

Shri Swami Vivekanand Shikshan Sanstha Kolhapur's

Vivekanand College, Kolhapur (Empowered Autonomous)

Department of Physics

Notice

Date: Tuesday, 28th February 2025

All the students of B.Sc. – II are hereby informed that, Continuous Internal Evaluation CIE Examination is scheduled on 5th and 6th March 2025 in the Department of Physics at 10 AM.

Instructions:

- 1) Nature of question paper for B.Sc. – II: 02 MCQ's (02 Marks), 02 Short Answer Questions (04 Marks each), total = 10 Marks.
- 2) Students should present before 15 minutes of the examination.
- 3) Answer sheets will be provided by the Department.
- 4) Strictly mention the Full Name and Roll number on Answer Sheet correctly.
- 5) All students should remain present for the Internal Examination as the examination will not be conducted afterwards in any case.

Sr. No.	Date	Paper	Name of Topic	Time
01	05/03/2025	(Paper VII)	Thermodynamic Potential	10 – 11 AM
		Major		
02	06/03/2025	(Paper VIII)	(01) Cardinal Points	10 – 11 AM
			(02) Resolving Power and Optical instruments	
03	05/03/2025	(Paper VII)	Mathematical & Thermal Physics	10 – 11 AM
		Minor		
04	06/03/2025	(Paper VIII)	Environmental Physics	10 – 11 AM


HC Head
HEAD
DEPARTMENT OF PHYSICS
VIVEKANAND COLLEGE, KOLHAPUR
(EMPOWERED AUTONOMOUS)

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-Shikshanmaharshi Dr. Bapuji Salunkhe
Shri Swami Vivekanand Shikshan Sanstha, Kolhapur
Vivekanand College, Kolhapur (Empowered Autonomous)
Department of Physics
B.Sc. Part-II SEM II Internal Examination (2024-25)
Thermodynamic and Statical Mechanics-II
Paper code: DSC03PHY41

Day: - Wednesday
Date: - 05/03/2025

Time: - 10.00 am- 11.00 am
Total Marks: 10

Sr. No.	Name of the students	Roll. No.	Sign	Marks
1]	Rushikesh S. Raut	7701	<i>Raut</i>	07
2]	NIHAL R. SAYYAL	7702	<i>Sayyal</i>	09
3]	Prem. M. Agrawal	777949	<i>PA</i>	08

A. N. Gore
Teachers Incharge
(Mr. A. N. Gore)

HOD



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Shri Swami Vivekanand Shikshan Sanstha, Kolhapur

Vivekanand College, Kolhapur (Empowered Autonomous)

Department of Physics

B.Sc. Part-II SEM II Internal Examination (2024-25)

Thermodynamic and Statical Mechanics-II

Paper code: DSC03PHY41

Day: - Wednesday

Date: - 05/03/2025

Time: - 10.00 am- 11.00 am

Total Marks: 10

Instructions: -

- 1) All questions are compulsory.
- 2) Figures to the right indicate full marks.
- 3) Use of log table and calculator is allowed.

Q.1 Select Correct Alternative:

(02)

1. Thermodynamic potentials are also known as

- (a) thermodynamic variables (b) thermodynamic constants
(c) thermodynamic functions (d) thermodynamic relations

2. For an ideal gas, Joule-Thomson effect is

- (a) zero (b) positive
(c) negative (d) infinite

Q.2 Attempt any two

(08)

1. State and explain thermodynamic potentials: a) Internal energy b) Enthalpy.
2. State and explain Joule-Thomson effect.
3. Derive Clausius-Clapeyron's equations from Maxwell's thermodynamic relations.



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- शिक्षणमहर्षी डॉ. बापूजी साबुळे

27936

Shri Swami Vivekanand Shikshan Sanstha Kolhapur's

VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)

SUPPLIMENT

Name: Rushikesh Sarjerao Raut.

Date: 05/03/2025.

Suppliment No.:

Roll No. : 7701

Class : B.Sc. Sy. (Sem - IV)

Signature
of
Supervisor

Subject: Thermodynamic & statical
Mechanics - II.

Test / Tutorial No.:

Div.:

Q 1] i) Thermodynamic constants function.

ii) Zero.

Q 2] i)

a) Internal energy: The sum of kinetic energy & potential energy of every element of in Thermodynamic system is called Internal energy. The infinitely heat energy supplied to the Thermodynamic system. the internal energy is change by Thermodynamic first law.

$$dQ = dU + dw.$$

$$\text{but, } dw = PdV.$$

$$\therefore dQ = dU + PdV.$$



b]. Enthalpy: It is denoted by H . It is the total heat content of thermodynamic system is internal energy & pressure & volume.

$$H = U + PV.$$

differentiating.

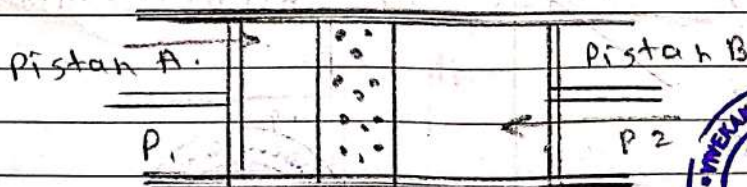
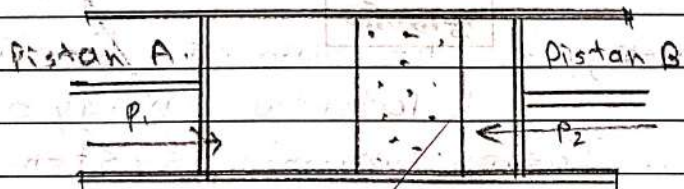
$$dH = dU + P dV + V dP.$$

$$dH = T ds + P dV + V dP.$$

$$\cancel{dH} - \cancel{P dV} = T ds + V dP.$$

$$dH - P dV = T ds + V dP.$$

Q2: 2].



When a gas is forced from a region of low pressure to a region of high pressure at constant pressure, it is called as Joule-Thomson effect.

When a gas in a region of constant pressure passes through a porous plug to a region of lower constant pressure, its temperature reduces. This is called as Joule-Thomson effect.



NAME - NIHAL RIVAJANAMAD SAXYAD

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- शिक्षणमहर्षी डॉ. बापूजी साळुंखे

Shri Swami Vivekanand Shikshan Sanstha Kolhapur's

VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)

SUPPLIMENT

Suppliment No. : 1

Roll No. : 7702

Class : BSC-II - SY - SEM III

Signature
of
Supervisor



Subject : PHYSICS

Test / Tutorial No. : INTERNAL EXAM

Div. : - DATE - 5-03-2025

27935

09
10

Q1]

1)

→

a) Thermodynamic ~~variables~~ functions

2)

→

a) ~~negative~~ zero

Q2]

1)

→

a) Internal Energy -

The sum of kinetic & Potential energy of all the molecules in a thermodynamic system is called as internal energy. It is denoted by (U).

i.e. $dU = Tds - PdV$ — from $dQ = dU + dW$

b) Enthalpy -

Enthalpy is a thermodynamic potential equal to the internal energy ~~plus~~ product of Pressure & volume.

It is denoted by (H).

i.e. $H = U + PV$



Q27

2)

→

Joule - Thomson Effect -

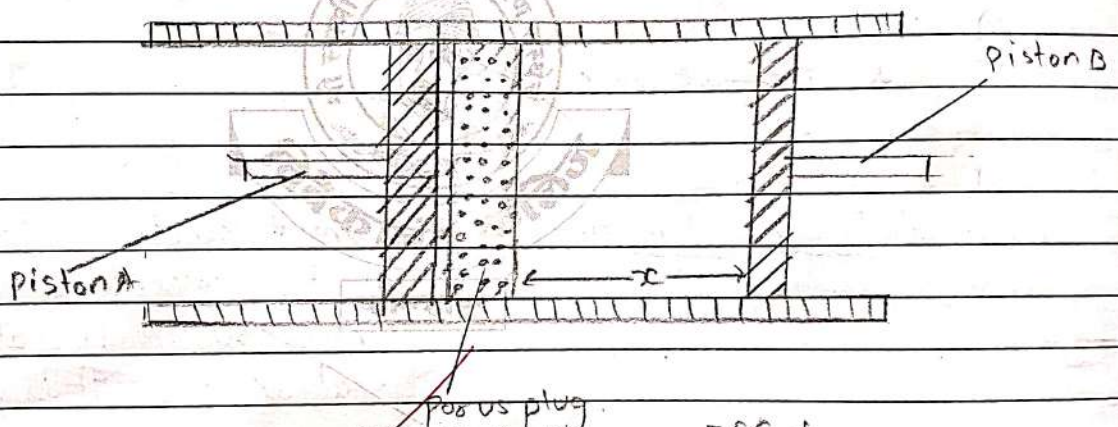
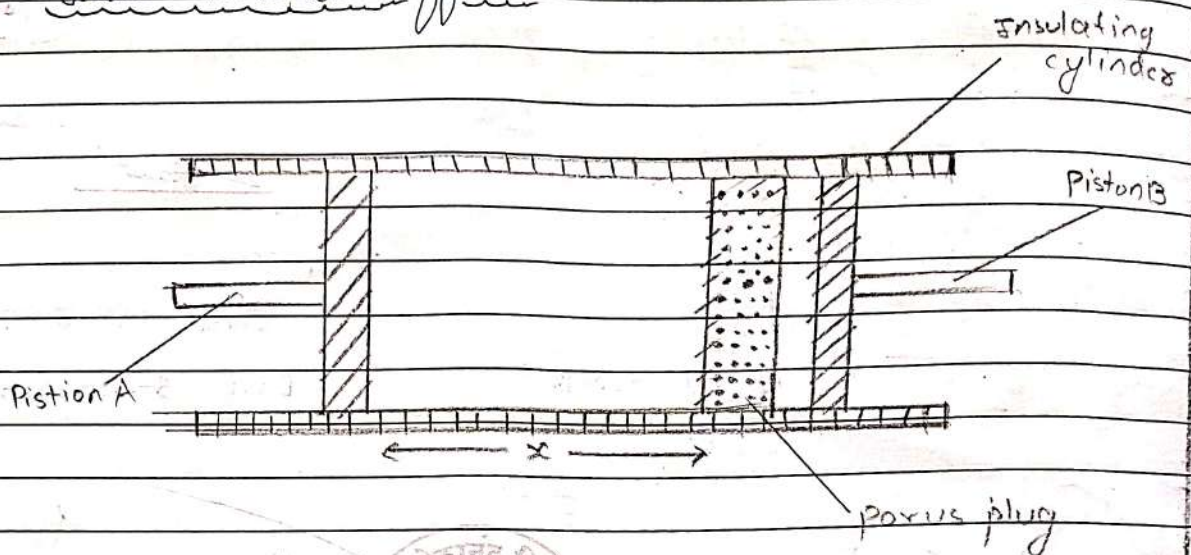


Fig. Joule Thomson Effect

When a gas in ~~pass~~ a region of constant pressure is passed through a porous plug to a region of lower constant pressure its temperature changes. This is called as Joule-Thomson effect or throttling process.

The change in temperature is given by -

$$\frac{dT}{dP} = T(V_2 - V_1)$$



Q2] 3)

→

Clausius - Clapeyron's equation -

The Clausius - Clapeyron's equation is derived from Maxwell's eqⁿ of first thermodynamic potential.

$$\text{i.e. } \left(\frac{\partial S}{\partial V} \right)_T = \left(\frac{\partial P}{\partial T} \right)_V \quad \text{--- (1)}$$

Multiplying both sides by T .

$$T \left(\frac{\partial S}{\partial V} \right)_T = T \left(\frac{\partial P}{\partial T} \right)_V \quad \text{--- (2)}$$

We know - $\delta Q = T \delta S$ --- from first law of thermodynamics.

$\therefore$ eqⁿ (2) becomes -

$$\left(\frac{\partial Q}{\partial V} \right)_T = T \left(\frac{\partial P}{\partial T} \right)_V \quad \text{--- (3)}$$

Here $\left(\frac{\partial Q}{\partial V} \right)_T$ represents heat absorbed or emitted by the thermodynamic system. This heat must be latent heat. This also corresponds to change in volume. Let, L be the change in heat.

$$\therefore \delta Q = L \quad \& \quad \delta V = V_2 - V_1$$

$$\therefore \left(\frac{\partial Q}{\partial V} \right)_T = \frac{L}{V_2 - V_1} \quad \text{--- (4)}$$

Putting eqⁿ (4) in (3)

$$\therefore T \left(\frac{\partial P}{\partial T} \right)_V = \frac{L}{V_2 - V_1}$$



$$\therefore \frac{\partial P}{\partial T} = \frac{L}{T(V_2 - V_1)}$$

This is clausius-clapeyron equation



Prem Agrawal Milind Agrawal

Date: 5/3/25

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- शिक्षणमहर्षी डॉ. बापूजी साबुळे

27510

Shri Swami Vivekanand Shikshan Sanstha Kolhapur's

VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)

SUPPLIMENT

Signature
of
Supervisor

[Signature]

Suppliment No. :

Roll No. : 7949

Class : BSc II (Sem IV)

Subject : Physics

Test / Tutorial No. : Internal exam

Div. :

1]

1) c) Thermodynamic functions

2) a) ~~Negative~~ Zero

2]

1) Internal energy : It is denoted by constant U . It is the addition of kinetic and potential energy of all molecules in thermodynamic system.

$$dQ = dU + PdV$$

$$\text{i.e. } dU = dQ - PdV$$

$$\text{If } P=0, \text{ then } dU = dQ$$

$$\therefore dU = TdS - PdV$$

The thermodynamic function is independent of S & V .

Enthalpy : It is denoted by H . It is the total heat ^{or} ~~heat~~ ^{content} in the thermodynamic system. It is internal energy, plus product of Pressure and volume.

$$H = U + PV$$

Taking differential,

$$dH = dU + PdV + VdP$$

$$\therefore dH = TdS - PdV + PdV + VdP$$

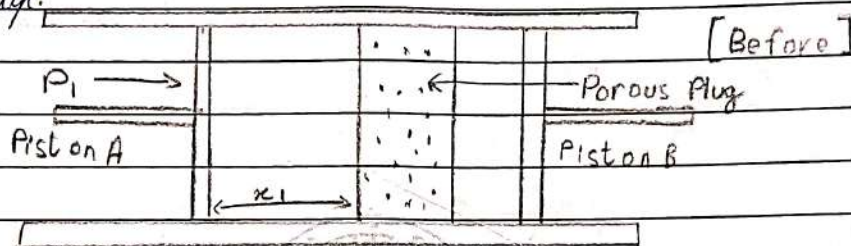
$$\therefore dH = TdS + VdP \quad \text{If } P=0, \text{ then } dH$$



This function is independent of S & P.

2)

When a gas is forced from a high ^{constant} pressure region to a low constant pressure region through a porous plug, it known as Joule-Thomson effect. There is no change in enthalpy, there is change in internal energy. Other gases reduce their temperature, only hydrogen and helium heat up.



After:



The ~~area~~ between the cross section area between piston and porous plug is a .

$$H_1 = U_1 + a_1 \times x_1 = U_1 + P_1 V_1$$

$$H_2 = U_2 + a_2 \times x_2 = U_2 + P_2 V_2$$

$$\therefore H_2 - H_1 = U_2 + P_2 V_2 - U_1 - P_1 V_1$$

$$\therefore H = U + PV \text{ is constant}$$

3



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Vivekanand College, Kolhapur (Empowered Autonomous)
Department of Physics

B.Sc. Part-II SEM IV Internal Examination (2024-25)

Optics

Paper code: DSC03PHY42

Day: - Thursday
Date: - 06/03/2025

Time: - 10.00 am- 11.00 am
Total Marks: 10

Sr. No.	Name of the students	Roll. No.	Sign
1	Rushikesh S. Raut.	7701	<i>Raut</i>
2	Bun M Agrawal	7949	<i>Bun</i>
3	NIHAL R SAYYAD	7702	<i>N. Sayyad</i>



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Vivekanand College, Kolhapur (Empowered Autonomous).
Department of Physics
B.Sc. Part-II SEM IV
Internal Examination
Optics

Date: 06/03/2025
Day: Thursday

Total Marks: 10
Time: 10-11 am

Instructions:

- 1) All questions are compulsory.
- 2) Figures to the right indicate full marks.
- 3) Use of log table and calculator is allowed.

Q.1) A] Select correct alternative

(2)

1. A ray passing through first focal point emerges as a -----.
☒ (a) ray parallel to the principal axis
(b) ray parallel to the incident ray
(c) ray passing through second focal point
(d) none of the above
2. 'Any two close objects can be resolved by increasing magnification'. The statement is -----.
(a) true ☒ (b) false (c) sometime true (d) partially true

Q.2 Short Answer Question (Any two)

(08)

1. Explain the graphical method of constructing the image.
2. Explain modified Rayleigh's criterion.
3. Define linear, axial and angular magnifications of lens system and hence obtain a relationship between them.
4. Derive expression for resolving power of prism.



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-शिक्षणमहर्षी डॉ. बापूजी साळुंखे-

Shri Swami Vivekanand Shikshan Sanstha Kolhapur's

VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)

SUPPLIMENT
Name: Rushikesh Sarjerao Raut.
Date: 06/03/2025
Suppliment No.:

Roll No. : 7701

Class : B.Sc. 54. (sem - IV)

Signature
of
Supervisor

Subject : Optics.

Test / Tutorial No. :

Div. :

Q1. A.

☒ a) ray parallel to the principal axis.

☒ b) false.

Q2.

☒ linear magnification: $m = \frac{A.B}{AB} = \frac{h_2}{h_1}$

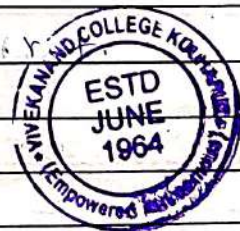
☒ Axial magnification: $du/dv = m$

~~for~~ Newtons formulae: $x_1 x_2 = f_1 f_2$

~~differe~~

diff. Newtons formulae w.r

$$\frac{dx_2}{dx_1} = \frac{f_1 - x_2}{x_1}$$



now we know $\frac{A_1 B_1}{AB} = \frac{\alpha_2}{f_1} = \frac{h_2}{h_1}$

$\therefore \frac{A_1 B_1}{AB} = \frac{\alpha_2}{h_1} = f_1 \cdot h_2$

$\frac{A_1 B_1}{AB} = \alpha_2 = f_1 \cdot m$

similarly

$\frac{AB}{A_1 B_1} = \frac{\alpha_1}{f_2} = \frac{h_1}{h_2}$

$\therefore \frac{AB}{A_1 B_1} = \frac{\alpha_1}{h_2} = f_2 \cdot \frac{h_1}{h_2}$

$\frac{AB}{A_1 B_1} = \frac{\alpha_1}{m} = f_2$

$\therefore \frac{\alpha_2}{\alpha_1} = \frac{f_1 \cdot m}{\frac{f_2}{m}} = \frac{f_1}{f_2} m^2$

or

$\frac{\alpha_2}{\alpha_1} = \frac{f_1}{f_2} m^2$



3]. angular magnification: α i.e. $\alpha = \frac{\theta_1}{\theta_2}$

$\alpha \cdot m = m$

Relation of linear, axial & angular magnification
 $\alpha \cdot m = m$

Name- NIHAL RIYAJAHAMAD SAYYAD

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Shri Swami Vivekanand Shikshan Sanstha Kolhapur's

VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)

SUPPLIMENT

Suppliment No. : 1

Roll No. : 7702

Class : BSC-FY-SEM-IV

Signature
of
Supervisor

Subject : PHYSICS (OPTICS)

Test / Tutorial No. : INTERNAL EXAM-SEM IV

Div. : —

06
10

Q1]

A)

1)

→

a) ray parallel to principal axis

2)

→

b) False



Q2]

1)

→

2)

→

3)

→

1) Linear magnification = $m = \frac{A_1 B_1}{AB} = \frac{h_2}{h_1}$

2) axial magnification = $\frac{dx}{dx} = m$

We know, Newton's formula = $x_1 x_2 = f_1 f_2$

Differentiating Newton's formula we get,

$\frac{dx}{dx} = f_1 \cdot x_2 + x_2 \frac{dx}{dx} = 0$ i.e. $\frac{dx_2}{dx_1} = -\frac{x_1}{x_2}$

Now,

We know, $\frac{A_1 B_1}{AB} = \frac{x_2}{f_1} = \frac{h_2}{h_1}$

$\therefore \frac{A_1 B_1}{AB} = x_2 = f_1 \cdot \frac{h_2}{h_1}$

$\therefore \frac{A_1 B_1}{AB} = f_1 \cdot m$

Similarly, $\frac{A_1 B_1}{A_1 B_1} = \frac{x_1}{f_2} = \frac{h_1}{h_2}$

$\therefore \frac{AB}{A_1 B_1} = x_1 = f_2 \frac{h_1}{h_2}$

$\therefore \frac{AB}{A_1 B_1} = \frac{f_2}{m}$



$$\therefore \frac{x_2}{x_1} = \frac{-f_1 \cdot m}{f_2/m}$$

$$= \frac{-f_1 m^2}{f_2}$$

3> Angular magnification = $\alpha = \frac{\theta_1}{\theta_2}$

or solving we get, $|\alpha \cdot m_L = m|$ — This is the relation between linear, axial & angular magnifications



From Milind Agrawal

Date: 6/3/25

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Shri Swami Vivekanand Shikshan Sanstha Kolhapur's

VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)

SUPPLIMENT

Suppliment No. :

Roll No. : 7949

Class : BSc II A

Signature
of
Supervisor

Subject : Physics (Optics)

Test / Tutorial No. : Internal

Div. :

1] A]

1) a) ray parallel to the principal axis

2) b) False

2]

3) Linear magnification = $m = \frac{A_1 B_1}{AB} = \frac{h_2}{h_1}$

Angular magnification = $\frac{d\theta}{d\theta} = m$

$\therefore$ Newton's formula = $x_1 x_2 = f_1 f_2$

By differentiating this,

$$x_1 dx_2 + x_2 dx_1 = 0$$

$$\text{i.e. } \frac{dx_2}{dx_1} = -\frac{x_2}{x_1}$$

Now we have, $\frac{A_1 B_1}{AB} = \frac{x_2}{f_1} = \frac{h_2}{h_1} \therefore \frac{A_1 B_1}{AB} = \frac{h_2}{h_1} = \frac{f_1}{f_2}$



$$\therefore \frac{A_1 B_1}{A B} = f_1 m$$

$$\text{Likewise, } \frac{A B}{A_1 B_1} = \frac{x_1}{f_2} = \frac{h_1}{h_2}$$

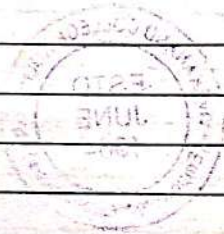
$$\therefore \frac{A B}{A_1 B_1} = \frac{x_1}{f_2} = \frac{f_2 h_1}{h_2} \quad \therefore \frac{A B}{A_1 B_1} = \frac{f_2}{m}$$

$$\therefore \frac{x_2}{x_1} = \frac{f_1 m}{\frac{f_2}{m}}$$

Angular magnification = α i.e. $\alpha = \theta_1 / \theta_2$

$$\therefore \alpha \cdot m_L = m$$

~~Rel~~ Relation of linear, axial and angular ~~magnification~~ magnification.



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Vivekanand College, Kolhapur (Empowered Autonomous)

Department of Physics

B.Sc. Part-II SEM IV Internal Examination (2024-25)

Mathematical & Thermal Physics

Paper code: MIN03PHY41

Day: - Tuesday

Time: 10:00 am-11:00 am

Date: - 05/03/2025

Total Marks: 10

Attendance Sheet

Sr. No.	Name of the Students	Roll No	Signature
1	Sumit Jotiba Dhabule	7743	S.J. Dhabule
2	Shreya Deepak Athane	7759	S.D. Athane
3	Rupesh Mohan Nigade	7965	R. Nigade
4	Prathamesh B. Khopkar	7954	P. Khopkar
5			
6			
7			
8			
9			
10			



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Vivekanand College, Kolhapur (Empowered Autonomous)
Department of Physics

B.Sc. Part-II SEM IV Internal Examination (2024-25)

Mathematical & Thermal Physics

Paper code: MIN03PHY41

Day: - Tuesday
Date: - 05/03/2025

Time: 10:00 am - 11:00 am
Total Marks: 10

Instructions:

- 1) All questions are compulsory.
- 2) Figures to the right indicate full marks.
- 3) Use of log table and calculator is allowed.

Q.1 Select Correct Alternative:

(02)

1. Matrix multiplication is associative, if confirmability is assured

- (a) $AB = BA$ (b) $AB = AB$
(c) $AB \neq BA$ (d) All of the above

2. $(\cos \theta + i \sin \theta)^n = \dots\dots\dots$

- (a) $\cos n \theta + i \sin n \theta$ (b) $n \cos \theta + i \sin n \theta$
(c) $n \cos \theta + i n \sin \theta$ (d) $n \cos n \theta + i n \sin n \theta$

Q.2 Attempt any two

(08)

1. Find the inverse of given matrix with the help of adjoint of matrix

$$A = \begin{bmatrix} 3 & -3 & 4 \\ 2 & -3 & 4 \\ 0 & -1 & 1 \end{bmatrix}$$

2. Express $\frac{1+2i}{1-3i}$ in the polar form $r (\cos \theta + i \sin \theta)$.

3. Define the rank of matrix and determine the rank of given matrix

$$A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 4 & 7 \\ 3 & 6 & 10 \end{bmatrix}$$



Name : Sumit Joti'sa Dhubale

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- शिक्षणमहर्षी डॉ. बापूजी साळुंखे

27509

Shri Swami Vivekanand Shikshan Sanstha Kolhapur's

VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)

SUPPLIMENT

Date : 5/3/2025

Suppliment No. :

Roll No. : 7743

Class : BSc - 54

Signature
of
Supervisor

Subject : Mathematical & Thermal physics

Test / Tutorial No. :

Div. :

Q.1

1. Matrix multiplication is associative, if confirmability is assumed

→ c) $AB \neq BA$

2. $(\cos \theta + i \sin \theta)^n =$

→ $n \cos \theta + i \sin \theta$



Q.2)

1) Find the inverse of given matrix with the help of adjoint of matrix

⊗

$$A = \begin{bmatrix} 3 & -3 & 4 \\ 2 & -3 & 4 \\ 0 & -1 & 1 \end{bmatrix}$$

$$|A| = 3(-3 - (-4)) + 3(2 - 0) + 4(-2 - 0)$$

$$= 3(-3 + 4) + 3(2) + 4(-2)$$

$$= 3 + 6 - 8 = 1$$

$$M_{11} = \begin{vmatrix} -3 & 4 \\ -1 & 1 \end{vmatrix} = -3 - (-4) = -3 + 4 = 1$$

$$M_{12} = \begin{vmatrix} 2 & 4 \\ 0 & 1 \end{vmatrix} = 2 - 0 = 2$$

$$M_{13} = \begin{vmatrix} 2 & -3 \\ 0 & -1 \end{vmatrix} = -2 - 0 = -2$$

$$M_{21} = \begin{vmatrix} -3 & 4 \\ -1 & 1 \end{vmatrix} = -3 - (-4) = -3 + 4 = 1$$

$$M_{22} = \begin{vmatrix} 3 & 4 \\ 0 & 1 \end{vmatrix} = 3 - 0 = 3$$

$$M_{23} = \begin{vmatrix} 3 & -3 \\ 0 & -1 \end{vmatrix} = -3 - 0 = -3$$



$$M_{31} = \begin{vmatrix} -3 & 4 \\ -3 & 4 \end{vmatrix} = -12 - (-12) = 0$$

$$M_{32} = \begin{vmatrix} 3 & 4 \\ 2 & 4 \end{vmatrix} = 12 - 8 = 4$$

$$M_{33} = \begin{vmatrix} 3 & -3 \\ 2 & -3 \end{vmatrix} = -9 - (-6) = -9 + 6 = -3$$

Cofactor

$$C_{11} = (-1)^2 = M_{11} = 1$$

$$C_{12} = (-1)^3 = M_{12} = -2$$

$$C_{13} = (-1)^4 = M_{13} = -2$$

$$C_{21} = (-1)^3 = M_{21} = -1$$

$$C_{22} = (-1)^4 = M_{22} = 3$$

$$C_{23} = (-1)^5 = M_{23} = 3$$

$$C_{31} = (-1)^4 = M_{31} = 0$$

$$C_{32} = (-1)^5 = M_{32} = -4$$

$$C_{33} = (-1)^6 = M_{33} = -3$$

$$\text{Cofactor} = \begin{vmatrix} 1 & -2 & -2 \\ -1 & 3 & 3 \\ 0 & -4 & -3 \end{vmatrix}$$



Adjoint of A =

$$\begin{vmatrix} 1 & -1 & 0 \\ -2 & 3 & -4 \\ 2 & 3 & -3 \end{vmatrix}$$

$$\begin{vmatrix} 1 & -1 & 0 \\ -2 & 3 & -4 \\ 2 & 3 & -3 \end{vmatrix}$$

Q.2

Express $\frac{1+2i}{1-3i}$ in the polar form $r(\cos\theta + i\sin\theta)$

$$\Rightarrow \frac{1+2i}{1-3i}$$

$$= \frac{(1+2i)}{(1-3i)} \times \frac{(1+3i)}{(1+3i)}$$

$$= \frac{1+3i+2i+6i^2}{1+3i-3i-9i^2}$$

$$= \frac{1+5i+6}{10}$$

$$= \frac{7+5i}{10}$$

$$= \frac{7}{10} + \frac{5}{10}i$$

$$= r = \sqrt{x^2 + y^2}$$

$$= \sqrt{\left(\frac{7}{10}\right)^2 + \left(\frac{5}{10}\right)^2}$$

$$= \sqrt{\frac{49}{100} + \frac{25}{100}}$$



Name: Sumit Jotiba Dhabule

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Shri Swami Vivekanand Shikshan Sanstha Kolhapur's

VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)

SUPPLIMENT

Date: 5/3/2025

Suppliment No.:

Roll No. : 7743

Class : BSC - SY

Signature
of
Supervisor



Subject : Mathematical & Thermal Physics

Test / Tutorial No.:

Div.:

$$\sqrt{\frac{1}{2}}$$

$$z = r \cos \theta$$

$$\frac{1}{2} = \frac{1}{\sqrt{2}} \cos \theta$$

$$\cos \theta = \frac{1}{\sqrt{2}} \cdot \frac{\sqrt{2}}{1}$$

$$\theta = \cos^{-1} \frac{1}{\sqrt{2}}$$

$$\theta = \frac{\pi}{4}$$

polar form of $z = \frac{1}{2} (\cos \theta + i \sin \theta)$

$$\frac{1}{2} \left(\cos \frac{\pi}{4} + i \sin \frac{\pi}{4} \right)$$



04

Shreyo Deepak Athane

॥ ज्ञान, विज्ञान आणि सुरांस्कार यांसाठी शिक्षण प्रसार ॥

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27937

Shri Swami Vivekanand Shikshan Sanstha Kolhapur's

VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)

SUPPLIMENT

Date - 5/3/25

Suppliment No. : 1

Roll No. : 7759

Class : SY



Signature
of
Supervisor

Subject : 1

physics (minor)

Test / Tutorial No. : -

Div. : A

Q 1

1) $AB \neq BA$
01

2) $n \cos \theta + i \sin 2\theta$
01



Q 2

$$2] \frac{1+2i}{1-3i}$$

$$\frac{1+2i}{1-3i} \cdot \frac{1+3i}{1+3i}$$

$$\frac{1+3i+2i+6i^2}{1+3i-3i+9i^2}$$

$$= \frac{1+5i+6i^2}{1+9i^2}$$

$$\therefore i^2 = -1$$

$$= \frac{1+5i-6}{10}$$

$$= \frac{5i-5}{10}$$

$$= \frac{5i}{10} - \frac{5}{10}$$

$$= \frac{1}{2}i - \frac{1}{2}$$

$$r = \sqrt{x^2 + y^2}$$

$$= \sqrt{1/4 + 1/4}$$

$$= \sqrt{2/4} = \frac{1}{\sqrt{2}}$$

$$r = \frac{1}{\sqrt{2}}$$



$$x = r \cos \theta$$

$$-1/2 = \frac{1}{\sqrt{2}} \cos \theta$$

$$\cos \theta = \frac{1}{\frac{1}{\sqrt{2}} \sqrt{2}} \cdot \frac{\sqrt{2}}{1}$$

$$\cos \theta = \frac{1}{\sqrt{2}}$$

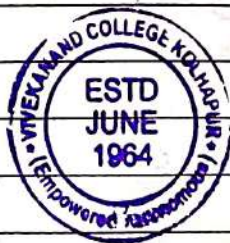
$$\theta = \cos^{-1} \frac{1}{\sqrt{2}}$$

$$\cos \theta = \pi/4$$

$$\cos \theta = 45^\circ$$

$$z = r (\cos \theta + i \sin \theta)$$

$$= \frac{1}{\sqrt{2}} (\cos \pi/4 + i \sin \pi/4)$$



Q 2

$$1) A = \begin{bmatrix} 3 & -3 & 4 \\ 2 & -3 & 4 \\ 0 & -1 & 1 \end{bmatrix}$$

$$M_{11} = \begin{vmatrix} -3 & 4 \\ -1 & 1 \end{vmatrix} = -3 - (-4) = -3 + 4 = 1$$

$$M_{12} = \begin{vmatrix} 2 & 4 \\ 0 & 1 \end{vmatrix} = 2$$

$$M_{13} = \begin{vmatrix} 2 & -3 \\ 0 & -1 \end{vmatrix} = -2$$

$$M_{21} = \begin{vmatrix} -3 & 4 \\ -1 & 1 \end{vmatrix} = -3 - (-4) = -3 + 4 = 1$$

$$M_{22} = \begin{vmatrix} 3 & 4 \\ 0 & 1 \end{vmatrix} = 3$$

$$M_{23} = \begin{vmatrix} 3 & -3 \\ 0 & -1 \end{vmatrix} = -3$$

$$M_{31} = \begin{vmatrix} -3 & 4 \\ -3 & 4 \end{vmatrix} = -12 - (-12) = -12 + 12 = 0$$

$$M_{32} = \begin{vmatrix} 3 & 4 \\ 2 & 4 \end{vmatrix} = 12 - 8 = 4$$

$$M_{33} = \begin{vmatrix} 3 & -3 \\ 2 & -3 \end{vmatrix} = -9 - (-6) = -9 + 6 = -3$$



Shreya Deepak Athane

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Shri Swami Vivekanand Shikshan Sanstha Kolhapur's

VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)

SUPPLIMENT

Date - 5/3/25

Suppliment No. :

Roll No. : 7759

Class : 8Y

Signature
of
Supervisor



Subject physics (Minor)

Test / Tutorial No. :

Div. : A.

co-factor

$$C_{11} = (-1)^{1+1} = (-1)^2 \cdot 1 = 1$$

$$C_{12} = (-1)^{1+2} = (-1)^3 \cdot -2 = -2$$

$$C_{13} = (-1)^{1+3} = (-1)^4 \cdot -2 = -2$$

$$C_{21} = (-1)^{2+1} = (-1)^3 \cdot 1 = -1$$

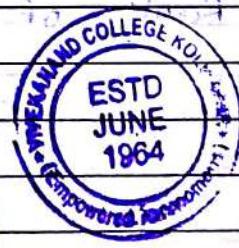
$$C_{22} = (-1)^{2+2} = (-1)^4 \cdot 3 = 3$$

$$C_{23} = (-1)^{2+3} = (-1)^5 \cdot -3 = 3$$

$$C_{31} = (-1)^{3+1} = (-1)^4 \cdot 0 = 0$$

$$C_{32} = (-1)^{3+2} = (-1)^5 \cdot 4 = -4$$

$$C_{33} = (-1)^{3+3} = (-1)^6 \cdot 3 = 3$$



co-factor =
$$\begin{bmatrix} 1 & -2 & -2 \\ -1 & 3 & 3 \\ 0 & -4 & 3 \end{bmatrix}$$

Q1 Adjoint of A =
$$\begin{bmatrix} 1 & -1 & 0 \\ -2 & 3 & -4 \\ -2 & 3 & 3 \end{bmatrix}$$

Q2
$$A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 4 & 7 \\ 3 & 6 & 10 \end{bmatrix}$$

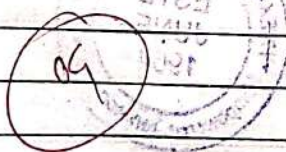
$$= R_2 - 2R_1, R_3 - 3R_1$$

$$\begin{bmatrix} 1 & 2 & 3 \\ 0 & 0 & 1 \\ 0 & 0 & 1 \end{bmatrix}$$

$$R_2 - R_3, R_3 - R_2$$

$$\begin{bmatrix} 1 & 2 & 3 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}$$

Rank of matrix = 2



Rupesh Mohan Nigade

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VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)

SUPPLIMENT

Signature
of
Supervisor

Suppliment No. :

Roll No. : 7965

Class : BSc Sy

Subject : Mathematical and
Test / Tutorial No. : Thermal Physics

Div. : I

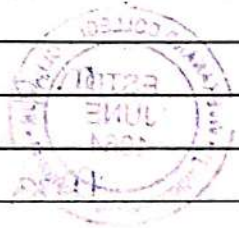
Q.1

1. Matrix multiplication is associative, if
commutability is assured

→ c) $AB \neq BA$

2) $(\cos \theta + i \sin \theta)^n =$

→ a) $\cos n \theta + i \sin n \theta$



Q2)

1.)

$$A \rightarrow A^{-1} = \frac{1}{|A|} \therefore (\text{Adj } A)$$

$$|A| = 3(-3+4) + 3(2) + 4(-2) \\ = +3 + 6 - 8 \\ = -1$$

$$m_{11} = \begin{vmatrix} -3 & 4 \\ -1 & 1 \end{vmatrix} = -3+4=1 \quad C_{11} = (-1)^2 m_{11} = 1$$

$$m_{12} = \begin{vmatrix} 2 & 4 \\ 0 & 1 \end{vmatrix} = 2-0=2$$

$$C_{12} = (-1)^3 = -2$$

$$m_{13} = \begin{vmatrix} 2 & -3 \\ 0 & -1 \end{vmatrix} = -2 = -2$$

$$C_{13} = (-1)^4 = -2$$

$$m_{21} = \begin{vmatrix} -3 & 4 \\ -1 & 1 \end{vmatrix} = -3+4=1$$

$$C_{21} = (-1)^3 = -1$$

$$m_{22} = \begin{vmatrix} 3 & 4 \\ 0 & 1 \end{vmatrix} = 3$$

$$C_{22} = (-1)^4 = 3$$

$$m_{23} = \begin{vmatrix} 3 & -3 \\ 0 & -1 \end{vmatrix} = -3$$

$$C_{23} = (-1)^5 = 3$$

$$m_{31} = \begin{vmatrix} -3 & 4 \\ -3 & 4 \end{vmatrix} = -12+12=0$$

$$C_{31} = 0$$

$$m_{32} = \begin{vmatrix} 3 & 4 \\ 2 & 4 \end{vmatrix} = 12-8=4$$

$$C_{32} = (-1)^5 = -4$$

$$m_{33} = \begin{vmatrix} 3 & -3 \\ 2 & -3 \end{vmatrix} = -9+6=-3$$

$$C_{33} = (-1)^6 = 3$$



$$\text{cof} = \begin{bmatrix} 1 & -2 & -2 \\ -1 & 3 & 3 \\ 0 & -4 & 3 \end{bmatrix} \rightarrow \text{Adj } A = \begin{bmatrix} 1 & -1 & 0 \\ -2 & 3 & -4 \\ -2 & 3 & 3 \end{bmatrix}$$

04

3)

$$A \rightarrow A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 4 & 7 \\ 3 & 6 & 10 \end{bmatrix}$$

$$R_2 = R_2 - 2R_1, R_3 = R_3 - 3R_1$$

$$A = \begin{bmatrix} 1 & 2 & 3 \\ 0 & 0 & 1 \\ 0 & 0 & 1 \end{bmatrix}$$

$$R_3 = R_3 - R_2$$

$$A = \begin{bmatrix} 1 & 2 & 3 \\ 0 & 0 & 1 \\ 0 & 0 & 0 \end{bmatrix}$$

$$\therefore P[A] = 2$$

02



"Education for Knowledge, Science and Culture"
-Shikshanmaharshi Dr. Bapuji Salunkhe
Shri Swami Vivekanand Shikshan Sanstha, Kolhapur
Vivekanand College, Kolhapur (Empowered Autonomous)
Department of Physics

B.Sc. Part-II SEM IV Internal Examination (2024-25)
Environmental Physics-Minor
Paper code: MIN03PHY42

Day: - Thursday
Date: - 06/03/2025

Time: - 10.00 am- 11.00 am
Total Marks: 10

Sr. No.	Name of the students	Roll. No.	Sign	Marks
1.	Sumit Jotiba Dhabale	7743	<i>S.J. Dhabale</i>	
2.	Shreya Deepak Athane	7759	<i>S.P. Athane</i>	
3.	Pratishtha B. Bhoplekar	7954	<i>P.B.</i>	
4.	Rupesh M. Nigade	7965	<i>R. Nigade</i>	



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Shri Swami Vivekanand Shikshan Sanstha, Kolhapur
Vivekanand College, Kolhapur (Empowered Autonomous)
Department of Physics
B.Sc. Part-II SEM IV (Minor Paper VIII)
Internal Examination
Environmental Physics

Date: 06/03/2025

Day: Thursday

Total Marks: 10

Time: 10 -11 AM

Q.1] Select correct alternatives.

(02)

1. The ozone filter is located in the.....

a) stratosphere b) mesosphere c) thermosphere d) exosphere

2. is a type of natural change.

a) deforestation b) burning fossil fuels c) agriculture d) volcanic eruptions

Q.2] Short answer questions. (attempt any 2)

(08)

1. Write the four major environmental problems.

2. What is photosynthesis? Write the equation of photosynthesis process.

3. What is the greenhouse effect? Mention greenhouse gases.



Name :- Sumit Jotiba Dhabule.

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Shri Swami Vivekanand Shikshan Sanstha Kolhapur's

VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)

SUPPLIMENT

Date :- 06/03/2023

Suppliment No. :

Roll No. : 7743

Class : BSc-SY

Signature
of
Supervisor

Subject : Environmental Physics

Test / Tutorial No. :

Div. :

5
10

Q.1]

②

i) The ozone filter is located in the

=> a) stratosphere

2] is a type of natural change.

=> c) agriculture

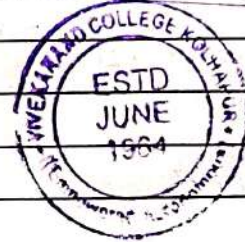
d) volcanic eruptions



Q2]

Q1. What is photosynthesis? Write the equation of photosynthesis process.

⇒ ~~photosynthesis is the process of natural gases~~
~~to the studied of environmental pollution is called~~
~~photosynthesis.~~



Equation of photosynthesis

4

Write the four major environmental problems.

⇒ 1. Climate change :- Global warming, rising sea levels, and extreme weather events due to greenhouse gas emissions.

2. Air pollution :- Release of pollutants like particulate matter, nitrogen oxides and sulfur dioxide, affecting human health and ecosystems.

3. Water pollution :- Contamination of water bodies through industrial waste, agricultural runoff, and domestic ~~sewage~~ sewage, harming aquatic life and human health.

4. Deforestation :- Clearance of forests for agriculture, urbanization, and logging, leading to loss of biodiversity, soil erosion, and climate change.



Rupesh Mahan Nigade



(अधिकारप्रदत्त स्वायत्त)
कोल्हापूर

VIVEKANAND COLLEGE, KOLHAPUR.
(Empowered Autonomous)

SUPPLIMENT

॥ ज्ञान, विज्ञान आणि सुसंस्कार यासाठी शिक्षण प्रसार ॥

- शिक्षणमहर्षी डॉ. बापूजी साळुंखे

Jr. Supervisor's Sign. :

Students Sign. : Rupesh Nigade

Seat No. : 7965

Seat No. in words :

Suppliment No. :

47105

Centre

5
10

प्र. क्र.
Q. No.

Q.1) (2)

1. The ozone filter is located in the _____

→ a) stratosphere

2. _____ is a type of natural change

→ d) Volcanic eruptions



[illegible]

प्र. क्र.
Q. No.

Q2]

A →

- (i) Major current environmental issues may include climate change, pollution, environmental degradation, and resource depletion.
- (ii) The conservation movement lobbies for protection of endangered species and protection of any ecologically valuable natural areas, genetically modified foods, and global warming.
- (iii) Environmental problems are the harmful effects of activities on the environment.
- (iv) These include pollution, overpopulation, waste disposal, climate change, global warming, etc.



prathamesh Babasaheb Khopkar

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Shri Swami Vivekanand Shikshan Sanstha Kolhapur's

VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)

SUPPLIMENT

Suppliment No. :

Roll No. : 7954

Class : BSc. 4

Signature
of
Supervisor

Subject : Environmental physics

Test / Tutorial No. :

Div. : A

15
10

Q.1] Select correct alternatives.

①. The ozone filter is located in the

→ a] Stratosphere

②. ----- is a type of natural change.

→ d] volcanic eruptions



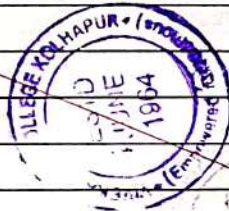
Q.2]

shoot answer questions. (attempt any 2)

①

→

major environmental problems issues may include climate change, pollution, environmental degradation, and resource depletion. the conservation movement lobbies for protection. the conservation movement of may ecologically valuable natural areas genetically modified foods and global warming. Environmental issues are the harmful effect of human activities on the environment. these include pollution and climate change, global warming, the global the greenhouse effect. this is a very important major environmental problems.



③ ②

→

Earth's greenhouse gas heat in the atmosphere and warm the plant the main gases responsible for the greenhouse effect include "carbon dioxide methane nitrous oxide, and water vapour." In addition, to these natural compounds synthetic halourinated gas also function as greenhouse gases. The greenhouse effect is a natural process where certain gases in Earth's atmosphere trap heat, warming the plant. It is similar to how a greenhouse works, where sunlight enters; but the heat is trapped inside. However, increased greenhouse gas from human activities have intensified this effect, leading to climate change.

key greenhouse gases

- 1] ~~key~~ Carbon dioxide (CO_2)
- 2] methane (CH_4)
- 3] water vapour (H_2O)

