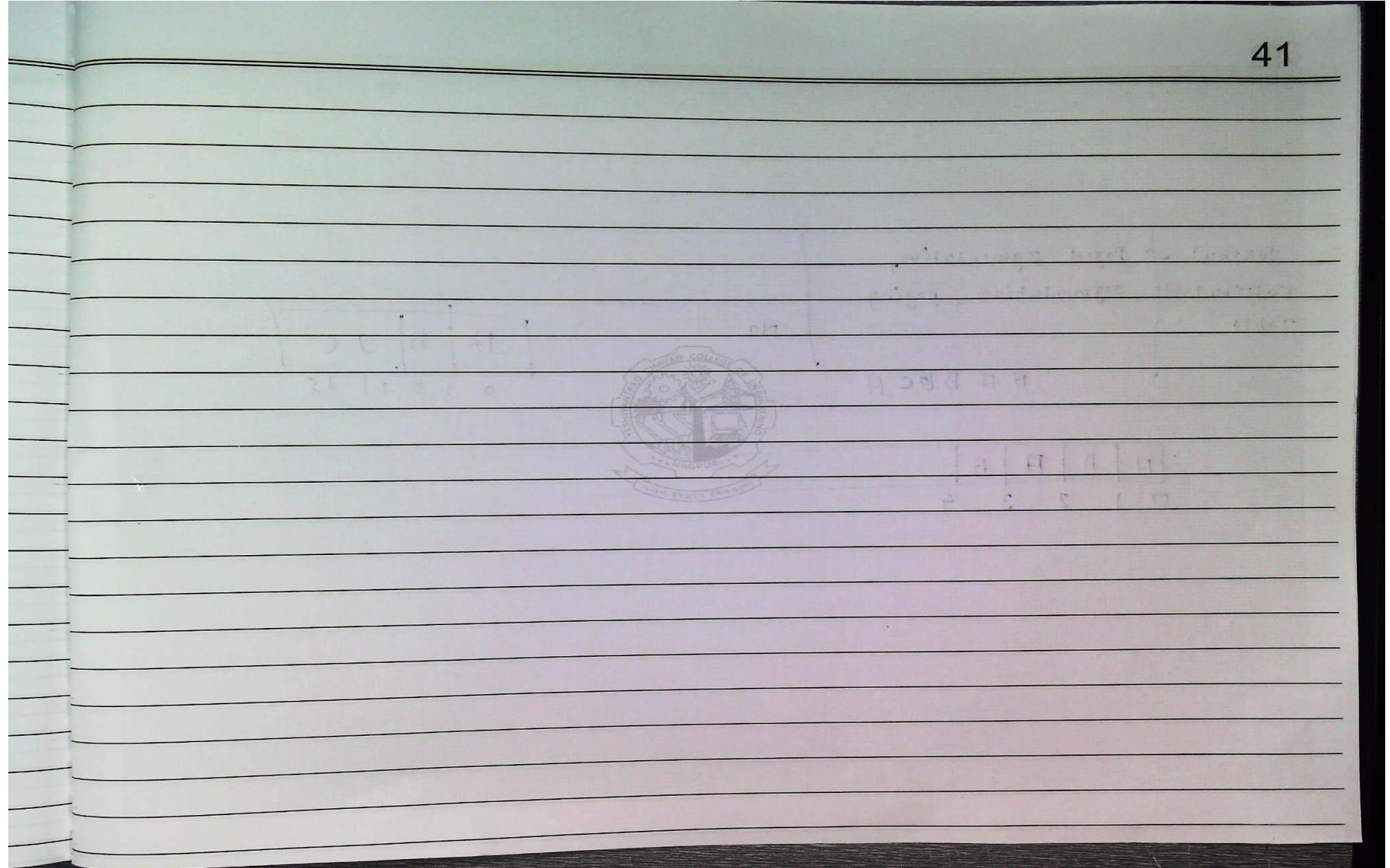
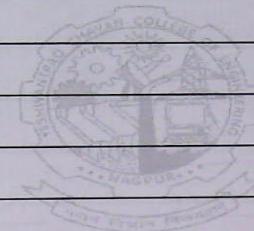


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B B C A B C

A	B	A	B	C	A
0	1	2	3	4	5





Internal \rightarrow
 External \rightarrow
 Table

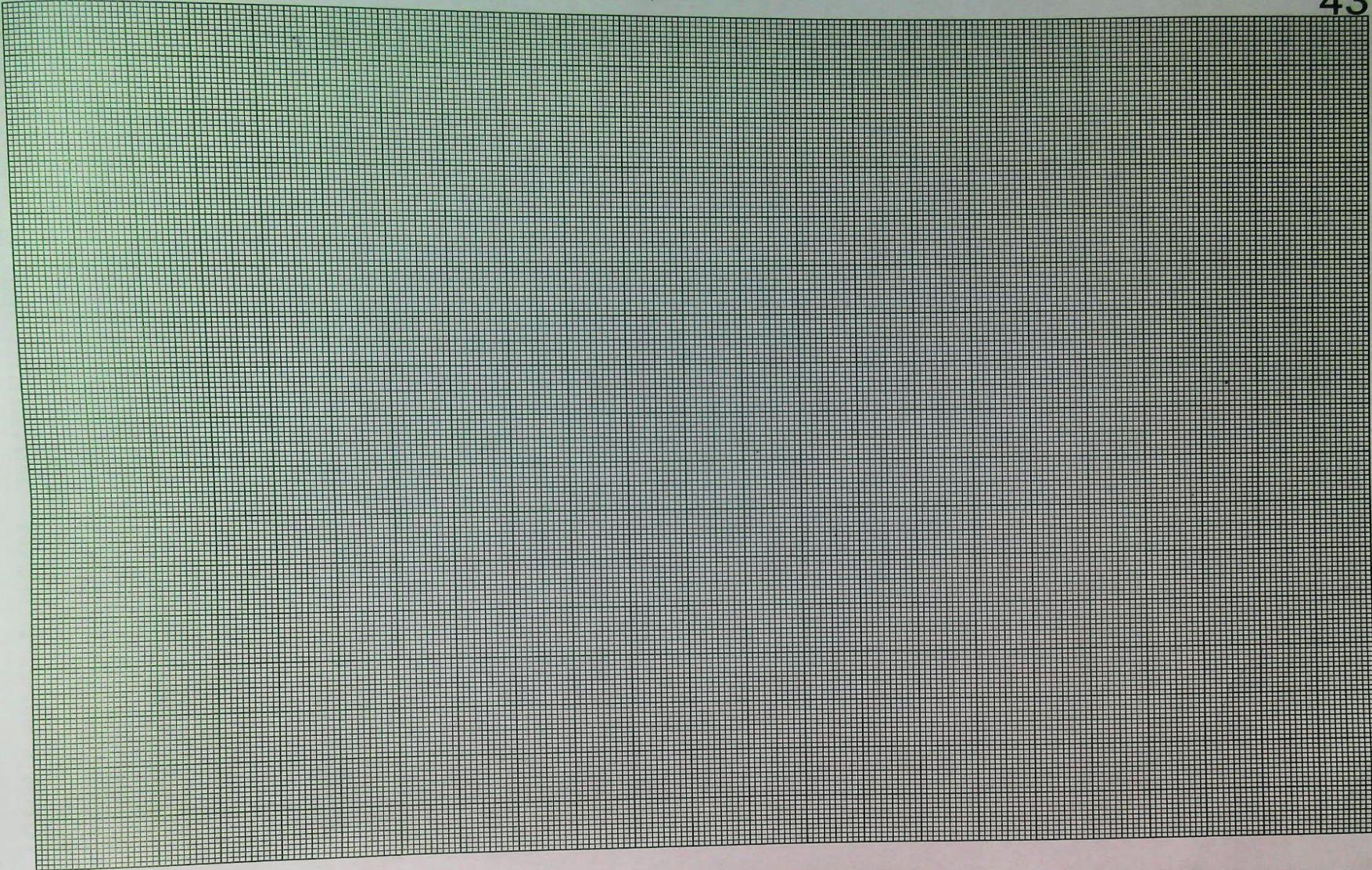
Paged segmentation,
 segmentation, paging

B. A B. B C A

No.

17	18	19	20	21	22
0	3	9	11	15	

17	18	19	20	21
0	1	2	3	4



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