

Shri Swami Vivekanand Shikshan Sanstha's

Vivekanand College, Kolhapur (Empowered Autonomous).

Department of Physics

Date: 02/09/2024

Internal Examination Notice

The students of B.Sc. I, II and III are hereby informed that the internal examination of current semester is scheduled as per following time table:

Sr. No.	Class and Sem	Paper No.	Title of the paper	Date and time
1.	B.Sc. I, SEM I	I	Mechanics I	24/09/2024 10: 00 to 11:00 am
2.	B.Sc. I, SEM I	II	Electricity and Magnetism I	25/09/2024 10: 00 to 11:00 am
3.	B.Sc. II, SEM III	V	Thermal and statistical mechanics I	24/09/2024 10: 00 to 11:00 am
4.	B.Sc. II, SEM III	VI	Waves and Oscillations	25/09/2024 10: 00 to 11:00 am
5.	B.Sc. III, SEM V	IX	Mathematical Physics	24/09/2024 12:00 to 01:00 pm
6.	B.Sc. III, SEM V	X	Nuclear and Particle Physics	25/09/2024 12:00 to 01:00 pm
7.	B.Sc. III, SEM V	XI	Quantum physics	26/09/2024 12:00 to 01:00 pm
8.	B.Sc. III, SEM V	XII	Solid state physics I	27/09/2024 12:00 to 01:00 pm

Nature of question paper

- For B.Sc. I and II

Total Marks (for each paper) = 10

Q: 1) Select correct alternative

(4 marks)

Q: 2) Short answer question (any two out of three)

(08 marks)

- For B.Sc. III

Total Marks (for each paper) = 15

Q: 1) Select correct alternative

(3 marks)

Q: 2) Short answer question (any three out of four)

(12 marks)



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

Shri Swami Vivekanand Shikshan Sanstha, Kolhapur's

Vivekanand College, Kolhapur

(Empowered Autonomous)

Department of Physics

B. Sc. / M.Sc. ☒ Part - _____, Semester - III, PHYSICS Paper - _____

Title of the Paper: Internal Examination (B.Sc. II Major)

Name of Teacher: _____

Attendance Sheet

Sr. No.	Name of the Student	paper - V (PSC03 PHY 31)					
1)	Rushikesh S. Raut	<u>Raut</u>	<u>Raut</u>				
2)	NIHAL R. SAYYAD	<u>Sayyad</u>	<u>Sayyad</u>				
3)	Prem M Agrawal	<u>PA</u>	<u>PA</u>				
4)							
5)							
6)							
7)							
8)							
9)							
10)							
11)							
12)							
13)							
14)							
15)							
16)							
17)							
18)							
19)							
20)							



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Shri Swami Vivekanand Shikshan Sanstha, Kolhapur
Vivekanand College, Kolhapur (Empowered Autonomous).
Department of Physics

B.Sc. Part-II SEM III Examination (2024-25)
Waves and Oscillations

Paper VI (Paper code: DSC03PHY32)

Date : 25/09/2024

Day : 10.00 to 11.00 am

Total Marks: 10

Time :- 1 hour

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

(2)

1) What is the frequency of SHM?

- | | |
|---|------------------------------|
| a) Number of oscillations per unit time | b) Time for one oscillation |
| c) Time taken for motion to reverse direction | d) Same as angular frequency |

2) The waves, in which the particles of the medium vibrate in a direction perpendicular to the direction of wave motion, is known as _____

- | | |
|---------------------|-----------------------|
| a) Transverse waves | b) Longitudinal waves |
| c) Propagated waves | d) Magnetic waves |

Q.2 Attempt any One

(8)

1. Discuss in detail , analytically , the resultant motion of two simple harmonic motions having same frequency and acting along the same line
2. Discuss in detail , analytically , the resultant motion of two simple harmonic motions having same frequency and acting at right angles to each other



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- शिक्षणमहर्षी डॉ. बापूजी साळुंखे

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51515

VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)

SUPPLIMENT

Name : Rushikesh Sarjerao Raut.
Suppliment No. : 1
Roll No. : 7701
Class : B.Sc Sy

Signature
of
Supervisor

Subject : waves & Oscillations
Test / Tutorial No. : Internal exam
Div. :

06
10

Q1 1 a) Number of oscillation per unit time

2 a) Transverse wave



Q2 1 Consider. a simple harmonic motions having same frequency but different ~~amplitude~~ ~~amplitude~~ but different amplitudes a_1 & a_2 . So the phase difference are α_1 & α_2 .

Now the linear s.h.m. y_1 & y_2 .
it is

$$y_1 = a_1 \sin(\omega t + \alpha_1) \quad \text{--- (1)}$$

$$y_2 = a_2 \sin(\omega t + \alpha_2) \quad \text{--- (2)}$$

Here $y = y_1 + y_2$.

$$\begin{aligned} \therefore y &= a_1 \sin(\omega t + \alpha_1) + a_2 \sin(\omega t + \alpha_2) \\ &= a_1 (\sin \omega t \cos \alpha_1 + \cos \omega t \sin \alpha_1) \\ &\quad + a_2 (\sin \omega t \cos \alpha_2 + \cos \omega t \sin \alpha_2) \\ &= a_1 \sin \omega t \cos \alpha_1 + a_2 \sin \omega t \cos \alpha_2 \\ &\quad + a_1 \cos \omega t \sin \alpha_1 + a_2 \cos \omega t \sin \alpha_2 \end{aligned}$$

$$\begin{aligned} &= \sin \omega t \cdot (a_1 \cos \alpha_1 + a_2 \cos \alpha_2) \\ &\quad + \cos \omega t \cdot (a_1 \sin \alpha_1 + a_2 \sin \alpha_2) \end{aligned}$$

Now $(a_1 \cos \alpha_1 + a_2 \cos \alpha_2) = R \cos \alpha$.

$(a_1 \sin \alpha_1 + a_2 \sin \alpha_2) = R \sin \alpha$.

$$\begin{aligned} &\sin \omega t (R \cos \alpha) + \cos \omega t (R \sin \alpha) \\ &= R (\sin(\omega t + \alpha)) \end{aligned} \quad \text{--- (4)}$$



NAME - NIHAL RIYAJMAMAD SAYYAD

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VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)

SUPPLIMENT

Suppliment No. : 1

Roll No. : 7702

Class : BSC-SY-MAJOR

Signature
of
Supervisor

Subject : PHYSICS

Test / Tutorial No. : INTERNAL ~~EXAM~~ EXAM

Div. : -

• WAVES AND OSCILLATIONS •

Q1]

1)

→ a) Number of oscillations per unit time

10
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2)

→ a) Transverse waves



Q27

1)

→

Consider two simple Harmonic oscillations having same frequencies but different amplitudes & Phase acting on a particle in Y-direction. Let y_1 & y_2 be the Displacement of two SHM's. Therefore, according to the principle of Superposition of waves the resultant Displacement is given by -

$$y = y_1 + y_2$$

$$\text{Here, } y_1 = a_1 \sin(\omega t + \alpha_1)$$

$$y_2 = a_2 \sin(\omega t + \alpha_2)$$

where, a_1 & a_2 are the amplitudes & α_1 & α_2 are phases.

$$\therefore y = a_1 \sin(\omega t + \alpha_1) + a_2 \sin(\omega t + \alpha_2)$$

$$= a_1 (\sin \omega t \cos \alpha_1 + \cos \omega t \sin \alpha_1) + a_2 (\sin \omega t \cos \alpha_2 + \cos \omega t \sin \alpha_2)$$

$$\therefore (\sin(A+B) = \sin A \cos B + \cos A \sin B)$$

$$= a_1 \sin \omega t (\cos \alpha_1 + \cos \alpha_2) + a_2 \cos \omega t (\sin \alpha_1 + \sin \alpha_2)$$

$$\text{put } a_1(\cos \alpha_1 + \cos \alpha_2) = R \cos \theta \quad \text{--- (1)}$$

$$\& a_2(\sin \alpha_1 + \sin \alpha_2) = R \sin \theta. \quad \text{--- (2)}$$

$$\therefore y = \sin \omega t R \cos \theta + \cos \omega t R \sin \theta.$$

$$= R \sin(\omega t + \theta)$$

$$\therefore \sin(A+B) = \sin A \cos B + \cos A \sin B.$$

$$y = R \sin(\omega t + \theta)$$

This is the resultant displacement of two SHM's. Having same angular frequency but different



amplitude & Phase

Squaring & adding eqⁿ ① & ②.

$$\therefore R \cos^2 \theta + R \sin^2 \theta = a_1^2 (\cos \alpha_1 + \cos \alpha_2)^2 + a_2^2 (\sin \alpha_1 + \sin \alpha_2)^2$$

$$= a_1^2 \cos^2 \alpha_1 + 2 \cos \alpha_1 \cos \alpha_2 + \cos^2 \alpha_2 + a_2^2 \sin^2 \alpha_1 + 2 \sin \alpha_1 \sin \alpha_2 + \sin^2 \alpha_2$$

$$\therefore R (\cos^2 \theta + \sin^2 \theta) = a_1^2 (\cos^2 \alpha_1 + 2 \cos \alpha_1 \cos \alpha_2 + \cos^2 \alpha_2) + a_2^2 (\sin^2 \alpha_1 + 2 \sin \alpha_1 \sin \alpha_2 + \sin^2 \alpha_2)$$

$$\therefore R = \sqrt{a_1^2 + a_2^2 + 2 a_1 a_2 \cos(\alpha_1 + \alpha_2)}$$

Now, Dividing eqⁿ ② by ①.

$$\therefore \frac{R \sin \theta}{R \cos \theta} = \frac{a_2 (\sin \alpha_1 + \sin \alpha_2)}{a_1 (\cos \alpha_1 + \cos \alpha_2)}$$

$$R^2 = \tan^{-1} \left(\frac{a_2 \sin \alpha_1 + a_2 \sin \alpha_2}{a_1 \cos \alpha_1 + a_1 \cos \alpha_2} \right)$$

$$\therefore \left(\frac{\sin \theta}{\cos \theta} = \tan \theta \right)$$



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51518

VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)

SUPPLIMENT

Suppliment No. :

Roll No.

Class

: 79459

: BSc II

Signature
of
Supervisor

Subject : Physics (Major) Paper 2

Test / Tutorial No. :

Div. :

1]

i) a) Number of oscillations per unit time

ii) a) Transverse waves

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2]

i) $y_1 = a_1 \sin(\omega t + \alpha_1)$ (i), $y_2 = a_2 \sin(\omega t + \alpha_2)$ (ii)
 $\therefore y = y_1 + y_2$

$$\begin{aligned} \therefore y &= a_1 \sin(\omega t + \alpha_1) + a_2 \sin(\omega t + \alpha_2) \\ &= a_1 (\sin \omega t \cos \alpha_1 + \cos \omega t \sin \alpha_1) + a_2 (\sin \omega t \cos \alpha_2 + \cos \omega t \sin \alpha_2) \\ &= \sin \omega t (a_1 \cos \alpha_1 + a_2 \cos \alpha_2) + \cos \omega t (a_1 \sin \alpha_1 + a_2 \sin \alpha_2) \\ \text{Let } (a_1 \cos \alpha_1 + a_2 \cos \alpha_2) &= R \cos \theta \text{ (iii)} \\ \& (a_1 \sin \alpha_1 + a_2 \sin \alpha_2) &= R \sin \theta \text{ (iv)} \\ \therefore y &= \sin \omega t (R \cos \theta) + \cos \omega t (R \sin \theta) \\ &= R (\sin \omega t \cos \theta + \cos \omega t \sin \theta) \\ &= R \sin(\omega t + \theta) \end{aligned}$$



$$\therefore y = R \sin(\omega t + \theta) \quad \textcircled{v}$$

⑤ represents that resultant motion is in SHM.

sq² and addⁿ ③ & ④

$$\therefore (a_1 \cos \alpha_1 + a_2 \cos \alpha_2)^2 + (a_1 \sin \alpha_1 + a_2 \sin \alpha_2)^2 = R^2 \cos^2 \theta + R^2 \sin^2 \theta$$

$$\therefore a_1^2 \cos^2 \alpha_1 + 2a_1 a_2 \cos \alpha_1 \cos \alpha_2 + a_2^2 \cos^2 \alpha_2 + a_1^2 \sin^2 \alpha_1 + 2a_1 a_2 \sin \alpha_1 \sin \alpha_2 + a_2^2 \sin^2 \alpha_2 = R^2 (\cos^2 \theta + \sin^2 \theta)$$

$$\therefore a_1^2 (\cos^2 \alpha_1 + \sin^2 \alpha_1) + 2a_1 a_2 [\cos \alpha_1 \cos \alpha_2 + \sin \alpha_1 \sin \alpha_2] + a_2^2 (\cos^2 \alpha_2 + \sin^2 \alpha_2)$$

$$\therefore a_1^2 + 2a_1 a_2 \cos(\alpha_1 - \alpha_2) + a_2^2 = R^2$$

$$\therefore R = \sqrt{a_1^2 + 2a_1 a_2 \cos(\alpha_1 - \alpha_2) + a_2^2}$$

$\therefore$ The resultant motion of two simple harmonic motions having same frequency and acting at right angles to along the same line = $\sqrt{a_1^2 + 2a_1 a_2 \cos(\alpha_1 - \alpha_2) + a_2^2}$

Let α_1 & α_2 be 2 angular frequencies,

a_1 & a_2 be 2 amplitudes,

and y_1 & y_2 be the 2 displacements in SHM.

Divide ④ & ③

$$\frac{R \sin \theta}{R \cos \theta} = \frac{a_1 \sin \alpha_1 + a_2 \sin \alpha_2}{a_1 \cos \alpha_1 + a_2 \cos \alpha_2}$$

$$\therefore \tan \theta = \frac{a_1 \sin \alpha_1 + a_2 \sin \alpha_2}{a_1 \cos \alpha_1 + a_2 \cos \alpha_2}$$

$$\therefore \theta = \tan^{-1} \left(\frac{a_1 \sin \alpha_1 + a_2 \sin \alpha_2}{a_1 \cos \alpha_1 + a_2 \cos \alpha_2} \right)$$



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Department of Physics

B.Sc. Part-II SEM III Examination (2024-25)
Thermal and statistical Mechanics I
Paper V (Paper code: DSC03PHY31)

Date : 25 /09 /2024
Day : 10.00 to 11.00 pm

Total Marks: 15
Time :-

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

(3)

1. According to kinetic theory of gases, all gas molecules are ... in terms of shape and size.
 - a) Identical
 - b) Different
 - c) Double
 - d) None of above
2. Which of the following is monoatomic gas..?
 - a) H gas
 - b) N₂ gas
 - c) CH₄ gas
 - d) O₂ gas
3. Mean free path of gas molecule is..... to pressure of gas molecule
 - a) directly proportional
 - b) inversely proportional
 - c) is equal to
 - d) two times

Q.2 Attempt any THREE

(12)

1. Write a short note on postulates of kinetic theory of gases
2. Derive the relation for mean free path of gas molecule
3. Derive the relation for the coefficient of diffusion of the gas molecule using kinetic theory of gases.
4. Derive the relation for the coefficient of diffusion of the gas molecule using kinetic theory of gases.



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51726

VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)

SUPPLIMENT

Name: Rushikesh Sarjerao Raut
Suppliment No. : 1

Roll No. : 7701

Class : B.Sc.-54

Signature
of
Supervisor

Subject: Thermal and statistical
Mechanics-I

Test / Tutorial No. : Internal Exam

Div. :

- Q1
1. a) different ✓
 2. a) H gas ✓
 3. b) inversely proportional ✓

06
10

2



Q2

1) Postulates of kinetic theory of gases,

1) Molecules.

A gas is composed from a small indivisible particle is called molecules. The same gases of molecules are alike & differ from other gas.

three types of molecules.

1) Monoatomic : He gas Ne gas

2) Diatomic : H_2 gas O_2 gas

3) Polyatomic : CH_4 gas.

2) The same gas molecules are identical in all aspects. They have same mass shape & size but different gas molecules having diff properties.

3) Volume.

The volume of gas molecule are negligible compared the vessel volume.

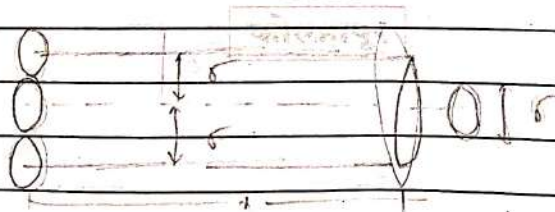
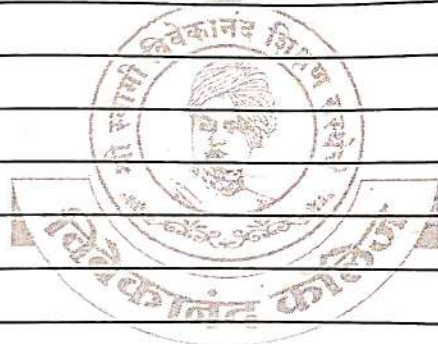
4) molecules have no inter molecular force of attraction or repulsion.

5) Pressure is not depends upon the no. of particles it is depends on force on area.

$$P = \frac{F}{A}$$



③ Kinetic energy does not depend upon the no. of molecules.



NAME - NIHAL RIYAJAHAMAD SAYYAD

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51729

VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)

SUPPLIMENT

Suppliment No. : 1

Roll No. : 7702

Class : BSC-SY-MAJOR

Signature
of
Supervisor

Subject : PHYSICS

Test / Tutorial No. : INTERNAL EXAM

Div. : -

• THERMAL & STATISTICAL MECHANICS-I •

Q1]

1)

→ a) Identical ✓

10
10

2)

→ a) H gas ✓

3)

→ b) Inversely Proportional ✓



Q2]

17

→

The kinetic theory of Gases takes into account the microscopic structure of matter, a gas enclosed in a container consists of large number of molecules moving in all directions colliding with each other.

There are 8 Postulates of kinetic Theory of Gases -

The Postulates are as follows -

consists of

- (1) Molecules - The Gas is ~~in~~ indivisible small particles, The particles are called molecules.

There are 3 types of molecules - Mono, Dia & Poly.

- (2) The molecules of the same gases are identical in shape & size while they differ from other gas molecules.

- (3) Intermolecular Forces - The intermolecular force betⁿ the gas molecules is negligible.

- (4) Volume - Volume occupied by gas is negligible to that of the container.

- (5) Pressure - Gas exerts pressure on the walls of the container - $P = \frac{F}{A}$

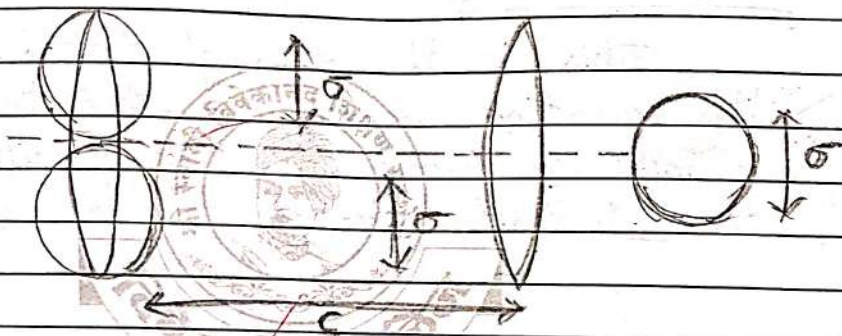


- (6) Elastic Collision - The molecules of the gas undergo Elastic collision i.e. there is no loss or gain of energy during collision.

- (7) K.E - The kinetic energy of the gas depends on the absolute temperature & not the nature of Gas. (on)

MEAN FREE PATH -

Consider n no. of molecules per c.c. The total mass of the gas is divided into infinitesimal parallel layers whose thickness is same as that of a single molecule.



While calculating mean free path it is considered that all the molecules of the gas are steady & only one molecule is moving. This moving molecule has velocity c . It collides with every molecule which lie at the center of the cylinder with radius σ & length c . The volume of the cylinder is $\pi\sigma^2 c$ & the cross sectional area is $\pi\sigma^2$. ~~This~~

$\therefore$ The total no. of collisions made by this molecule is on N is given by - $N = Vn = \pi\sigma^2 c$ is the total no. of molecules of the gas



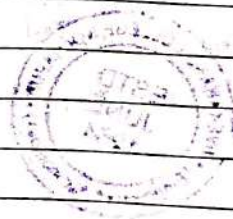
The mean free path is given by λ .

$$\lambda = \frac{\text{Total distance travelled by molecule in one second}}{\text{No of collisions made by the molecule in one second.}}$$

$$\therefore \lambda = \frac{c}{n\pi\sigma^2 c}$$

$$\boxed{\therefore \lambda = \frac{1}{n\pi\sigma^2}}$$

This is the value of Mean free Path. From this equation we can say that the mean free path is inversely proportional to Density of the gas & thus, inversely proportional to Pressure.



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51732

VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)

SUPPLIMENT

Suppliment No. : 2

Roll No. : 7702

Class : BSC-SY

Signature
of
Supervisor

Subject : PHYSICS

Test / Tutorial No. : INTERNAL EXAM

Div. : -

2]

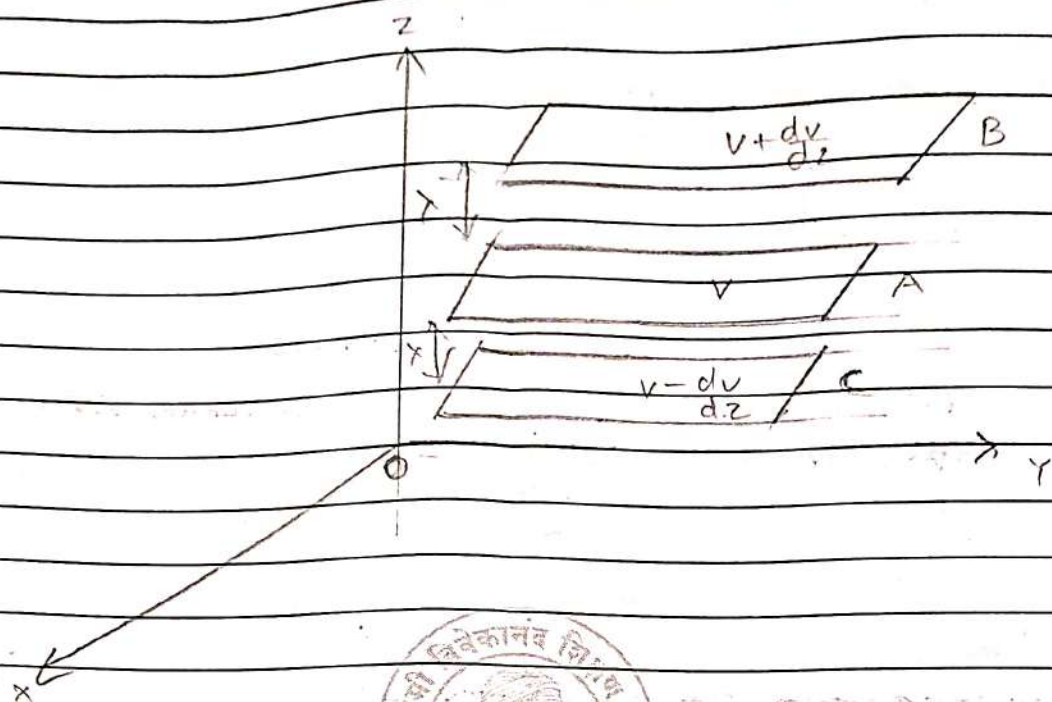
3)

→ COEFFICIENT OF VISCOSITY -

Let us consider that the gas in a container is divided into infinitesimal layers. The layers are only of the thickness of one molecule. These layers are parallel to the $(x-y)$ plane & are flowing in the +ve direction of the x -axis. The layer situated at the bottom near to surface of the container has zero velocity. The velocity increases in steady state of motion as we go upwards from the surface.

Consider an intermediate layer A with velocity V & velocity gradient $\frac{dv}{dz}$. The velocity of the layers above this layer is more than the layers below it & the velocity of the layers below it is less than the layers above.





The layer B exerts a tangential force on layer A which tries to increase the velocity of the layer A & the layer C exerts a tangential force on layer A which tries to decrease the velocity of the layer A. Thus, a tangential force is created in layer A which maintains the difference. Let these force. This force is called Viscous Force.

Viscous force is given by -

$$F = \eta \frac{dv}{dz}$$

— (1)

where η is coefficient of viscosity

The layers of the gas are of equal density as the flow is steady. Therefore the density remains same along each axis i.e. $\frac{1}{3}$ part of gas along x, y & z axis & $\frac{1}{3}$ parts of the gas along +ve & -ve direction of the z axis.

$\therefore$ the velocity of the molecules is $\propto \frac{1}{\sqrt{3}}$

$\therefore$ The total molecules = $\frac{n}{\sqrt{3}}$



The total momentum exerted by molecules of layer B on layer A is - $\frac{mnc}{6} \left(v + \frac{dv}{dz} \right)$

The momentum exerted by molecules of layer C on layer A is - $\frac{mnc}{6} \left(v - \frac{dv}{dz} \right)$

$$\therefore \text{Total momentum} = \frac{mnc}{6} \left(\left(v + \frac{dv}{dz} \right) + \left(v - \frac{dv}{dz} \right) \right)$$

$$= \boxed{\frac{1}{3} mnc \frac{dv}{dz}} \quad \text{--- (2)}$$

= net momentum per unit area

= Force

Comparing eqⁿ ① & ② we get,

$$\eta \frac{dv}{dz} = \frac{1}{3} mnc \frac{dv}{dz}$$

$$\therefore \boxed{\eta = \frac{1}{3} mnc}$$

This is the equation for coefficient of viscosity according to the kinetic theory of gases.
But, $mn = \rho$ - Density.

$$\therefore \boxed{\eta = \frac{\rho c}{3}}$$

$\therefore$ coefficient of viscosity is directly proportional to the density of the gas but is independent of the pressure of the gas.



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51724

VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)

SUPPLIMENT

Suppliment No. :

Roll No. : 7949

Class : BSc II

Signature
of
Supervisor :

Subject : Physics (Major)

Test / Tutorial No. :

Div. :

1]

i) a) Identical ✓

ii) a) H gas ✓

iii) b) Inversely proportional ✓

2]

i) Molecules: Molecules are indivisible particles. Molecules of the same gas are alike but differ from molecules of other gases.

Molecules of same gas: Molecules of same gas are alike in every aspect. They have same mass, shape and size.

Volume: Volume of molecules is negligible compared to volume of the container.

Random motion: The molecules travel in straight path unless they collide with the wall of container or other molecule.



Kinetic energy: The KE of gas molecules does not depend on the nature of gas. it depends on the absolute temperature.
Eg: ~~N₂ &~~ CH₄ & NH₄ have same KE on same temperature.

Gas pressure: When the molecules hit the wall of container, they exert certain pressure on the wall.

$$P = \frac{F}{A}$$

Collision: When the molecules hit the wall of container, there is no gain or loss of energy i.e. elastic collision.

ii) Let all molecules of gas be in rest except one molecule with velocity c . If the size of molecule be σ . The moving molecule A with velocity c will strike the molecules having size σ .



Shri Swami Vivekanand Shikshan Sanstha, Kolhapur's

Vivekanand College, Kolhapur

(Empowered Autonomous)

Department of Physics

B. Sc. / M.Sc. Part - _____, Semester - III, PHYSICS Paper - _____

Title of the Paper: Internal Examination (B.Sc. II - min)

Name of Teacher: _____

Attendance Sheet

Sr. No.	Name of the Student	MIN-V (min 03 phy 21)	MIN-VI (min 03 phy 32)				
1)	Sumit J Dhabale	<u>S.J. Dhabale</u>	<u>S.J. Dhabale</u>				
2)	Shreya. D. Athane	<u>Shreya</u>	<u>SDAthane</u>				
3)	Rupesh. M. Nigade	<u>Rupesh</u>	<u>Rupesh</u>				
4)	Prathmesh. B. Chopkar	<u>Prathmesh</u>	<u>Prathmesh</u>				
5)	Karan A. Bhosale	<u>Karan</u>	<u>Karan</u>				
6)							
7)							
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11)							
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17)							
18)							
19)							
20)							



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Vivekanand College, Kolhapur (Empowered Autonomous)
Department of Physics

B.Sc. Part-II SEM III Examination (2024-25)
Basic Electronics

Paper : MIN-V (MIN03PHY31)

Date : 24/09/2024

Day : Tuesday

Total Marks: 15

Time :- 10.00 - 11.00 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) Select correct alternative

(03)

1. The word 'Diode' is used to indicate that the device has....
(a) Two Junctions (b) Two electrodes
(c) Two Anodes (d) Two Cathodes
2. A light emitting diode is....
(a) Lightly doped (b) Heavily doped
(c) Intrinsic semiconductor (d) Zener diode
3. Zener diode is designed to specifically work in which region without getting damaged?
(a) Active region (b) Breakdown region
(c) Forward bias (d) Reverse bias

Q.2) Short answer question (any three out of four)

(12)

- i. Discuss the PN Junction diode.
- ii. What is Light Emitting Diode : Working & Its Applications
- iii. Definition of semiconductor.
- iv. What is solar cell ?



Shreya Deepak Athane (Minor)

॥ ज्ञान, विज्ञान आणि सुसंस्कार यांसाठी शिक्षण प्रसार ॥

- शिक्षणमहर्षी डॉ. बापूजी साळुंखे

Shri Swami Vivekanand Shikshan Sanstha Kolhapur's

51727

VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)

SUPPLIMENT

Suppliment No. : 1

Roll No. : 7759

Class : BSc (II)

Signature
of
Supervisor

Subject :

Test / Tutorial No. :

Div. :

08
15

Shreya

Q.1

1) The word 'Diode' is used to indicate that the device has two junctions

2 A light emitting diode is heavily doped

3 Zener diode is designed to specifically work in which region without getting damaged?

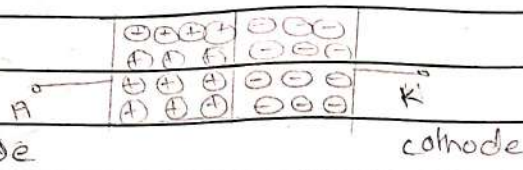
→ Breakdown region



Q2

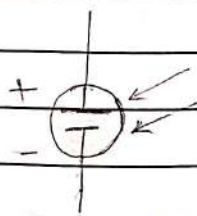
i] Extrinsic semiconductor types are classified as p type and N type.

In this p-n junction diode, diode is sandwiched between p type and n type material.



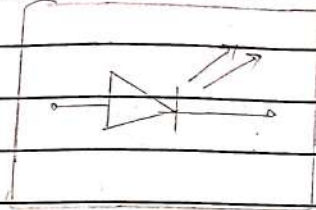
4] solar cell -

Solar cell is electrical device that convert into the energy of light directly into electricity or photovoltaic effect. which is a chemical and physical phenomenon. characteristic of solar cell is current, voltage, resistance vary when exposed to building block or photovoltaic modules otherwise known as photo panels. photovoltaic cell operate either under artificial light or sunlight.



2] Light Emitting Diode -

symbol -



कोरबा

Name:- Karan Anil Bhasale

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Shri Swami Vivekanand Shikshan Sanstha Kolhapur's

VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)

Internal exam
SUPPLIMENT

minor - physics

Suppliment No. :

Roll No. :

Class

: BSC - II 54

Signature
of
Supervisor

Subject :

Test / Tutorial No. :

Div. :

08
25

Q.1)

1) B) Two electrodes

2) B) Heavily doped

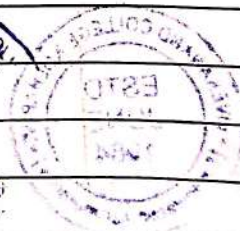
3) A) Active region



(Q.2)

i) A-P-N Junction is an interface or a boundary betn two semiconductor material types namely the p type and the semiconductor the P-N Junction is formed betn the p type and the n-type semiconductor In a semiconductor P-N junction is created by the method of doping the p side or the positive side of the semiconductor has an excess of holes.

ii) A solar cell is an electrical devices that converts the energy of light and directly electricity by the photolytic effect. The a physical and chemical phenomenon the form of photoelectric cell defined as a device whose electrical characteristics such as current, voltage or resistance building blocks of photovoltaic modules other wise known as solar pannel.



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Shri Swami Vivekanand Shikshan Sanstha Kolhapur's

51725

VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)

SUPPLIMENT

Name :- Sumit Totiba Dhabale

Suppliment No. :

Roll No. : 7743

Class : BSC-SY

Signature
of
Supervisor

Subject : physics (minor)

Test / Tutorial No. :

Div. :

08

15

Q.1)

1) The word 'Diode' is used to indicate that the device has

⇒ ~~a) Two Junctions~~ b) Two electrodes

2) A light emitting diode is

⇒ ~~b) Heavily doped~~ c) Heavily doped

3) Zener diode is designed to specifically work in which region without getting damaged?

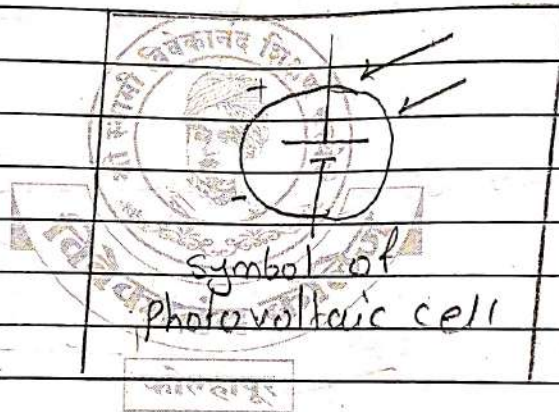
⇒ ~~d) Reverse bias~~ c) Breakdown region



iv) what is solar cell?

⇒ Define - A solar cell is an electrical device that converts the energy of light, which is directly into photovoltaic effect. the phenomenon of solar cell is physical and chemical phenomenon.

In the form of photoelectric cell, defined as the device in photovoltaic effect is created by the current, voltage and resistance vary when exposed to light. solar.



photovoltaic cell may operate under sunlight or artificial light.



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Vivekanand College, Kolhapur (Empowered Autonomous)
Department of Physics

B.Sc. Part-II SEM III Examination (2024-25)
Energy Studies

Paper : MIN-VI (MIN03PHY32)

Date : 25/09/2024

Day : Wednesday

Total Marks: 15

Time :-10.00-11.00am

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

(03)

1. The Capacity to do work is.....
(a) Motion (b) Power
(c) Energy (d) Force
2. Which of the following is secondary source of energy....
(a) sun (b) wind
(c) electrical (d) coal
3. Which of the following is not a unit of energy....
(a) Watt-sec (b) Joule
(c) Watt (d) kWh

Q.2 Short answer question (any three out of four)

(12)

- i. Explain essential subsystems in solar energy plants.
- ii. Application of wind energy
- iii. Definition of Energy.
- iv. Explain Energy Resource.



Name :- Kagan Anil Bhosale

॥ ज्ञान, विज्ञान आणि सुसंस्कार यांसाठी शिक्षण प्रसार ॥

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Shri Swami Vivekanand Shikshan Sanstha Kolhapur's

VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)

Internal exam
SUPPLIMENT

BSc - II - minor - physics

Suppliment No. :

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Class

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Test / Tutorial No. :

Div. :

05
15

Q.1)

1) The capacity to do work is

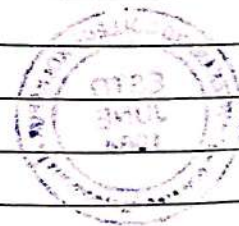
→ c) energy

2)

→ c) electrical

3)

→ b) Joule

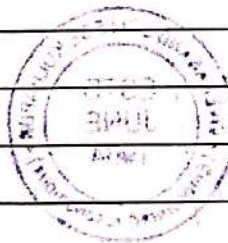


Q.2)

iii) Energy :- the capacity for the ~~doing~~ energy work. It may exist in potential energy, kinetic energy and thermal energy electrical chemical nuclear or other various forms. There are moreover the heat the energy process of transfer from one body to another after has been transferred energy is always designed according to the nature become the thermal energy work done may manifest in the mechanical energy.

i) Essential subsystems in solar energy plants :-

3 The includes fossil fuels found in the ground in an area coal, oil, wood and gas. But it also includes the potential an area has to exploit renewable resources like wind power, sunlight solar power waves tidal power under ground heat and geothermal following rivers the PV array DC-DC converter DC AC inverter balance of system (BOS) and battery storage subsystem.



Poornima Debashree Khopkar

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VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)

SUPPLIMENT

Suppliment No. :

Roll No. : 7954

Class :

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Supervisor

Subject :

Test / Tutorial No. :

Div. :

08

15

Q.1

①

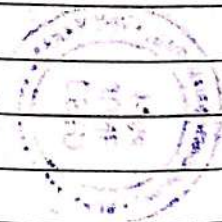
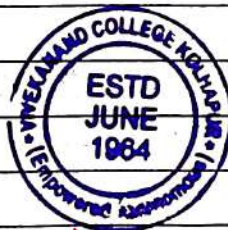
a] Energy

②

b] electrical

③

b] Joule



Q.2]

Q

1

wind energy system is divided into three main subsystems; electrical, mechanical, other subsystems. On the other hand, the solar - PV system includes five subsystems; PV array, DC-DC converter, DC-AC inverter, balance of system (BOS), and battery storage subsystems.

the PV Devices are the solar panels that convert the sunlight into solar electricity. the Load consists of all of the devices that use the electricity. the Load const generated by the PV Devices. This items like your microwave and blow dryer. This includes items such as the solar power inverter and storage batteries.



②

→

Application of wind Energy

Application of wind Energy :-

① the wind energy is used to propel the sailboats in river and seas to transport ~~mean~~ ^{men} and materials from one place to another.

② wind energy is used to run pumps to draw water from the grounds through wind mills.

wind energy has also been used to run flourmills to grind the grains like wheat and corn into flour.

③ Now-a-days wind energy is being used to generate electricity.

wind energy may be considered as the world's fastest growing energy source.



Energy :-

Energy in physics, the capacity for doing work. It may exist in potential, kinetic, thermal, electrical, chemical, nuclear, or other various forms. There are, moreover, heat and work - i.e., energy in the process of another. After it has been transferred, energy is always designated according to its nature. Hence, heat transferred may become thermal energy, while work done may manifest itself in the form of mechanical energy.



Rupesh mahan Nigade

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VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)

SUPPLIMENT

Suppliment No. :

Roll No.

Class

7965

BSc S.Y

Signature
of
Supervisor

Subject :

Energy studies

Test / Tutorial No. :

Div. :

10

1.5

Q1)

1. The Capacity to do work is _____

→ ~~a) Energy~~

2. which of the following is secondary source of energy _____

→ ~~c) electrical~~

3. which of the following is not a unit of energy _____

→ b) Joule



Q 2)

i.

A → ① Wind energy system is divided into two main subsystems, electrical, mechanical, other subsystems.

② On the other hand, the Solar-PV System includes five subsystems: PV array, DC-DC converter, DC-AC inverter, balance of system (BOS), and battery storage subsystems.

ii)

A) This includes Fossil Fuels found in the ground in an area: coal, oil, wood and gas. But it also includes the potential an area has to exploit renewable resources, like wind (wind power), sunlight (Solar power), waves (tidal power), underground heat (geothermal) and fast flowing rivers (hydroelectric power).



iii)

A→

- ① The capacity for doing work.
- ② It may exist in potential, kinetic, thermal, electrical, chemical, nuclear, or other various forms.
- ③ There are moreover, heat and work - i.e., energy in the process of transfer from one body to another.
- ④ After it has been transferred, energy is always designated according to its nature.
- ⑤ Hence, heat transferred may become thermal energy, while work done may manifest itself in the form of mechanical energy.
- ⑥ Energy can be neither created nor destroyed but only changed from one form to another.
- ⑦ This principle is known as the conservation of energy or the first law of thermodynamics.
- ⑧ Energy can be converted from one form to another in various other ways.



iv)

A → ① Energy resources are materials that can be used to produce energy for human use, such as electricity, power, heat, and movement.

② There are two main types of energy resources: renewable and non-renewable.

i) renewable

These resources are derived from natural sources that are inexhaustible.

Ex: ① Wind

② Solar

③ Hydro

ii) Non-Renewable

These resources come from sources that are limited on Earth.

Ex: ① Coal

② Petroleum

③ Nuclear fuels like uranium.

