Experiential Learning

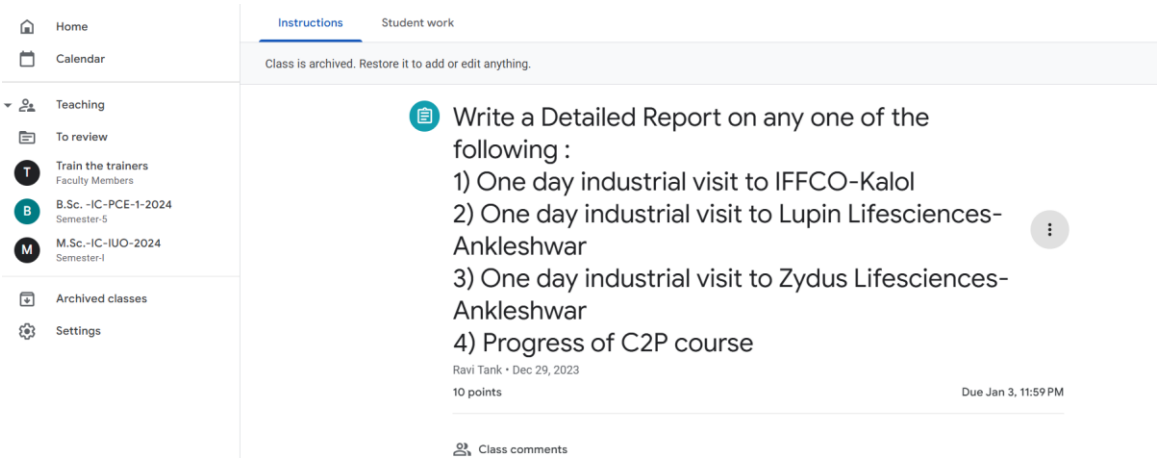
2.3.1	***Student centric methods, such as experiential learning, participative learning and problem solving methodologies are used for enhancing learning experience and teachers use ICT-enabled tools including online resources for effective teaching learning process)***

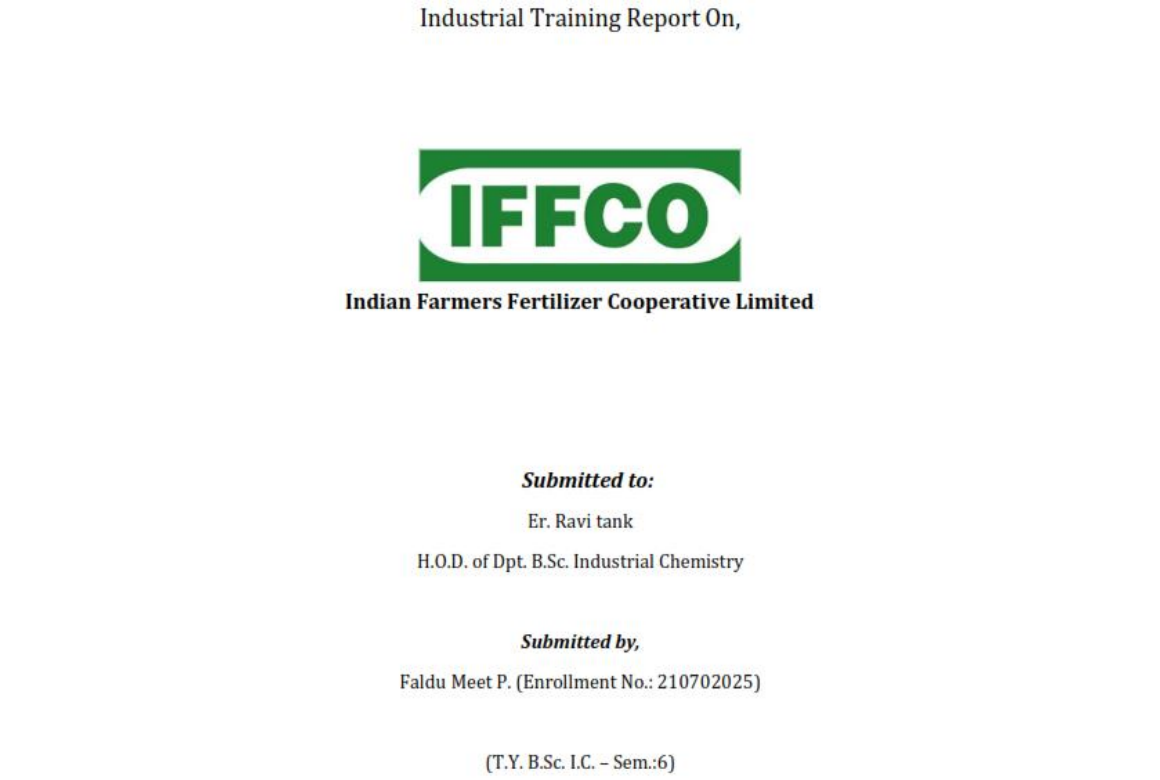
Abstract for Documentary Evidence

Details	Documentary Evidence	Page Number	View Document
Experiential Learning Methods	On Site demonstrative teaching	**2**	
	Skill Based Assignment	**13**	

1. On Site demonstrative teaching

At Atmiya University, we actively incorporate On-Site Demonstrative Teaching as part of our learning methodology through industrial tours. These tours provide students with practical exposure to real-world industrial processes, helping them bridge the gap between theoretical knowledge and its application. Below are some pictures and details showcasing our students' participation in these enriching experiences.





Industrial Training Report On,

IFFCO

Indian Farmers Fertilizer Cooperative Limited

Submitted to:

Er. Ravi tank

H.O.D. of Dpt. B.Sc. Industrial Chemistry

Submitted by,

Faldu Meet P. (Enrollment No.: 210702025)

(T.Y. B.Sc. I.C. – Sem.:6)

Details of journey

Dpt. Of B.Sc. I.C. had organized am industrial visit on 27TH Dec. 2023 To IFFCO Located in Kalol- Gujarat. The Visit Was Organized With Prior Permission and Guidliance Of Man. T. Swami.

We Started Travelling From The College Campus At 04:30 PM Via Our College Bus On 27th Dec. 2023 Along With Our H.O.D. and Faculties. We Reached To the IFFCO Promises At Kalol With In 05:30 Hrs.

At 05 PM, we left IFFCO for Haridham next Morning, we came back to Rajkot.

Company profile

IFFCO is headquartered in New Delhi, India. Started in 1967 with 57 member cooperatives, it is today the biggest co-op in the world by turnover on GDP per capita (as per World Cooperative Monitor 2021), with around 35,000 member cooperatives reaching over 50 million Indian farmers.

Company structure

The IFFCO Kalol Unit, spread over on 96 hectors of land is located 26 kms. Away from Ahmadabad on the Ahmadabad Mehsana state highway. The unit started commercial production in April 1975. The unit consists of plant to produce ammonia, urea, liquid carbon dioxide and dry ice along with offsite. Originally the 910 tpd ammonia plant was based on natural gas steam reforming process of M/s. M. W. Kellogg, USA and 1200 tpd urea plant was based on co2 stripping process of M/S Stamicarbon, The Netherlands. Both the plant have revamped in 1997 to enhance capacity to 1100 tpd ammonia and 1650 tpd urea. RLNG is used as feed stock for ammonia and associated gas as fuel. Water is supplied from Narmada Canal from Jaspur. Power is supplied by GEB.

Various Plants:

Ammonia Plant:

The plant is being designated to produce 1150 metric-tones of ammonia per day based on M. W. Kellogg Steam Reforming Process of USA. RLNG is used for ammonia production is supplied by Reliance Petrochemicals. From total production, about 950 metric-tons ammonia per day is used in the urea plant and remaining is stored in atmospheric storage tank.

Urea plant:

The 1650 metric-tons per day plant is based on Stamicarbon CO2 Stripping process engineered by Humphreys and Glasgow, U.K. The main raw material ammonia and carbon dioxide are from ammonia plant.

Utility plant:

(1) Water Treatment Plant

(I) Cooling Towers

(III) Air Compressor and Inert Gas Generation

(IV) Steam Generation

Offsite plant:

(1) Storage Tanks

(II) Narmada Water Treatment Plant

(III) Effluent Treatment Plant

Organizational structure:

Head office of IFFCO is located at New Delhi. It houses corporate staff function as:

(1) Engineering Service Division

(II) Management Service Division

(III) Finance and Accounts

(IV) Personnel and Administration

(V) Marketing

Product:

There are produce many fertilizer product but we visit only urea production plant through ammonia production plant.

Process Units:

Ammonia: 1160 Tons / Day

Urea: 1650 Tons / Day

Offsite & Utilities:

Water Treatment plant: 2570 Tons / Day

Steam Generation Plant: 1920 Tons / Day

Instrument and Plant Air: 1800 Nm3 / hr

Cooling Tower: 22900 Tons / Day

Raw Water Storage: 2600 m3

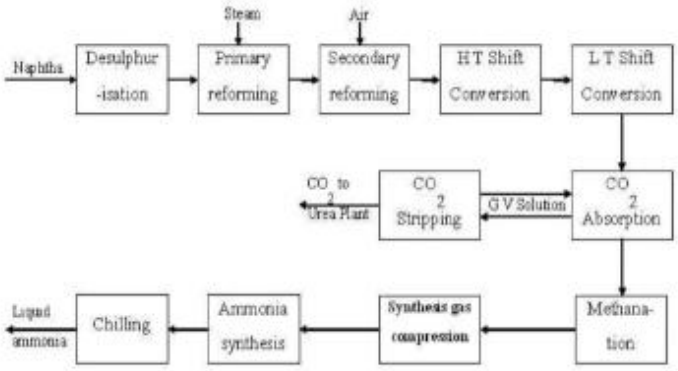
Process:

Ammonia Manufacturing Plant

Ammonia plant of IFFCO-Kalol was commissioned in 1974 based on natural gas steam reforming process which follows following stages one by one.

- ✓ Natural gas desulfurization
- ✓ Catalytic Steam Reforming
  - o Primary steam reforming
  - o Secondary steam reforming
- ✓ Carbon monoxide shift (HT & LT)
- ✓ Carbon dioxide removal
- ✓ Methanation
- ✓ Ammonia synthesis

Flow diagram of ammonia synthesis by air reforming process:-



Production of Urea

The production of urea from ammonia involves a series of chemical reactions in a process commonly known as the Haber-Bosch process. Here is an overview of the main steps:

1. Ammonia Synthesis:

Ammonia is the starting material for urea production.

Nitrogen gas (N_2) and hydrogen gas (H_2) are reacted in the presence of a catalyst (usually iron or iron oxide) at high pressure (around 200 to 300 atmospheres) and high temperature (400 to 500 degrees Celsius).

$$N_2 + 3H_2 \longrightarrow 2NH_3$$

2. Ammonia Purification:

The produced ammonia contains impurities, such as unreacted nitrogen and hydrogen, as well as traces of other gases. The ammonia is purified to remove these impurities.

3. Carbon Dioxide Stripping:

Urea synthesis involves the reaction of ammonia with carbon dioxide (CO_2).

Carbon dioxide is stripped from the urea solution or reaction mixture to enhance the reaction with ammonia.

4. Urea Synthesis:

Ammonia and carbon dioxide are reacted in a high-pressure reactor to form ammonium carbamate, an intermediate compound.

$$2NH_3 + CO_2 \longrightarrow NH_2COONH_4$$

5. Urea Formation:

- Ammonium carbamate decomposes to form urea and water.

$$NH_2COONH_4 \longrightarrow (NH_2)_2CO + H_2O$$

6. Concentration:

The urea solution is concentrated to increase the urea content and remove excess water.

7. Crystallization:

Urea is then crystallized from the concentrated solution, forming solid urea crystals.

8. Drying:

The urea crystals are dried to remove any remaining moisture, producing a granular or prilled urea product.

9. Quality Control:

Stringent quality control measures are implemented throughout the process to ensure the urea meets industry standards.

10. Packaging:

The final urea product is packaged into bags or other containers suitable for storage and transportation.

Group observations and learning's

General points that our group might have observed or learned during the visit:

1. Manufacturing Processes:

- Understanding the intricacies of urea production, from ammonia synthesis to the final product.

- Observing the technology and machinery involved in each step of the manufacturing process.

2. Safety Protocols:

- Noting the strict adherence to safety measures and protocols within the plant.

- Learning about the importance of safety in the chemical industry.

3. Environmental Practices:

- Observing any environmentally friendly practices implemented by IFFCO.

- Gaining insights into how the company addresses environmental sustainability.

4. Quality Control:

- Understanding the rigorous quality control measures in place to ensure the final product meets industry standards.

- Learning about the testing procedures used to maintain product quality.

5. Organizational Structure:

- Observing the organizational structure of IFFCO Kalol Plant and understanding the roles of different departments.

- Learning how effective communication and coordination contribute to the smooth functioning of the plant.

6. Technology and Innovation:

- Witnessing the use of advanced technology and innovative processes in urea production.

- Understanding how technological advancements contribute to efficiency and product quality.

7. Employee Roles and Responsibilities:

- Interacting with IFFCO personnel to understand their roles and responsibilities.

- Gaining insights into the teamwork and collaboration required for successful plant operations.

8. Industry Compliance:

- Observing how IFFCO complies with industry regulations and standards.

- Understanding the importance of adhering to legal and regulatory requirements in the chemical industry.

9. Supply Chain and Distribution:

- Learning about the logistics involved in the supply chain and distribution of urea products.

- Observing how IFFCO ensures timely and efficient product delivery to end-users.

10. Overall Impression:

- Sharing collective impressions of the visit, including any surprises or notable aspects.

- Reflecting on how the visit contributed to a better understanding of the fertilizer manufacturing industry.

Encourage members of our group to share their individual perspectives and takeaways, as this can lead to a more comprehensive understanding of the visit.

Our experience from the industrial visit

- Provides an insight into the real working environment
- Industrial visits provide me an insight into the real working environment, workstations, plants, assembly lines, machines, systems, and interact with highly trained and experienced personnel.
- **Provides an opportunity to plan, organize and engage things:** like, Industries are working on rules and regulations. They have a proper time set for every work.
- A good opportunity to interact with the experts.
- During the industrial visits, the I get a chance to experience and learn to manage what professionals live, study various management concepts like 'Just In Time' or Lean manufacturing, and the way they're put into action. It's very challenging to manage hundreds of skilled and unskilled workers at the same time and meet the stringent quality norms and production targets of the company.

Conclusions

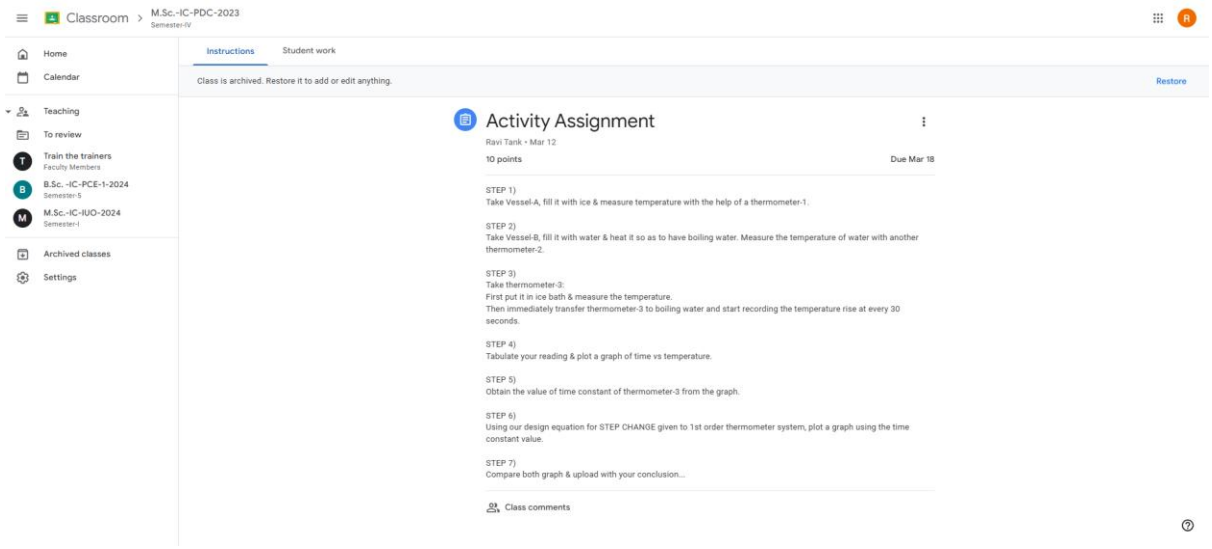
Our visit to IFFCO Kalol Plant provided a profound insight into the intricate world of fertilizer manufacturing. The journey through the various stages of urea production, from ammonia synthesis to the final granulated product, showcased the meticulous processes and advanced technologies employed by IFFCO. The commitment to safety was evident throughout the plant, underlining the company's dedication to maintaining a secure working environment.

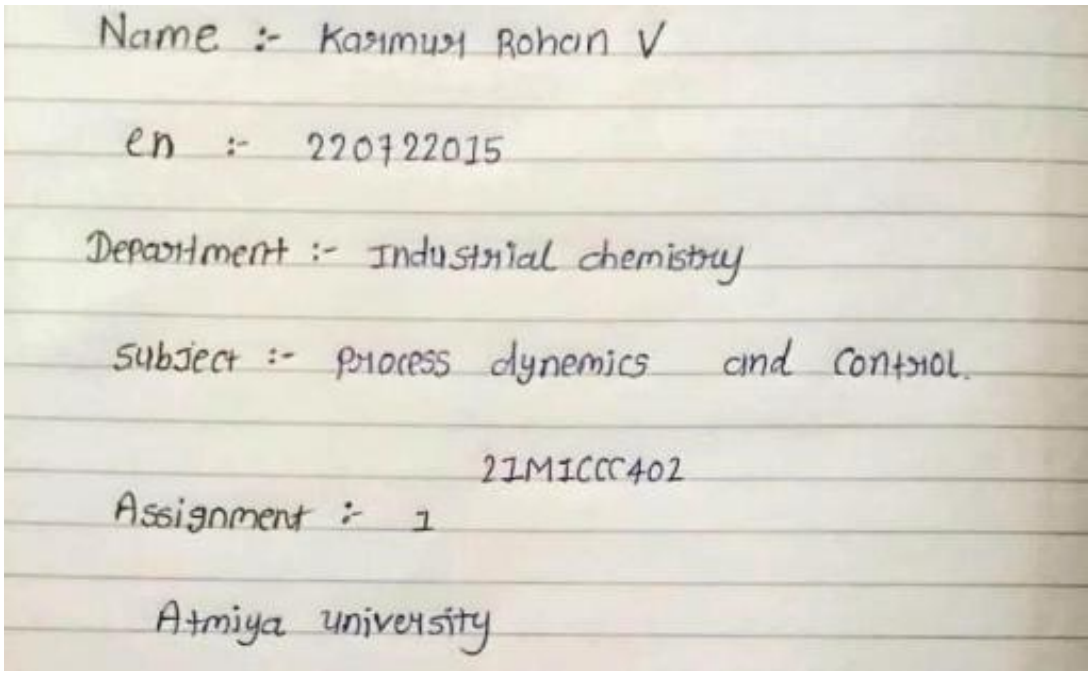
Witnessing the seamless coordination among different departments emphasized the significance of effective organizational structure and communication. The emphasis on quality control measures highlighted IFFCO's unwavering commitment to delivering products that meet stringent industry standards.

In conclusion, the IFFCO tour was a valuable educational experience, offering a blend of theoretical knowledge and practical insights. The visit not only deepened our understanding of the fertilizer manufacturing industry but also ignited a profound appreciation for the complexity and precision involved in ensuring the production of high-quality agricultural products. We extend our gratitude to IFFCO for opening its doors and providing us with this enriching opportunity.

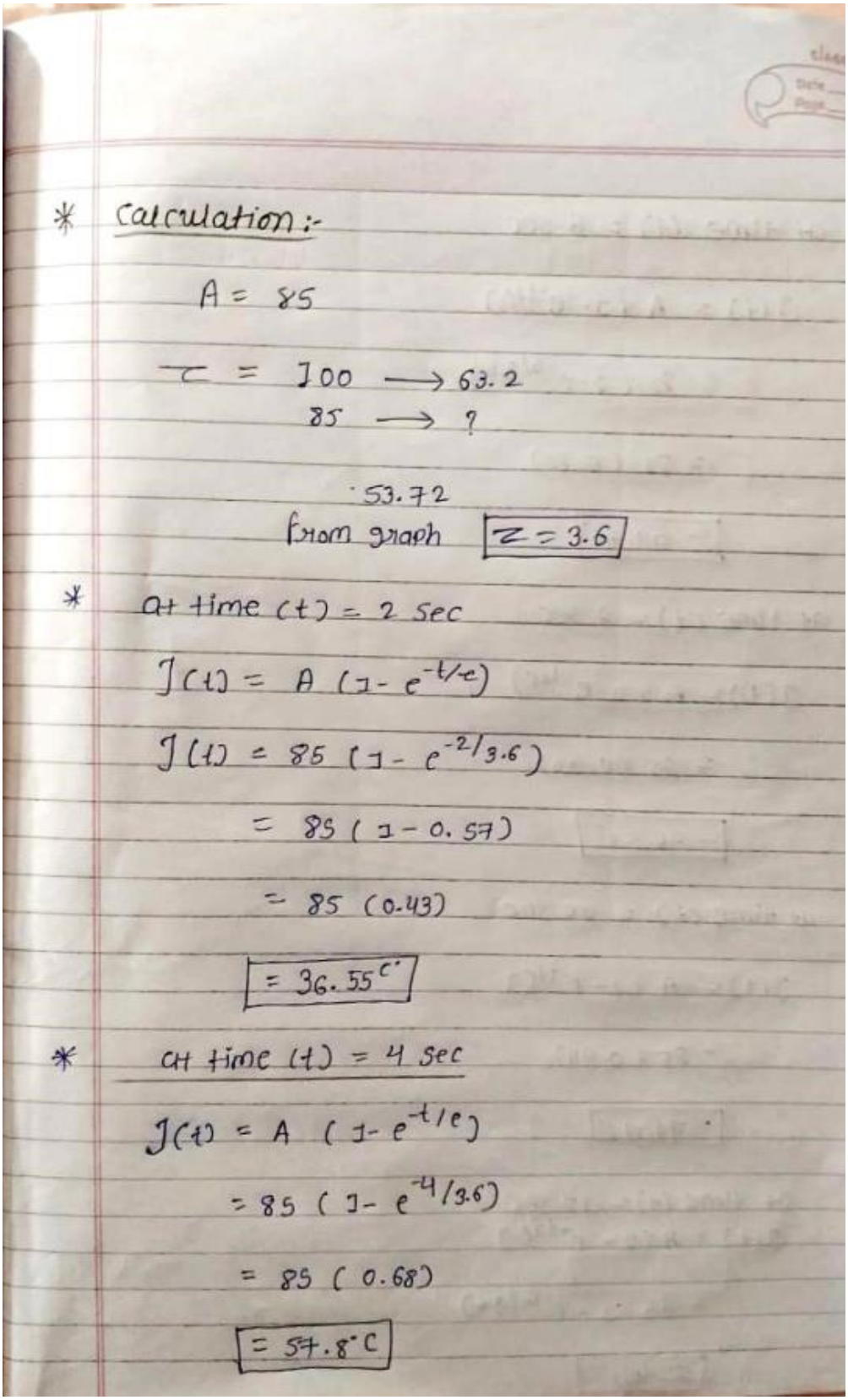
2. Skill Based Assignment

At Atmiya University, we emphasize Skill-Based Assignments to enhance students' practical abilities and align their learning with industry requirements. These assignments focus on applying theoretical knowledge to real-world scenarios, fostering critical thinking, creativity, and problem-solving skills. Below are examples and details of how students engage with such assignments, showcasing our commitment to skill development and hands-on learning.





time (seconds)	temperature (c) (thermometer)	temperature (c)
2	40	36.55
4	57	57.80
6	68	69.70
8	73	76.50
10	77	79.90
12	80	82.45
14	82	83.30
16	83	84.15
18	84	84.49
20	84	84.74
22	84	84.83
24	85	84.92
26	85	84.94
28	85	84.96
30	85	84.98
32	85	84.99



* Calculation :-

A = 85

τ = 100 ⟶ 63.2

85 ⟶ ?

53.72

From graph $\boxed{\tau = 3.6}$

* At time (t) = 2 sec

$J(t) = A\,(1 - e^{-t/\tau})$

$J(t) = 85\,(1 - e^{-2/3.6})$

$= 85\,(1 - 0.57)$

$= 85\,(0.43)$

$\boxed{= 36.55^{\circ}C}$

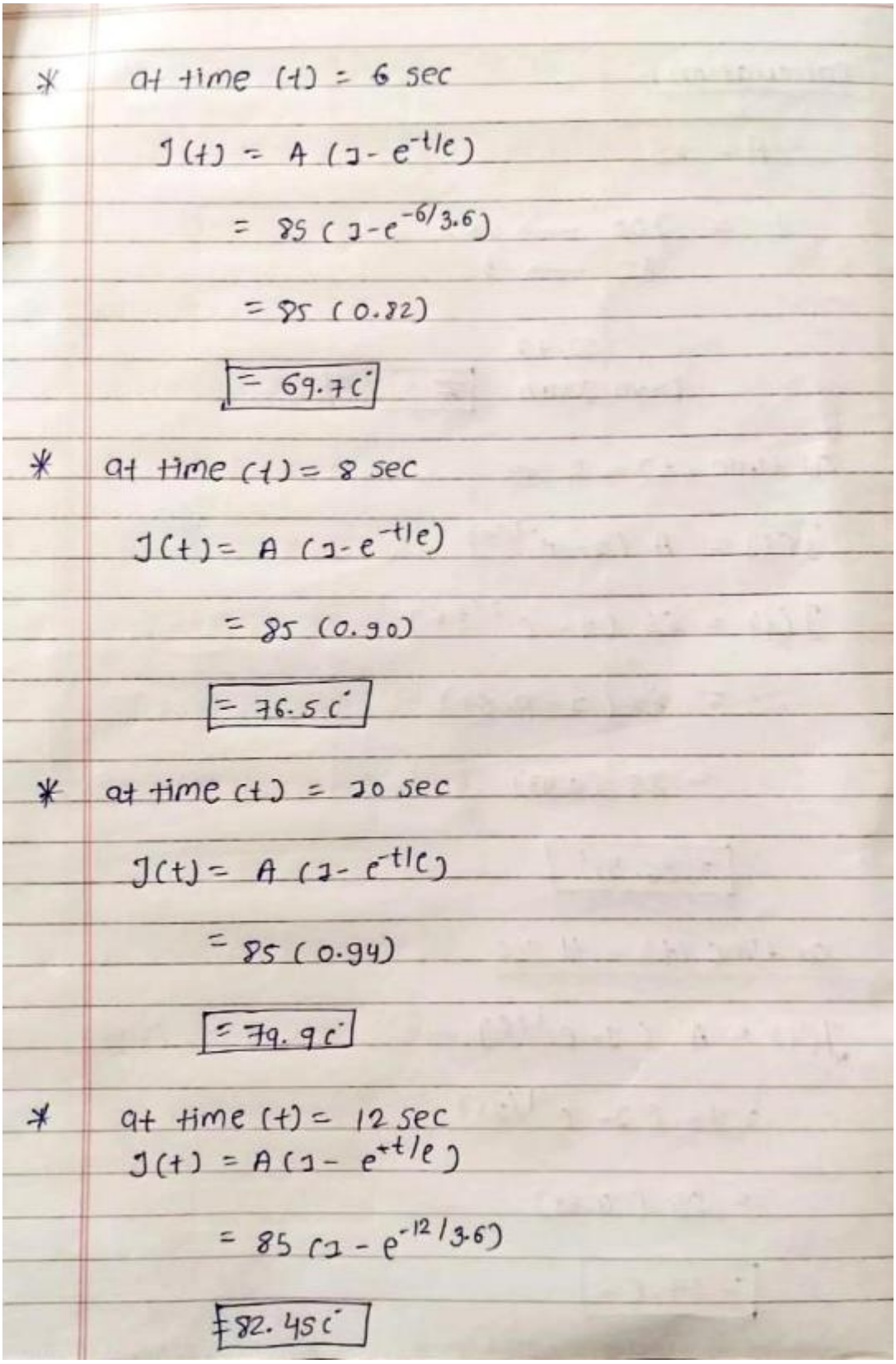
* At time (t) = 4 sec

$J(t) = A\,(1 - e^{-t/\tau})$

$= 85\,(1 - e^{-4/3.6})$

$= 85\,(0.68)$

$\boxed{= 57.8^{\circ}C}$



* at time (t) = 6 sec

$T(t) = A(1 - e^{-t/\tau})$

$= 85(1 - e^{-6/3.6})$

$= 85(0.82)$

$= 69.7°C$

* at time (t) = 8 sec

$T(t) = A(1 - e^{-t/\tau})$

$= 85(0.90)$

$= 76.5°C$

* at time (t) = 20 sec

$T(t) = A(1 - e^{-t/\tau})$

$= 85(0.94)$

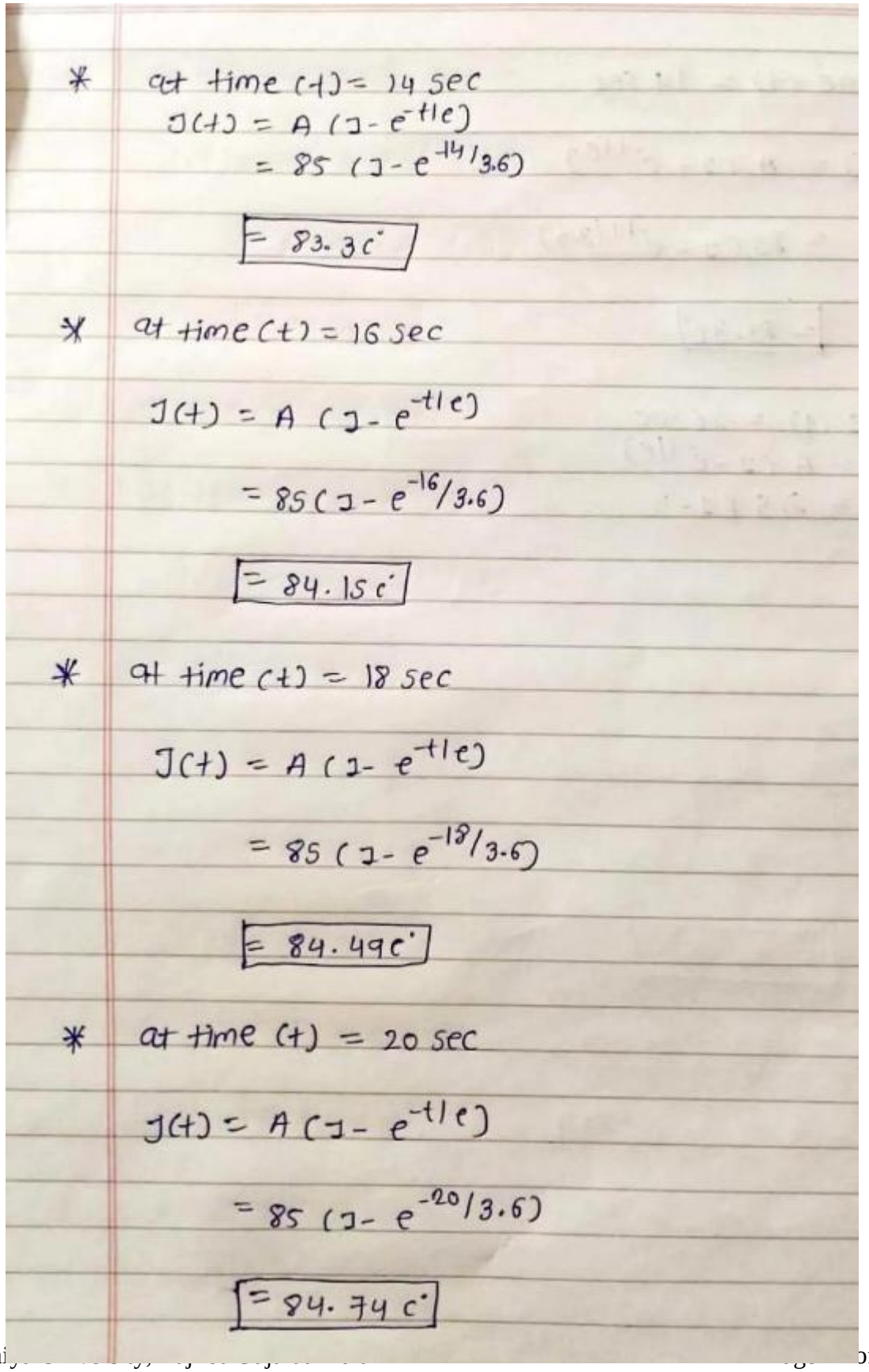
$= 79.9°C$

* at time (t) = 12 sec

$T(t) = A(1 - e^{-t/\tau})$

$= 85(1 - e^{-12/3.6})$

$= 82.45°C$



* at time (t) = 14 sec

$T(t) = A(1 - e^{-t/e})$

$= 85(1 - e^{-14/3.6})$

$= 83.3c^{\circ}$

* at time (t) = 16 sec

$T(t) = A(1 - e^{-t/e})$

$= 85(1 - e^{-16/3.6})$

$= 84.15c^{\circ}$

* at time (t) = 18 sec

$T(t) = A(1 - e^{-t/e})$

$= 85(1 - e^{-18/3.6})$

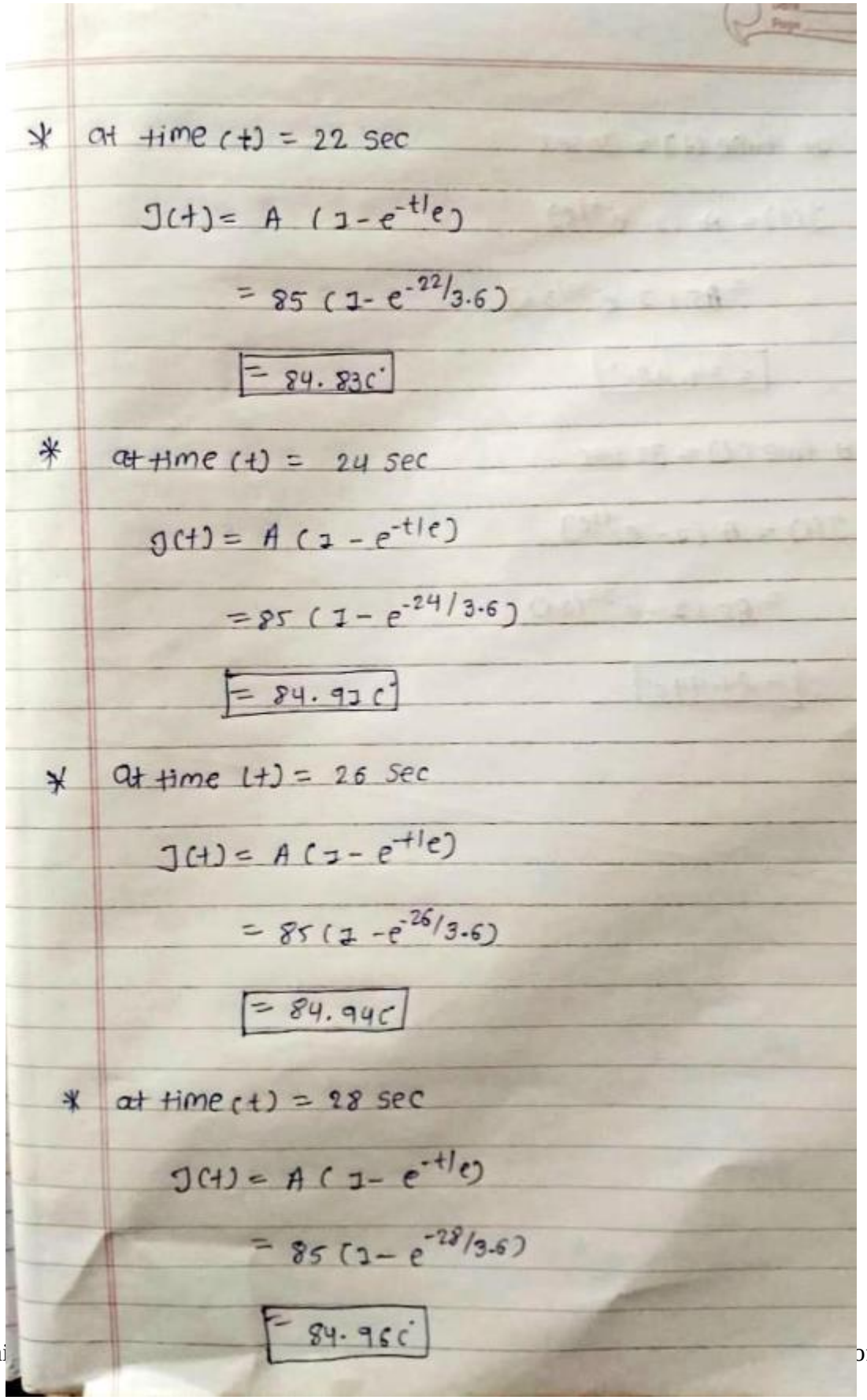
$= 84.49c^{\circ}$

* at time (t) = 20 sec

$T(t) = A(1 - e^{-t/e})$

$= 85(1 - e^{-20/3.6})$

$= 84.74c^{\circ}$



* at time (t) = 22 sec

$$T(t) = A\,(1 - e^{-t/e})$$

$$= 85\,(1 - e^{-22/3.6})$$

$$= 84.83C$$

* at time (t) = 24 sec

$$T(t) = A\,(1 - e^{-t/e})$$

$$= 85\,(1 - e^{-24/3.6})$$

$$= 84.97C$$

* at time (t) = 26 sec

$$T(t) = A\,(1 - e^{-t/e})$$

$$= 85\,(1 - e^{-26/3.6})$$

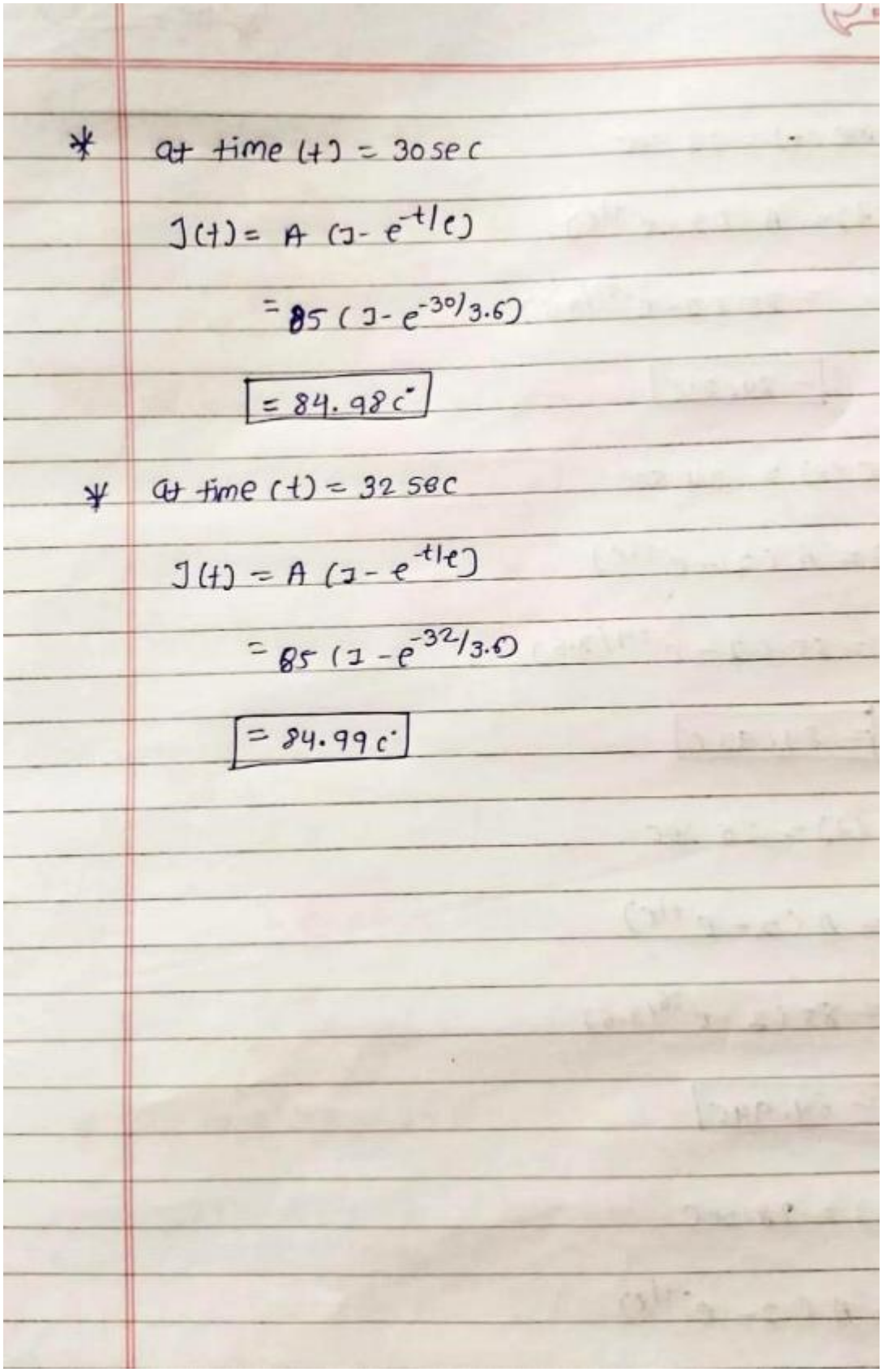
$$= 84.94C$$

* at time (t) = 28 sec

$$T(t) = A\,(1 - e^{-t/e})$$

$$= 85\,(1 - e^{-28/3.6})$$

$$= 84.95C$$



* at time (t) = 30 sec

$$I(t) = A(1 - e^{-t/\tau})$$

$$= 85(1 - e^{-30/3.6})$$

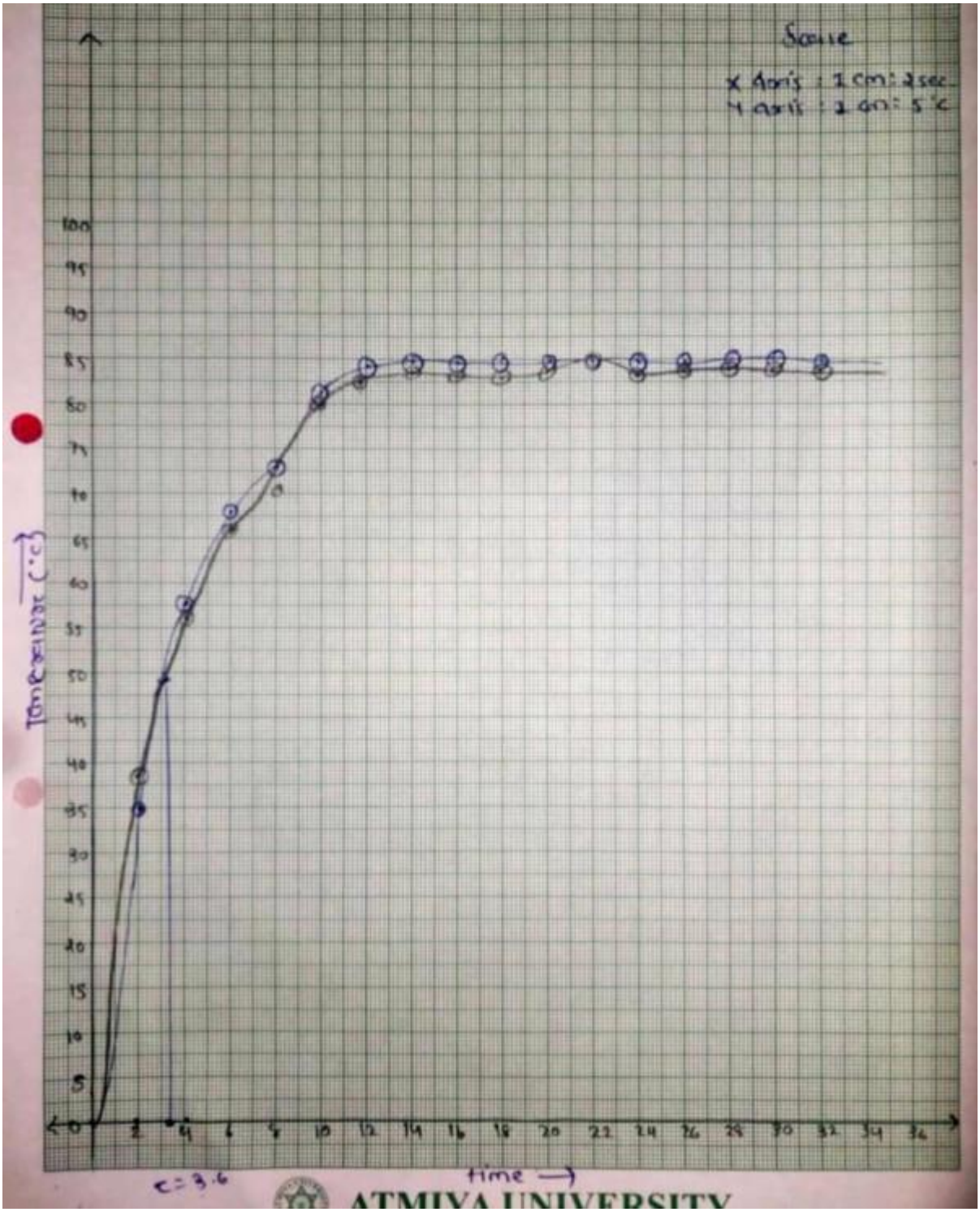
$$= 84.98 c^{\cdot}$$

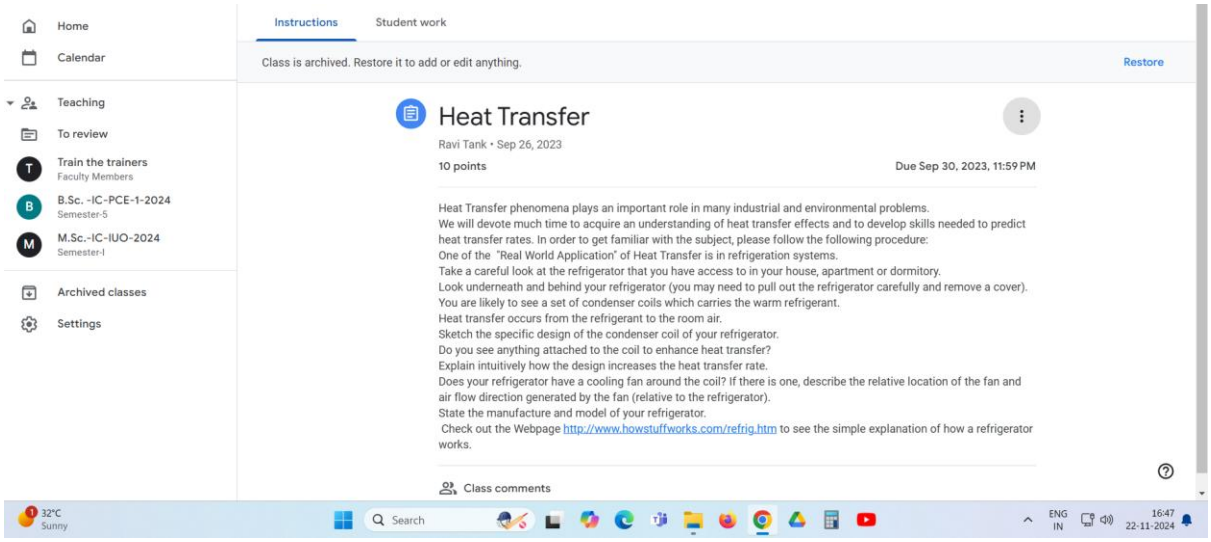
* at time (t) = 32 sec

$$I(t) = A(1 - e^{-t/\tau})$$

$$= 85(1 - e^{-32/3.6})$$

$$= 84.99 c^{\cdot}$$


Scale
x Axis : 1 cm : 2 sec
y axis : 2 cm : 5°C
Temperature (°C)
time →
ATMIYA UNIVERSITY


Home
Calendar
Teaching
To review
Train the trainers
Faculty Members
B.Sc. -IC-PCE-1-2024
Semester-5
M.Sc.-IC-IUO-2024
Semester-I
Archived classes
Settings
Instructions
Student work
Class is archived. Restore it to add or edit anything.
Restore
Heat Transfer
Ravi Tank • Sep 26, 2023
10 points
Due Sep 30, 2023, 11:59 PM
Heat Transfer phenomena plays an important role in many industrial and environmental problems.
We will devote much time to acquire an understanding of heat transfer effects and to develop skills needed to predict heat transfer rates. In order to get familiar with the subject, please follow the following procedure:
One of the "Real World Application" of Heat Transfer is in refrigeration systems.
Take a careful look at the refrigerator that you have access to in your house, apartment or dormitory.
Look underneath and behind your refrigerator (you may need to pull out the refrigerator carefully and remove a cover).
You are likely to see a set of condenser coils which carries the warm refrigerant.
Heat transfer occurs from the refrigerant to the room air.
Sketch the specific design of the condenser coil of your refrigerator.
Do you see anything attached to the coil to enhance heat transfer?
Explain intuitively how the design increases the heat transfer rate.
Does your refrigerator have a cooling fan around the coil? If there is one, describe the relative location of the fan and air flow direction generated by the fan (relative to the refrigerator).
State the manufacture and model of your refrigerator.
Check out the Webpage http://www.howstuffworks.com/refrig.htm to see the simple explanation of how a refrigerator works.
Class comments
32°C
Sunny
Search
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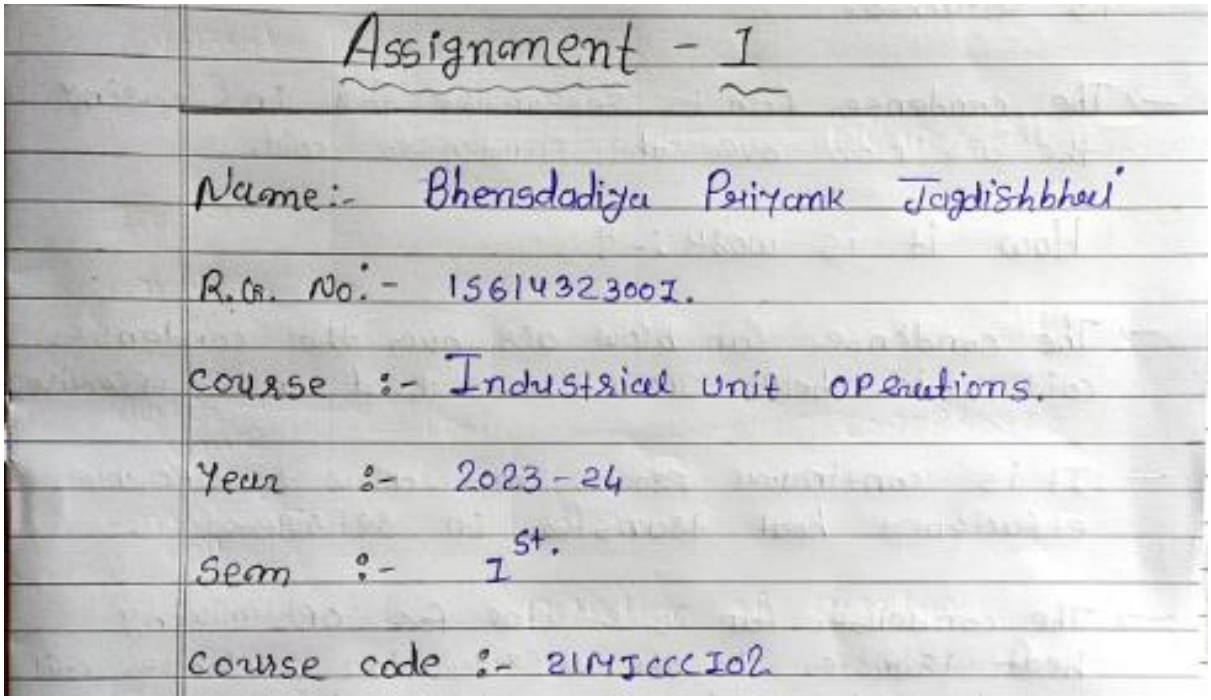
22-11-2024


Assignment - 1
Name:- Bhensdadiya Priyank Jagdishbhai
R.G. No:- 156143230031.
Course :- Industrial unit operations.
Year :- 2023-24
Sem :- 1st.
Course code :- 21MJCCC101

Date :
Page :

. 01 / Bhensdadiya Priyank J.

(1) Do you see anything attached to the coil to enhance heat transfer ?

→ condenser coil, a device called condenser fan is attached.

→ The condenser fan is responsible for increasing the air flow over the condenser coil.

How it is work :- ?

→ The condenser fan blow air over the condenser coil, which helps carry away heat more effectively

→ It is continuous process and allow to operate effacienty heat transfer in refrigerator.

→ The condenser fan is crucial for optimizing heat transfer in the refrigeration condenser coil, ensuring the appliance can effectively cool its contensets.

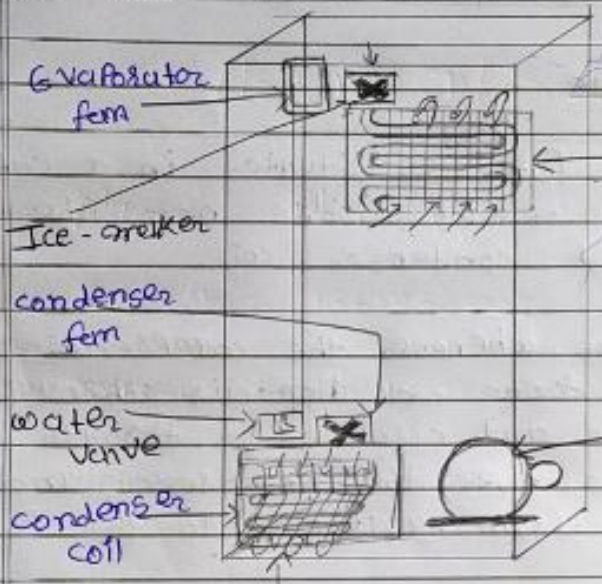
(A) size & Shape :-

→ Larger fridges may need more powerful system to maintain low temperature.

02 / Bhensdadiya Priyank J.

Date :
Page :

(2.) Does your refrigeration have a cooling fan around the coil? describe the relative location of the fan and air flow direction generated by the fan.



Evaporater fan :-

→ Hot air being forced through the circulate by the fan.

Water Valve :-

→ When the ice maker fills with water, a buzzing around and running water will be start.

Date :
Page :

01 | Bhensdadiya Priyank J.

Ice-water :- Ice - melter :-

→ occasionally you will here ice - cubes dropping in to the ice- box.

Condenser fan :-

→ The condenser fan is situated in a cabinet at the bottom of the fridge, near the compresser and condenser coil.

→ The fans runs whenever the compresser runs and it draws cool room air through the front grile and circulate it through the condenser coils over the compressor and back out the front grille into the room.

Compresor :-

→ The compressor recieves low pressure gas from the evaporater and converts it to high pressure gas through compression.

Classroom > B.Sc.-IC-PCE-I-2023
Semester-V

Instructions Student work

Class is archived. Restore it to add or edit anything. Restore

Fluid Mechanics (Experiential Assignment)

Ravi Tank • Sep 26, 2023 (Edited Oct 5, 2023)

10 points Due Oct 8, 2023, 11:59 PM

1) Select location like Home, office, industry etc.

2) Identify water taps and note its location.

3) Measure the diameter of the pipe.

4) Measure flow rates

a) When the valve is slightly open.

b) When the valve is partially open.

c) When the valve is fully open.

d) Collect 1 litre (L) of water & note down the time for collection of 1 L of water.

5) Calculate the flow rate.

6) Calculate Reynold's Number (N*RE*)

7) Comment the type of flow pattern on the basis of Reynold's Number.

8) Give sample calculation of any one reading.

Skip to main content

Tabulate your findings as below:

Meet Kathiriya 210702009

⇒ Fluid Mechanics: (Experimental Assignment)

→ Location ⇒ Home (Bathroom)

(A) When the valve is slightly open:

- D = Diameter of pipe = 2 cm = 0.02 meters
  ρ = Density of Fluid = 10^3 kg / m^3
  μ = Viscosity of fluid = 1 kg/m.s × 10^{-3} (kg/ms)

→ Time taken for 1 litre volume = 21 sec
so that 0.0476 litre/second.
Q = 4.76 × 10^{-5} m^3/second.

∴ Q = v A
∴ v = Q/A

$$= \frac{4.76\times10^{-5}}{\pi/4\,(D)^2} = \frac{4.76\times10^{-5}\times 4}{3.14\times(0.02)^2} = 0.15159 \text{ m/s}$$

⇒ Reynold's No. (NRe) $= \frac{D\,v\,\rho}{\mu} = \frac{0.02\times0.15159\times10^3}{1.002\times10^{-3}}$

$= 3.0318\times10^3$

$= 3031.8$

⇒ Type of Flow Rate = laminar flow
Transition Flow.
[NRe > 2100]

Meet Kathisiya 210702009

(B) When the Valve is partially open.

- D = Diameter of Pipe = 2 cm = 0.02 meters
  S = Density of fluid = 10^3 kg/m^3
  μ = Viscosity of fluid = 1.002×10^{-3} kg/ms.

→ Time taken for 1 litre volume = 7.08 sec.
so that 0.14124 litre / second
Q = 0.00014124 m^3/s

Q = 4 A
u = Q/A

$$= \frac{1.4124 \times 10^{-4}}{\pi/4 (D)^2}$$

$$= \frac{1.4124 \times 10^{-4} \times 4}{3.14 (0.02)^2}$$

$$= 0.4498 \text{ m/s}$$

⇒ Reynold's No. $(N_{Re}) = \frac{D \cdot u \cdot S}{\mu} = \frac{0.02 \times 0.4498 \times 10^3}{1.002 \times 10^{-3}}$

$$= 8978.04$$

⇒ Type of Flow Rate = Turbulent Flow
($N_{Re} > 4000$)

Meet Kathiriya 210702009

(c) When the valve is fully open:

- Diameter of Pipe = D = 2cm = 0.02 meter
  ρ = Density of water = 10^3 kg/m^3
  μ = Viscosity of water = 1.002×10^{-3} kg/ms

- Time taken for 1 litre volume = 3.98 sec.
  So that 0.02512 litre/sec.
  Q = 2.51×10^{-4} m^3/sec.

Q = u A
u = Q/A

$$= \frac{2.51 \times 10^{-4}}{\pi/4 \times (D)^2}$$

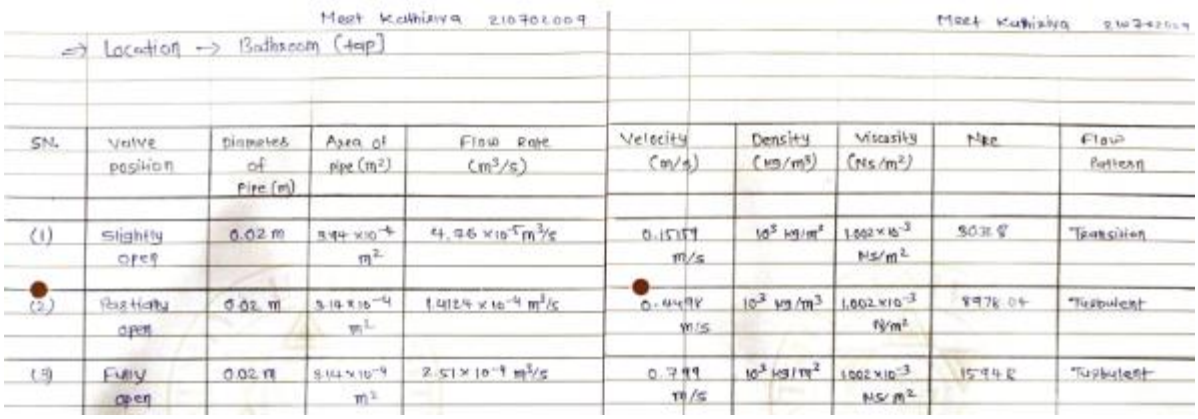
$$= \frac{2.51 \times 10^{-4} \times 4}{3.14 \times (0.02)^2}$$

$$= 0.799 \text{ m/s}$$

⇒ Reynold's No. (NRe) = $\frac{D.u.\rho}{\mu} = \frac{0.02 \times 0.799 \times 10^3}{1.002 \times 10^{-3}}$

$$= 15948$$

⇒ Type of Flow Rate = Transition Flow
(NRe > 4000)



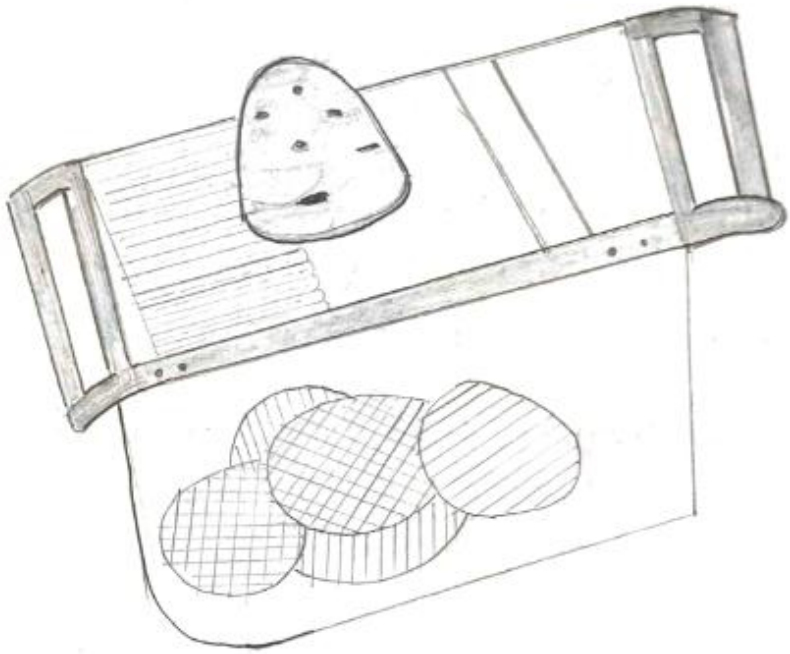
Meet Kathiriya 21070C0009

=> Location --> Bathroom (tap)

SN.	Valve position	Diameter of Pipe (m)	Area of pipe (m^2)	Flow Rate (m^3/s)	Velocity (m/s)	Density (kg/m^3)	Viscosity (Ns/m^2)	Nre	Flow Pattern
(1)	Slightly open	0.02 m	3.14×10^{-4} m^2	4.96×10^{-5} m^3/s	0.1579 m/s	10^3 kg/m^3	1.002×10^{-3} Ns/m^2	503.8	Transition
(2)	Partially open	0.02 m	3.14×10^{-4} m^2	1.4124×10^{-4} m^3/s	0.4497 m/s	10^3 kg/m^3	1.002×10^{-3} Ns/m^2	8976.04	Turbulent
(3)	Fully open	0.02 m	3.14×10^{-4} m^2	2.51×10^{-4} m^3/s	0.799 m/s	10^3 kg/m^3	1.002×10^{-3} Ns/m^2	15944.2	Turbulent

Name :- Dangar Malhar

Enrollment No.:- 220729008



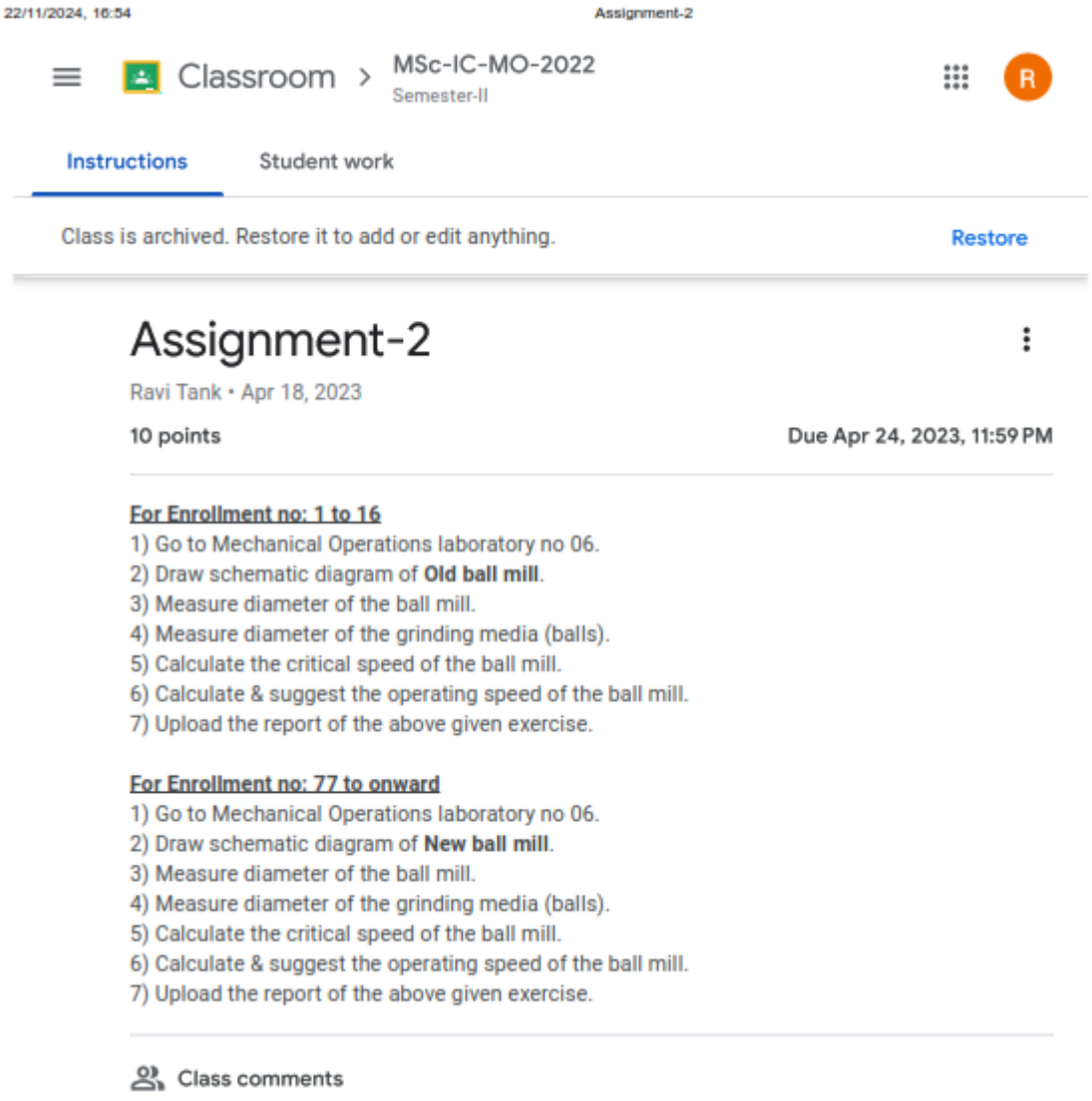
* Potato Slicer :-

→ This is manual size reduction equipment which used to slices the potato Or cut it in small pieces which commonly use at our home.

→ This equipment of size reduction is work on the principle of Shear.

→ Equipment is made up of Stainless steel

→ It is cheaper economical and Simple construction are the merits of this equipment.



22/11/2024, 16:54 Assignment-2

Classroom > MSc-IC-MO-2022
Semester-II

Instructions Student work

Class is archived. Restore it to add or edit anything. Restore

Assignment-2

Ravi Tank • Apr 18, 2023

10 points Due Apr 24, 2023, 11:59 PM

For Enrollment no: 1 to 16
1) Go to Mechanical Operations laboratory no 06.
2) Draw schematic diagram of **Old ball mill**.
3) Measure diameter of the ball mill.
4) Measure diameter of the grinding media (balls).
5) Calculate the critical speed of the ball mill.
6) Calculate & suggest the operating speed of the ball mill.
7) Upload the report of the above given exercise.

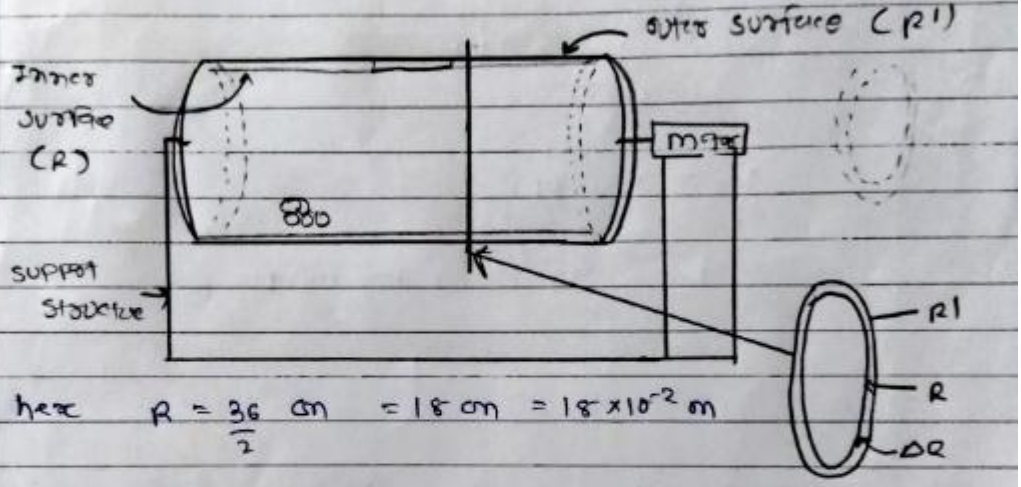
For Enrollment no: 77 to onward
1) Go to Mechanical Operations laboratory no 06.
2) Draw schematic diagram of **New ball mill**.
3) Measure diameter of the ball mill.
4) Measure diameter of the grinding media (balls).
5) Calculate the critical speed of the ball mill.
6) Calculate & suggest the operating speed of the ball mill.
7) Upload the report of the above given exercise.

Class comments

Name : Dare Prashant D.
(220722009)

Q:- Critical Speed of Ball mill

→ Diameter of the Ball mill = 36 cm
Diameter of the Ball mill = 14 cm



→ here $R = \frac{36}{2}$ cm $= 18$ cm $= 18 \times 10^{-2}$ m

$R = R' - \Delta R$

$r = \frac{14}{2}$ cm $= 7$ cm $= 7 \times 10^{-2}$ m

$g = 9.81$

→ Critical Speed $= N_c = \frac{1}{2\pi}\sqrt{\frac{g}{(R-r)}}$

$= \frac{1}{2 \times 3.14}\sqrt{\frac{9.81}{(18 \times 10^{-2} - 7 \times 10^{-2})}}$

$= \frac{1}{6.28}\sqrt{\frac{9.81}{0.18 - 0.07}}$

$$= \frac{1}{6.28}\sqrt{\frac{9.81}{0.11}}$$

$$N_c = \frac{1}{6.28}\sqrt{89.18}$$

$$N_c = \frac{1}{6.28} \times 9.44$$

$N_c = 1.50$ RPS

$N_c = 1.50 \times 60$

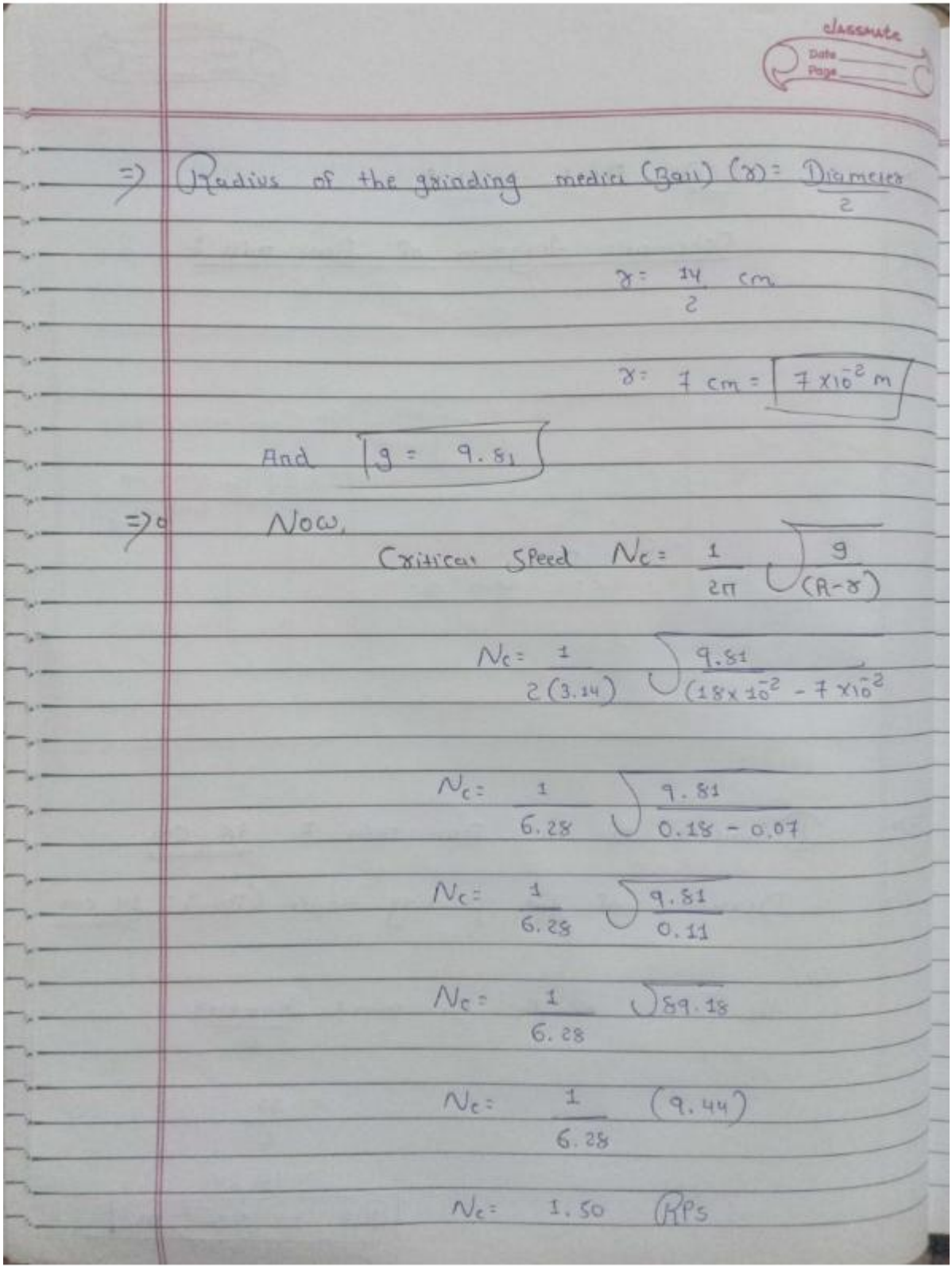
$N_c = 90$ Round Per minute

→ Now

Operating speed = 50 % (Critical speed)

$$= \frac{50}{100} \times 90$$

$$= 40 \text{ RPM}$$



=> Radius of the grinding media (Ball) (r) = Diameter / 2

$r = \frac{14}{2}$ cm

$r = 7$ cm = 7×10^{-2} m

And $g = 9.81$

=> Now,

Critical Speed $N_c = \frac{1}{2\pi} \sqrt{\frac{g}{(R-r)}}$

$N_c = \frac{1}{2(3.14)} \sqrt{\frac{9.81}{(18 \times 10^{-2} - 7 \times 10^{-2}}}$

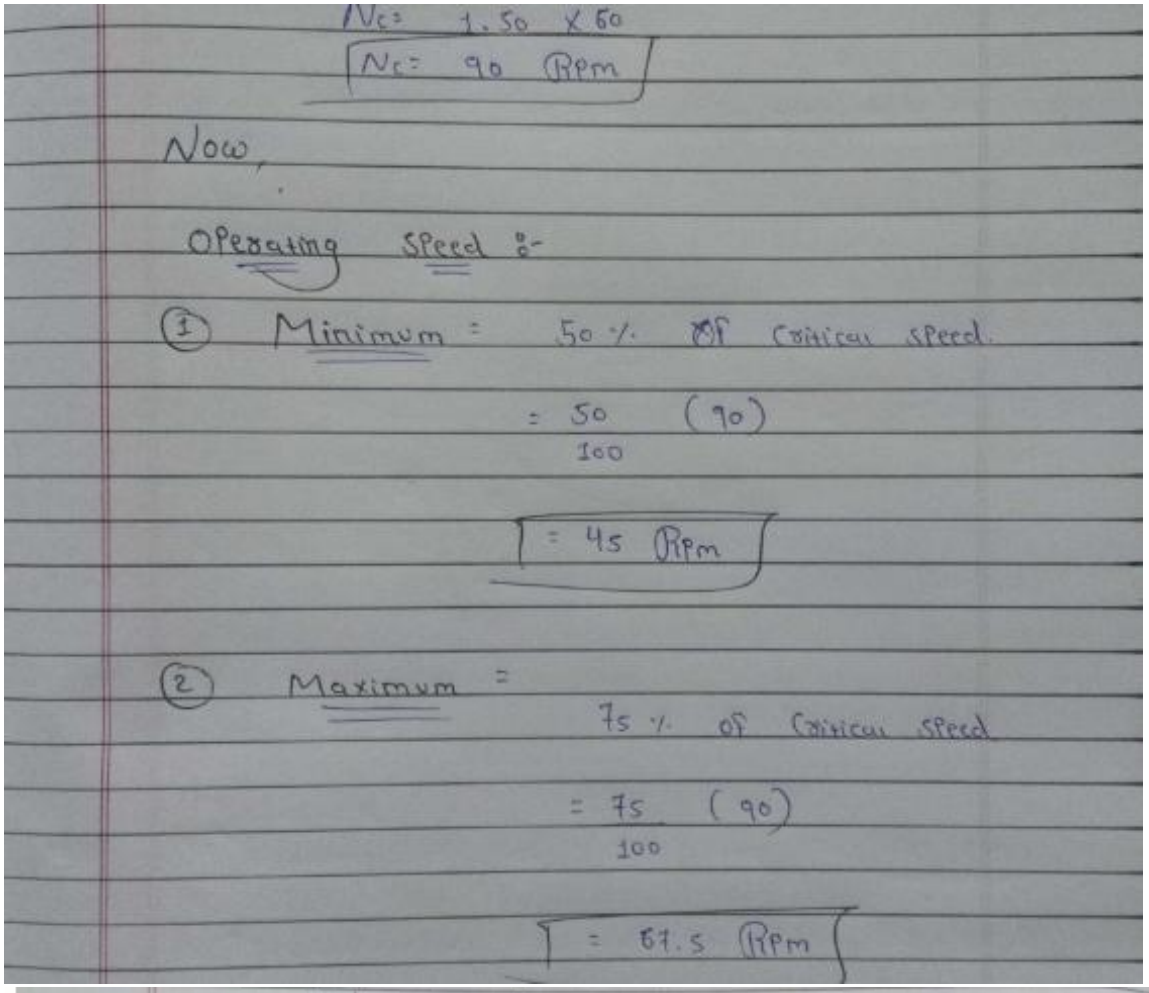
$N_c = \frac{1}{6.28} \sqrt{\frac{9.81}{0.18 - 0.07}}$

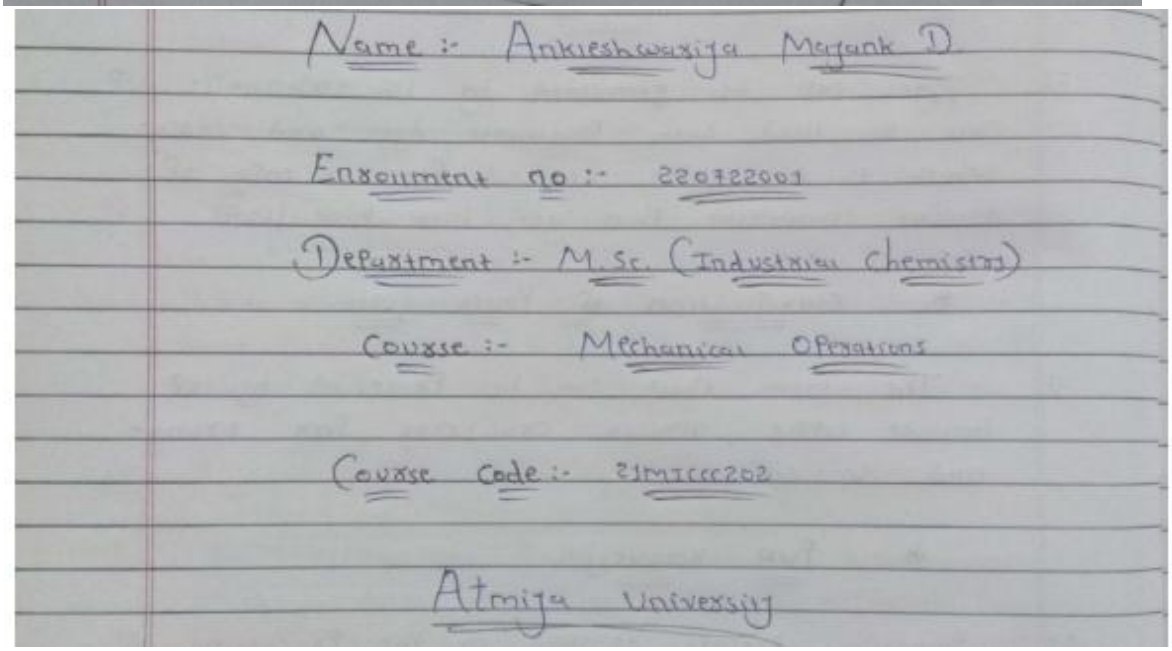
$N_c = \frac{1}{6.28} \sqrt{\frac{9.81}{0.11}}$

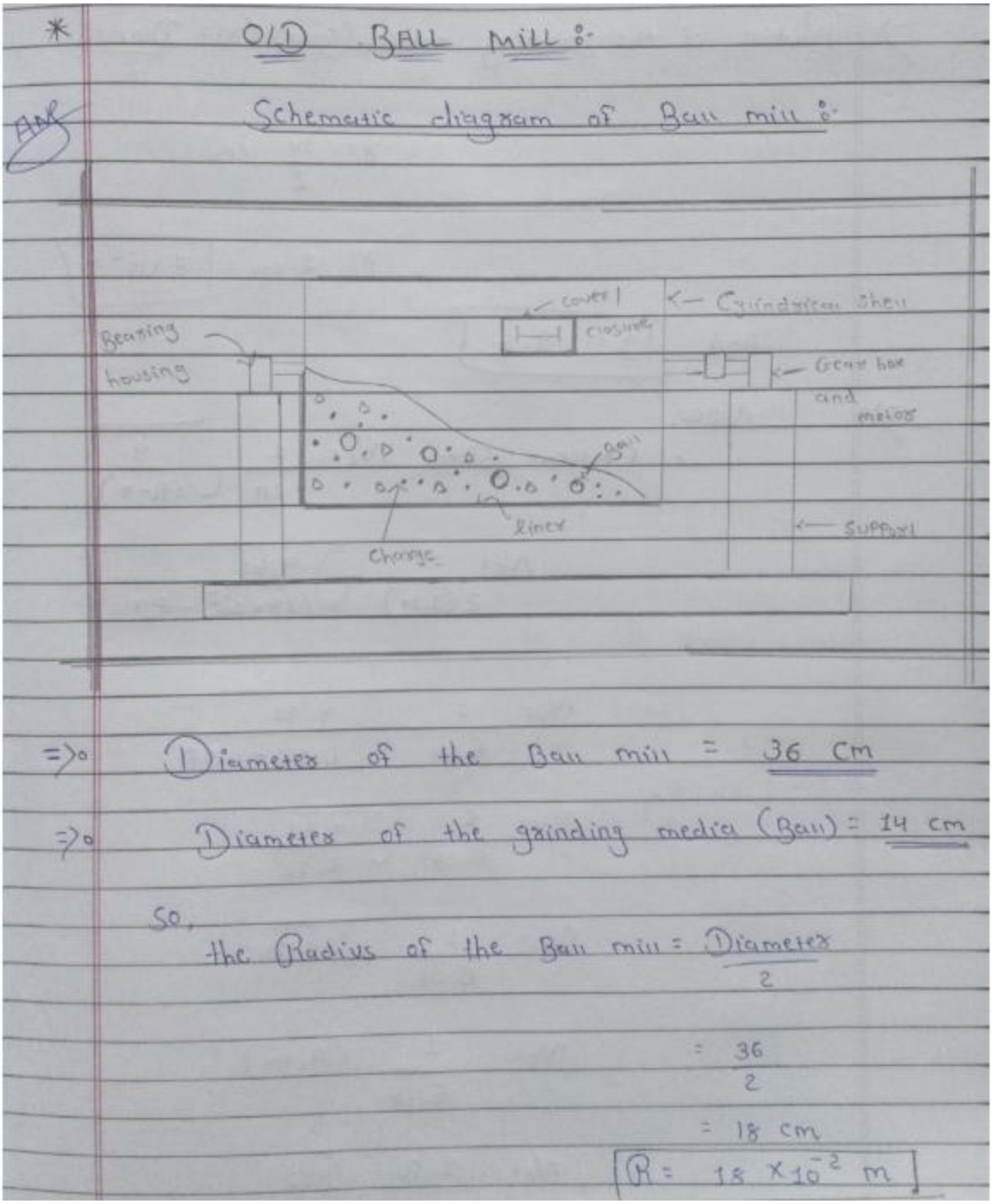
$N_c = \frac{1}{6.28} \sqrt{89.18}$

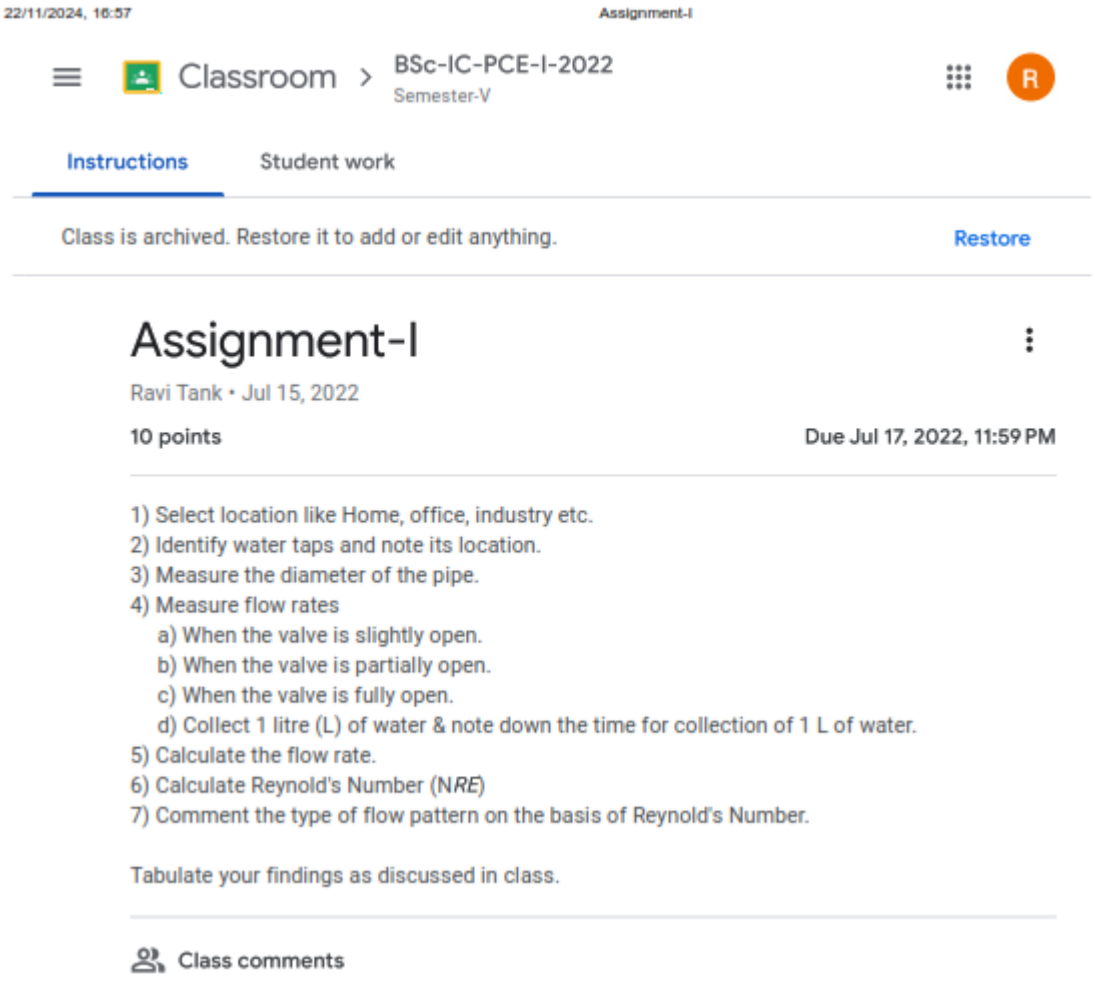
$N_c = \frac{1}{6.28} (9.44)$

$N_c = 1.50$ RPS


Nc = 1.50 X 60
Nc = 90 Rpm
Now,
Operating Speed :-
(1) Minimum = 50 % of Critical speed.
= 50/100 (90)
= 45 Rpm
(2) Maximum =
75 % of Critical speed
= 75/100 (90)
= 67.5 Rpm


Name :- Ankleshwariya Mayank D
Enrollment no :- 2207222001
Department :- M.Sc. (Industrial Chemistry)
Course :- Mechanical Operations
Course Code :- 21MICCC202
Atmiya University


* OLD BALL MILL :-
Schematic diagram of Ball mill :-
Bearing housing
cover / closure
Cylindrical shell
Gear box and motor
Ball
Liner
Charge
Support
=> (1) iameter of the Ball mill = 36 cm
=> Diameter of the grinding media (Ball) = 14 cm
So,
the Radius of the Ball mill = Diameter / 2
= 36 / 2
= 18 cm
R = 18 x 10^-2 m



22/11/2024, 16:57 Assignment-I

Classroom > BSc-IC-PCE-I-2022
Semester-V

Instructions Student work

Class is archived. Restore it to add or edit anything. Restore

Assignment-I

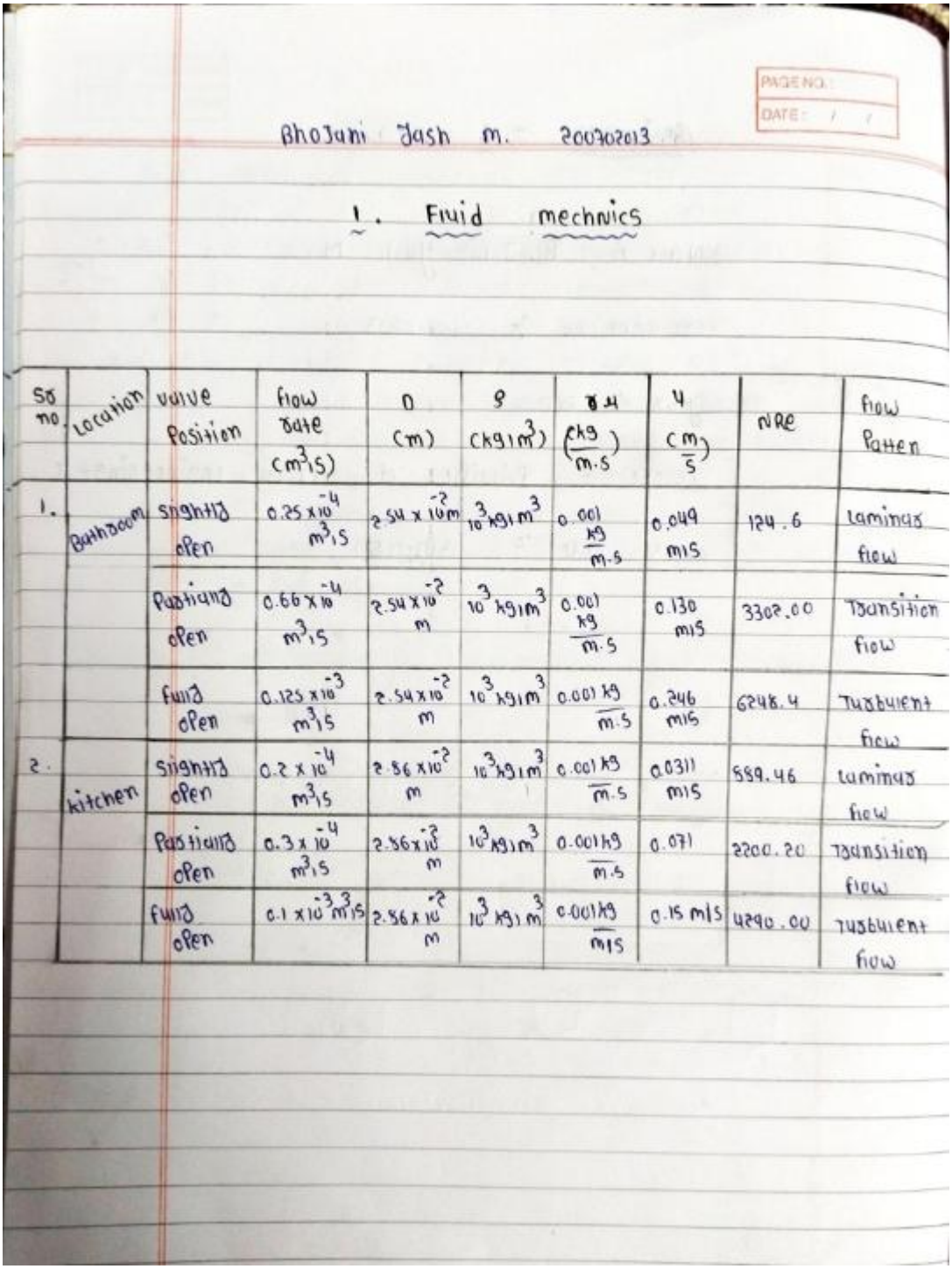
Ravi Tank • Jul 15, 2022

10 points Due Jul 17, 2022, 11:59 PM

1) Select location like Home, office, industry etc.
2) Identify water taps and note its location.
3) Measure the diameter of the pipe.
4) Measure flow rates
   a) When the valve is slightly open.
   b) When the valve is partially open.
   c) When the valve is fully open.
   d) Collect 1 litre (L) of water & note down the time for collection of 1 L of water.
5) Calculate the flow rate.
6) Calculate Reynold's Number (N*RE*)
7) Comment the type of flow pattern on the basis of Reynold's Number.

Tabulate your findings as discussed in class.

Class comments



PAGE NO.:
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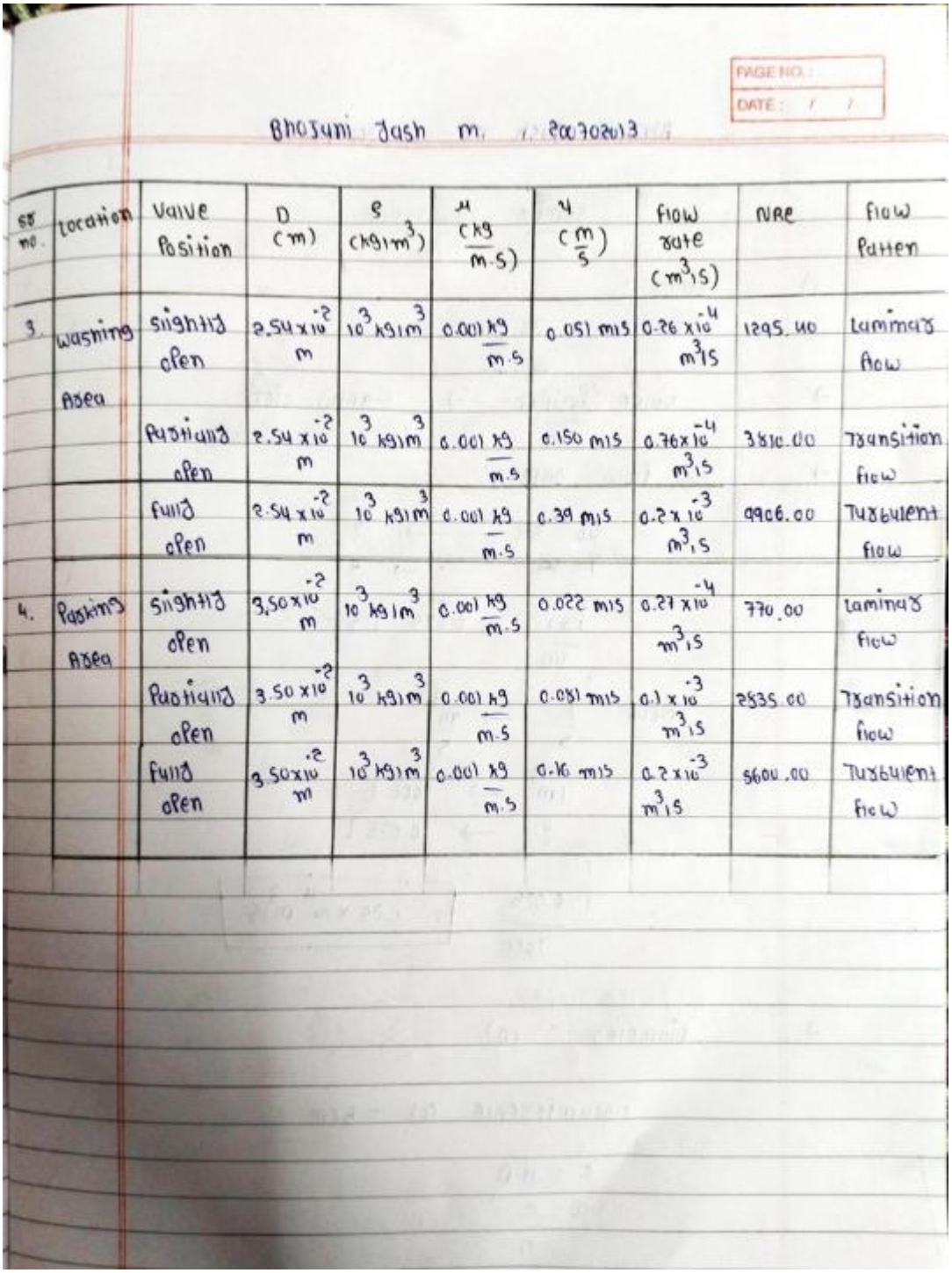
Bhojani Jash m. 200702013

1. Fluid mechnics

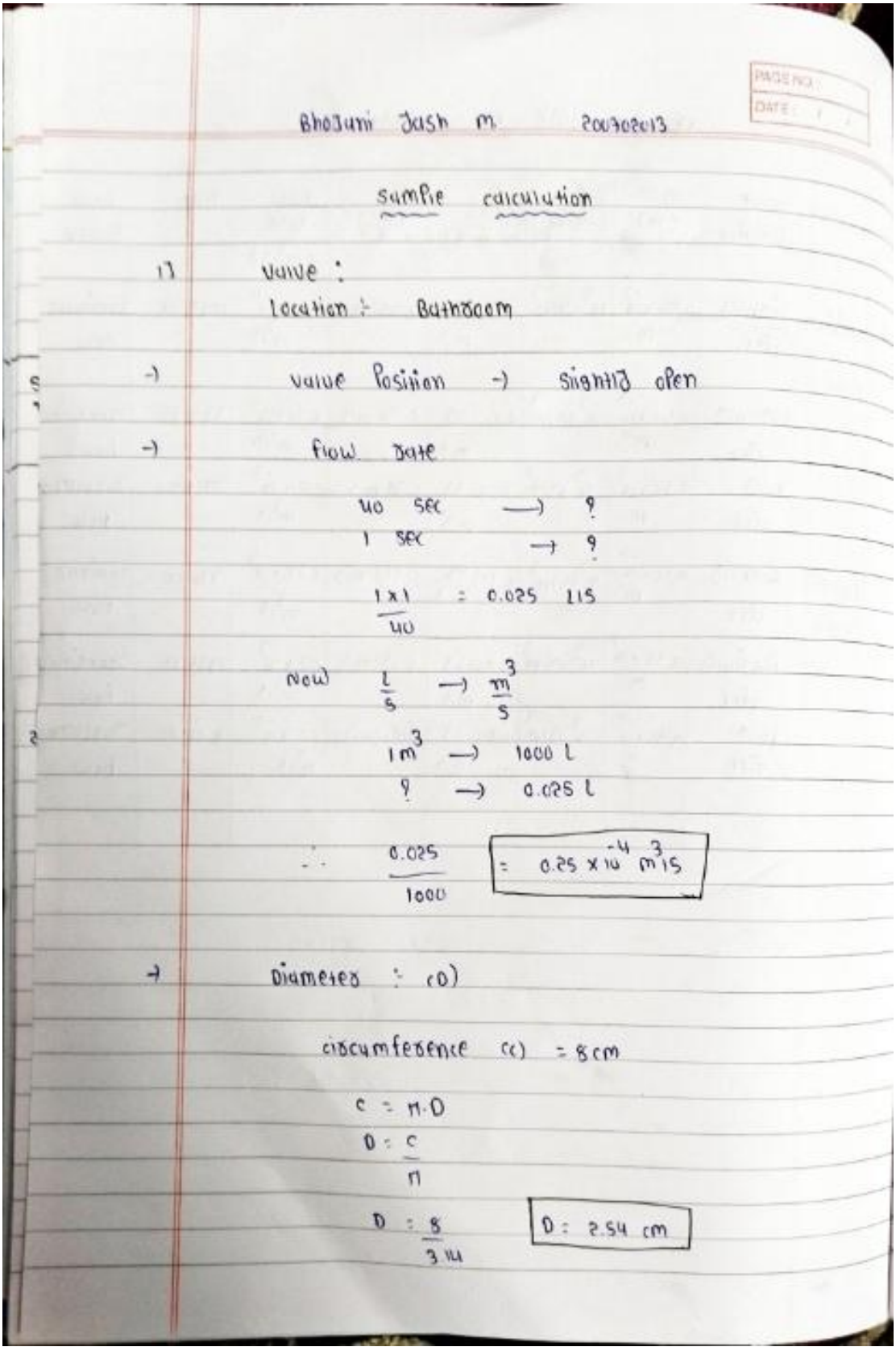
Sr no.	Location	valve Position	flow rate (m^3/s)	D (m)	ρ (kg/m^3)	μ ($\frac{kg}{m.s}$)	v ($\frac{m}{s}$)	NRe	flow Patten
1.	Bathroom	sightly open	0.25×10^{-4} m^3/s	2.54×10^{-2} m	10^3 kg/m^3	0.001 $\frac{kg}{m.s}$	0.049 m/s	124.6	Laminar flow
		Partiang open	0.66×10^{-4} m^3/s	2.54×10^{-2} m	10^3 kg/m^3	0.001 $\frac{kg}{m.s}$	0.130 m/s	3302.00	Transition flow
		fully open	0.125×10^{-3} m^3/s	2.54×10^{-2} m	10^3 kg/m^3	0.001 $\frac{kg}{m.s}$	0.246 m/s	6248.4	Turbulent flow
2.	kitchen	Sightly open	0.2×10^{-4} m^3/s	2.56×10^{-2} m	10^3 kg/m^3	0.001 $\frac{kg}{m.s}$	0.0311 m/s	589.46	Laminar flow
		Partially open	0.3×10^{-4} m^3/s	2.56×10^{-2} m	10^3 kg/m^3	0.001 $\frac{kg}{m.s}$	0.071	2200.20	Transition flow
		fully open	0.1×10^{-3} m^3/s	2.56×10^{-2} m	10^3 kg/m^3	0.001 $\frac{kg}{m/s}$	0.15 m/s	4290.00	Turbulent flow



PAGE NO.:
DATE: / /

Bhojani Jash m. 20170201 3

SR no.	Location	Valve Position	D (m)	ρ (kg/m^3)	μ ($\frac{kg}{m.s}$)	v ($\frac{m}{s}$)	Flow rate (m^3/s)	NRe	Flow Patten
3.	Washing Area	Slightly open	2.54×10^{-2} m	10^3 kg/m^3	0.001 $\frac{kg}{m.s}$	0.051 m/s	0.76×10^{-4} m^3/s	1295.40	Laminar flow
		Partially open	2.54×10^{-2} m	10^3 kg/m^3	0.001 $\frac{kg}{m.s}$	0.150 m/s	0.76×10^{-4} m^3/s	3816.00	Transition flow
		Fully open	2.54×10^{-2} m	10^3 kg/m^3	0.001 $\frac{kg}{m.s}$	0.39 m/s	0.2×10^{-3} m^3/s	9906.00	Turbulent flow
4.	Parking Area	Slightly open	3.50×10^{-2} m	10^3 kg/m^3	0.001 $\frac{kg}{m.s}$	0.022 m/s	0.27×10^{-4} m^3/s	770.00	Laminar flow
		Partially open	3.50×10^{-2} m	10^3 kg/m^3	0.001 $\frac{kg}{m.s}$	0.081 m/s	0.1×10^{-3} m^3/s	2535.00	Transition flow
		Fully open	3.50×10^{-2} m	10^3 kg/m^3	0.001 $\frac{kg}{m.s}$	0.16 m/s	0.2×10^{-3} m^3/s	5600.00	Turbulent flow



Bhojani Jash M. 20070201013

Sample calculation

1) Valve :

Location :- Bathroom

-) Valve Position -) Slightly open

-) Flow Rate

40 sec ⟶ 1 l

1 sec ⟶ ? l

$\frac{1 \times 1}{40} = 0.025$ l/s

Now $\frac{l}{s} \longrightarrow \frac{m^3}{s}$

$1\ m^3 \longrightarrow 1000$ l

? $\longrightarrow 0.025$ l

$\therefore \frac{0.025}{1000} = 0.25 \times 10^{-4}\ m^3/s$

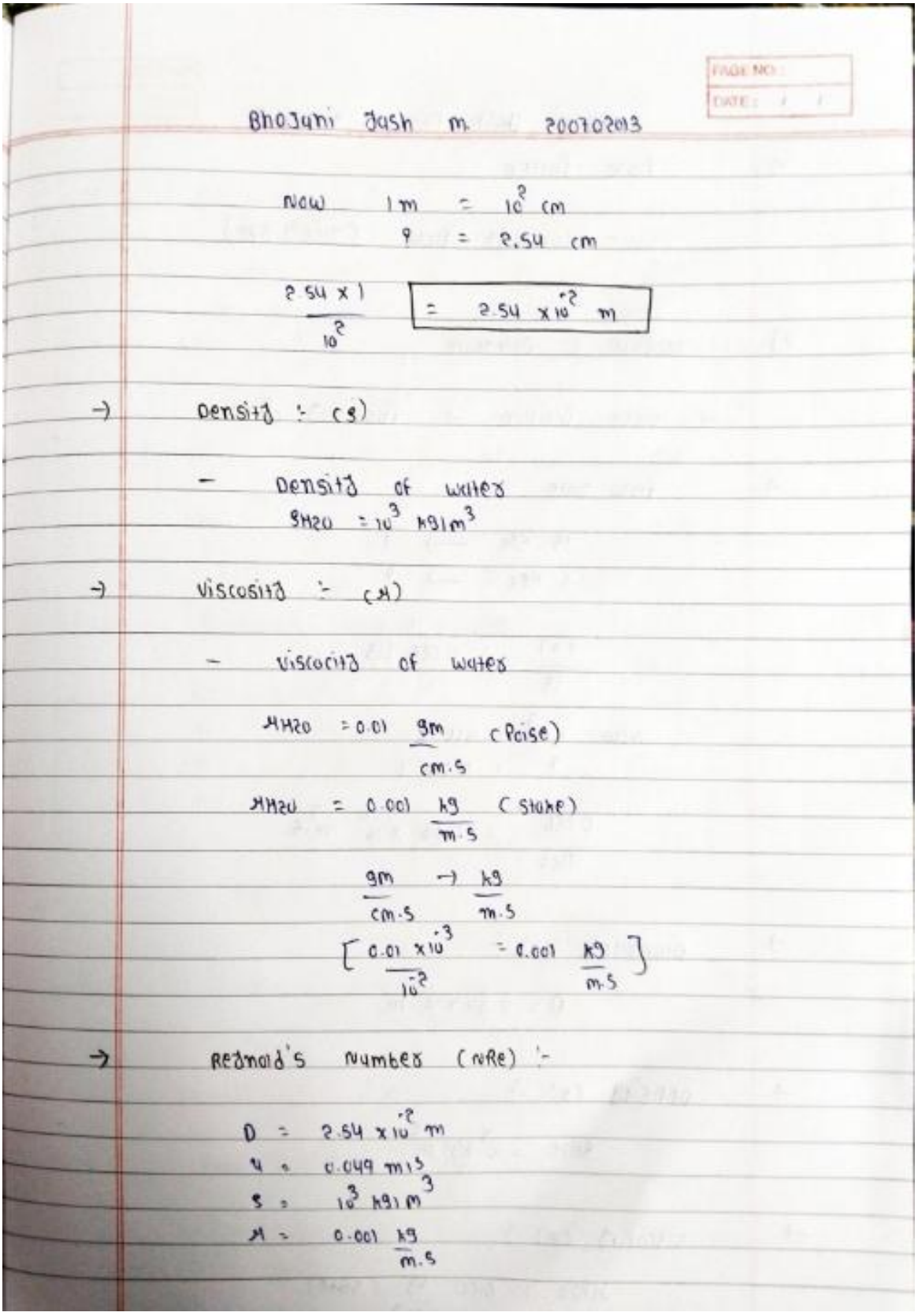
→ Diameter : (D)

circumference (c) = 8 cm

$c = \pi \cdot D$

$D = \frac{c}{\pi}$

$D = \frac{8}{3.14}$ D = 2.54 cm



Bhojani Jash m. 200702013

Now 1 m = 10^2 cm

9 = 2.54 cm

$\frac{2.54 \times 1}{10^2}$ = 2.54×10^{-2} m

→ Density :- (ρ)

– Density of water

$\rho_{H_2O} = 10^3$ kg/m^3

→ Viscosity :- (μ)

– Viscosity of water

$\mu_{H_2O} = 0.01$ $\frac{gm}{cm.s}$ (Poise)

$\mu_{H_2O} = 0.001$ $\frac{kg}{m.s}$ (Stoke)

$\frac{gm}{cm.s} \rightarrow \frac{kg}{m.s}$

$\left[\frac{0.01 \times 10^{-3}}{10^{-2}} = 0.001 \frac{kg}{m.s}\right]$

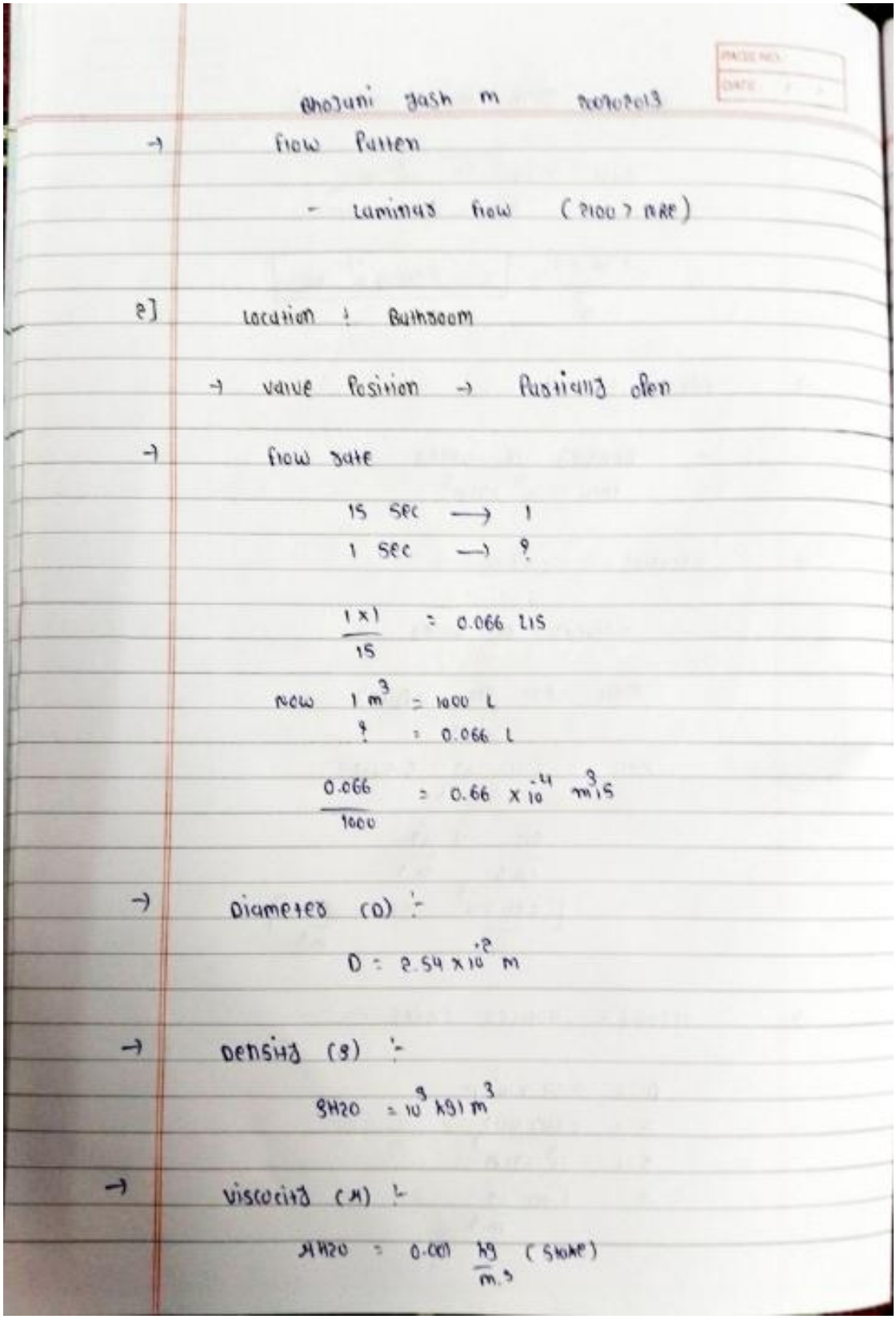
→ Reynold's Number (NRe) :-

D = 2.54×10^{-2} m

u = 0.049 m/s

ρ = 10^3 kg/m^3

μ = 0.001 $\frac{kg}{m.s}$



Bhojani Yash M 160160119

→ Flow Pattern

- Laminar flow (2100 > NRE)

2] Location : Bathroom

→ Valve Position → Partially open

→ Flow rate

15 sec ⟶ 1

1 sec ⟶ ?

$\frac{1 \times 1}{15} = 0.066$ L/S

Now $1\ m^3 = 1000$ L

? $= 0.066$ L

$\frac{0.066}{1000} = 0.66 \times 10^{-4}\ m^3/s$

→ Diameter (D) :-

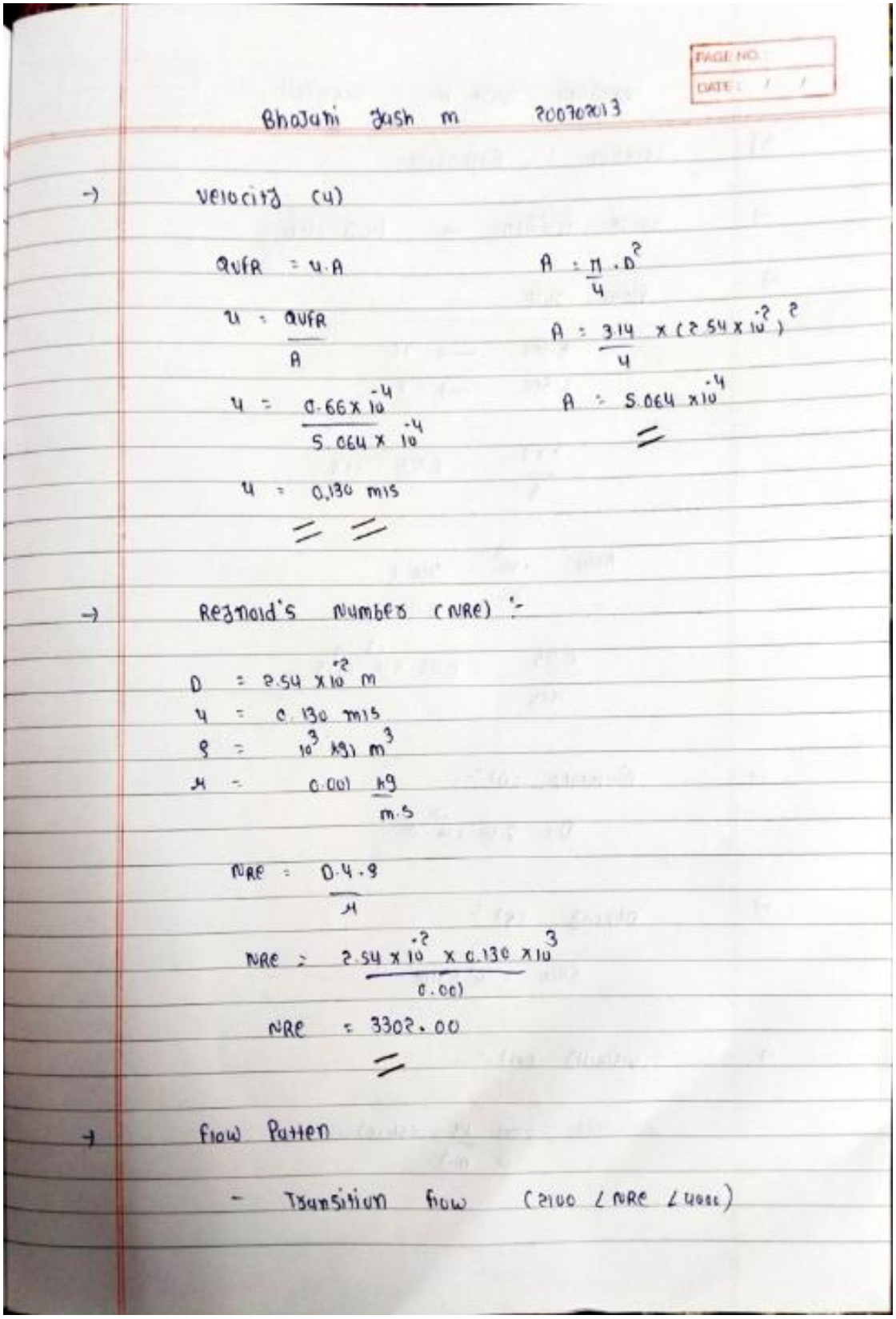
$D = 2.54 \times 10^{-2}$ m

→ Density (ρ) :-

$\rho_{H2O} = 10^3\ kg/m^3$

→ Viscosity (μ) :-

$\mu_{H2O} = 0.001\ \frac{kg}{m.s}$ (Standard)



PAGE NO.
DATE : / /

Bhajani Jash m 200702013

→ Velocity (u)

$Q_{VFR} = u \cdot A$

$u = \frac{Q_{VFR}}{A}$

$u = \frac{0.66 \times 10^{-4}}{5.064 \times 10^{-4}}$

$u = 0.130$ m/s

$A = \frac{\pi}{4} \cdot D^2$

$A = \frac{3.14}{4} \times (2.54 \times 10^{-2})^2$

$A = 5.064 \times 10^{-4}$

→ Reynold's Numbers (NRe) :-

$D = 2.54 \times 10^{-2}$ m

$u = 0.130$ m/s

$\rho = 10^3$ kg/m^3

$\mu = 0.001$ kg/m.s

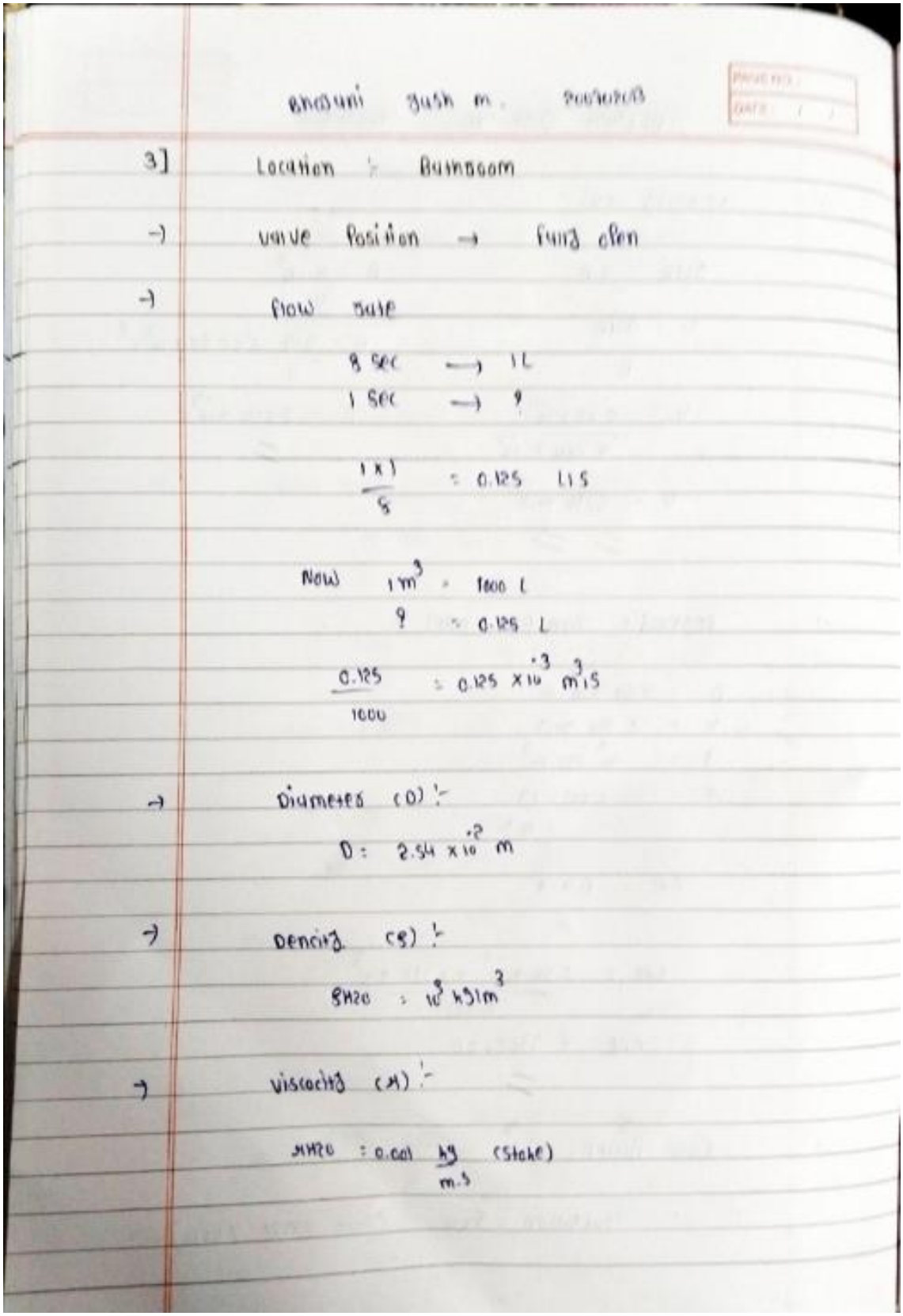
$NRe = \frac{D \cdot u \cdot \rho}{\mu}$

$NRe = \frac{2.54 \times 10^{-2} \times 0.130 \times 10^3}{0.001}$

$NRe = 3302.00$

→ Flow Pattern

- Transition flow (2100 < NRe < 4000)



3] Location :- Bamboom

→ valve Position → Fully open

→ Flow rate

8 sec → 1L

1 sec → 9

$\frac{1 \times 1}{8} = 0.125$ L/S

Now $1 m^3 = 1000$ L

9 = 0.125 L

$\frac{0.125}{1000} = 0.125 \times 10^{-3}$ m^3/S

→ Diameter (D) :-

$D = 2.54 \times 10^{-2}$ m

→ Density (ρ) :-

Water : 10^3 kg/m^3

→ Viscosity (μ) :-

water : 0.001 $\frac{kg}{m.s}$ (Stoke)

Bhojani Yash M. 20070203013

→ Velocity (u) :-

$Q_{VFR} = u \cdot A$

$u = \frac{Q_{VFR}}{A}$

$u = \frac{0.125 \times 10^{-3}}{5.064 \times 10^{-4}}$

$u = 0.024 \times 10^{1}$ m/s

$u = 0.24$ m/s

$A = \frac{\pi \cdot D^2}{4}$

$A = \frac{3.14 \times (2.54 \times 10^{-2})^2}{4}$

$A = 5.064 \times 10^{-4}$

→ Reynold's number (NRe) :-

$D = 2.54 \times 10^{-2}$ m

$u = 0.24$ m/s

$\rho = 10^3$ kg/m^3

$\mu = 0.001$ kg/m-s

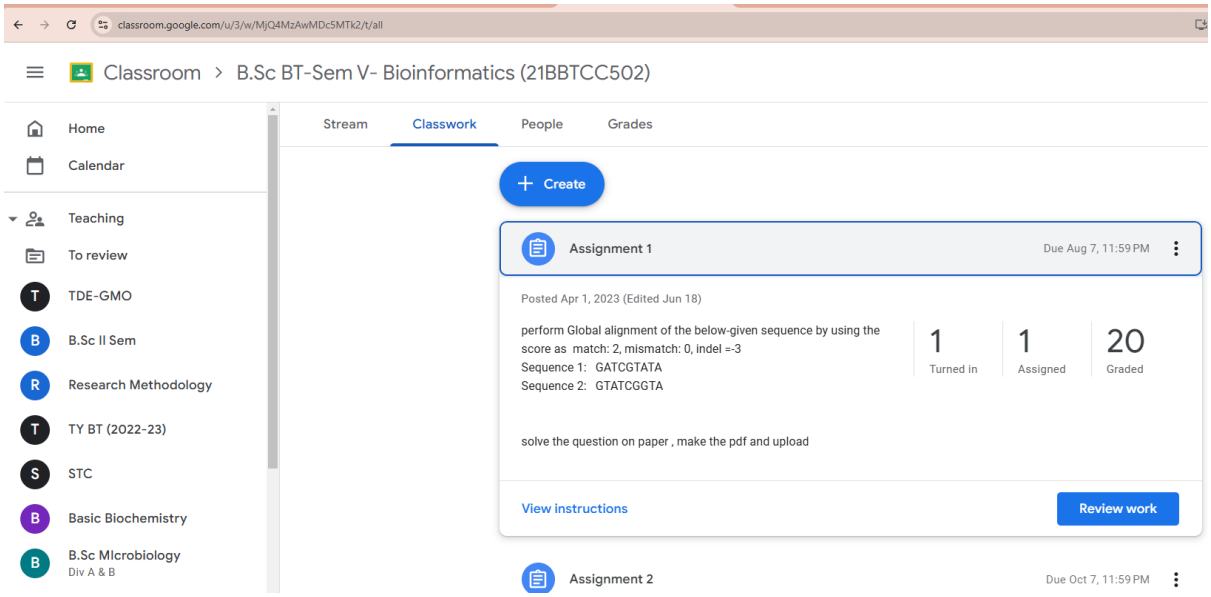
$N_{RE} = \frac{D \cdot u \cdot \rho}{\mu}$

$N_{RE} = \frac{2.54 \times 10^{-2} \times 0.24 \times 10^3}{0.001}$

$N_{RE} = 6096.00$

→ Flow Pattern

- Turbulent flow (> 4000 / NRe)


classroom.google.com/u/3/w/MjQ4MzAwMDc5MTk2/t/all
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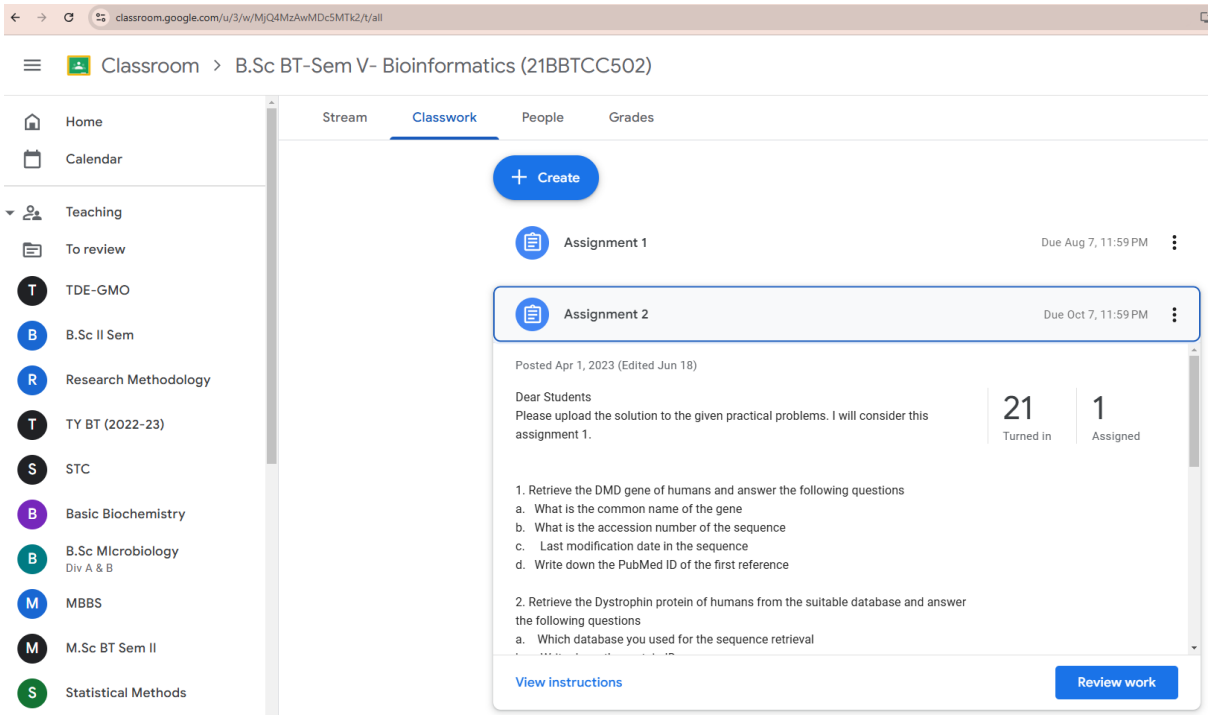
To review
TDE-GMO
B.Sc II Sem
Research Methodology
TY BT (2022-23)
STC
Basic Biochemistry
B.Sc MIcrobiology
Div A & B
Stream
Classwork
People
Grades
Create
Assignment 1
Due Aug 7, 11:59 PM
Posted Apr 1, 2023 (Edited Jun 18)
perform Global alignment of the below-given sequence by using the score as match: 2, mismatch: 0, indel =-3
Sequence 1: GATCGTATA
Sequence 2: GTATCGGTA
1
Turned in
1
Assigned
20
Graded
solve the question on paper , make the pdf and upload
View instructions
Review work
Assignment 2
Due Oct 7, 11:59 PM


classroom.google.com/u/3/w/MjQ4MzAwMDc5MTk2/t/all
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Statistical Methods
Stream
Classwork
People
Grades
Create
Assignment 1
Due Aug 7, 11:59 PM
Assignment 2
Due Oct 7, 11:59 PM
Posted Apr 1, 2023 (Edited Jun 18)
Dear Students
Please upload the solution to the given practical problems. I will consider this assignment 1.
21
Turned in
1
Assigned
1. Retrieve the DMD gene of humans and answer the following questions
a. What is the common name of the gene
b. What is the accession number of the sequence
c. Last modification date in the sequence
d. Write down the PubMed ID of the first reference
2. Retrieve the Dystrophin protein of humans from the suitable database and answer the following questions
a. Which database you used for the sequence retrieval
View instructions
Review work