

10

DOLPHIN[®]

UNNAL MUDIYUM

SCIENCE

Revised Edition

Attached

- PTA & All Govt Exam Questions & Answers Included
- Practical Manual



100
100
Sure



DOLPHIN PUBLICATIONS[®]



DOLPHIN[®]

UNNAL MUDIYUM

SCIENCE

**Revised
Edition**

SALIENT FEATURES

1. All Govt Exam Questions & Answers
2. PTA Questions & Answers
3. Higher Order Thinking Additional Questions
4. Collection Of Formula
5. Practical Manual Attached

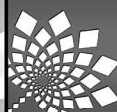


98653 06197 | 89256 77710 | 99435 67646

DOLPHIN PUBLICATIONS[®]

239, Keelappatti Street, SRIVILLIPUTTUR - 626 125. Virudhunagar Dt. TN.

Mail us : dolphin.pub2005@gmail.com | Visit us : www.kalvidolphin.com



Preface

Greetings to beloved Teachers and Students,

"Science is a beautiful gift to humanity, we should not distort it."

- Dr. APJ Abdul Kalam

As quoted by Kalam sir, Science is a beautiful gift to us. Students are the future pillars of the nation. We should develop our interest towards science and technology. It will help us think logically.

Dolphin guides – 10th Standard Science has been prepared in order to fulfill the needs of the students in different learning levels. The answers are very precise.

SALIENT FEATURES :

- 1. Answers for All Government Model and Exam Questions.**
- 2. Answers for Textual Exercises.**
- 3. Additional Questions and Answers for Higher Order Thinking.**
- 4. Collection of Formula.**
- 5. Practical Manual.**

We hope our guide will kindle the scientific urge among the students. It also leads you to score 100/100 in the upcoming SSLC Public Examination.



*"Dream is not that you see in sleep,
dream is something that does not let you sleep"*

*Best Wishes From
The Publisher*

TO ORDER BOOKS

Respected Head of the Institutions and Teachers,

Thank you for your support to Dolphin Publications.

You are the reason for our grand success.

Now you can order your needed copies by sending the same in your school letter pad.

For order please

Mobile No : 9865306197 / 8925677710 / 9943567646

Whatsapp No : 9345314146

Sms : 9345330937

Website : www.kalvidolphin.com

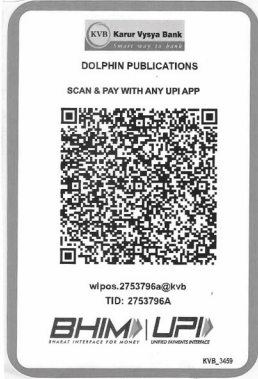
E-mail ID : dolphin.pub2005@gmail.com

BANK DETAILS (FOR DIRECT DEPOSIT)

D.D. / Cheque :

Should be drawn in favour of 'Dolphin Publications'
payable at Srivilliputtur.

ACCOUNT DETAILS



63743 17883

KARUR VYSYA BANK

A/C No : 1804135000006000

IFSC CODE : KVBL0001804

BRANCH : Srivilliputtur

CITY UNION BANK

A/C No : 328109000204092

IFSC CODE : CIUB0000328

BRANCH : Srivilliputtur

ICICI BANK

A/C No : 446005500030

IFSC CODE : ICIC0004460

BRANCH : Srivilliputtur

TAMILNADU MERCANTILE BANK

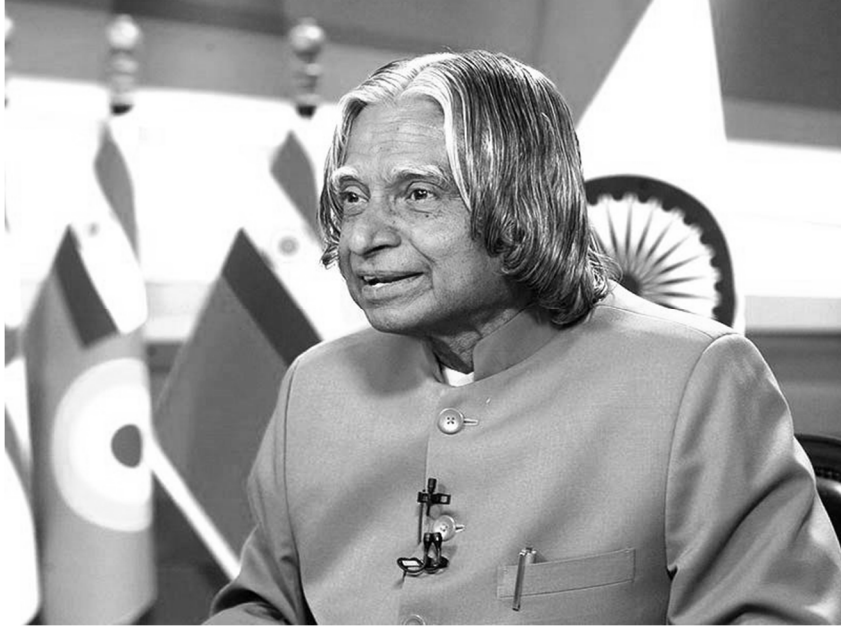
A/C No : 328150310875103

IFSC CODE : TMBL0000328

BRANCH : Srivilliputtur

பணம் செலுத்திய பின் கீழ்க்கண்ட தொலைபேசி
எண்களில் கண்டிப்பாக தகவல் தெரிவிக்கவும்

98653 06197, 89256 77710, 99435 67646



- அறிவியல் மனித இனத்துக்கான ஒரு அழகான பரிசு நாம் அதை சிதைத்து விடக்கூடாது.
- நாம் அனைவருக்கும் ஒரே மாதிரி திறமை இல்லாமல் இருக்கலாம். ஆனால் அனைவருக்கும் திறமையை வளர்த்துக்கொள்ள ஒரே மாதிரி வாய்ப்புகள் உள்ளன.
- நீங்கள் சூரியனைப் போலப் பிரகாசிக்க வேண்டுமானால், முதலில் சூரியனைப்போல எரிய வேண்டும்.
- முடியாத விஷயங்கள் குறித்து கனவு காண்பவர்களே அவற்றை வெற்றி கொள்ள முடியும்.
- கஷ்டம் வரும் போது கண்ணை மூடாதே, அது உன்னைக் கொன்றுவிடும். கண்ணைத் திறந்து பார், நீ அதை வென்று விடலாம்

- Dr. A.P.J. அப்துல்கலாம்

Table Of Contents

Unit	Title	Page No.	Month
1.	Laws of Motion	1	June
2.	Optics	12	July
3.	Thermal Physics	21	August
4.	Electricity	28	September
5.	Acoustics	40	October
6.	Nuclear Physics	50	November
7.	Atoms and Molecules	60	June
8.	Periodic Classification of Elements	68	July
9.	Solutions	75	August
10.	Types of Chemical Reactions	82	October
11.	Carbon and its Compounds	91	November
12.	Plant Anatomy and Plant Physiology	98	June

Unit	Title	Page No.	Month
13.	Structural Organisation of Animals	104	June
14.	Transportation in Plants and Circulation in Animals	109	July
15.	Nervous System	118	July
16.	Plant and Animal Hormones	126	August
17.	Reproduction in Plants and Animals	133	August
18.	Genetics	142	September
19.	Origin and Evolution of Life	151	October
20.	Breeding and Biotechnology	157	October
21.	Health and Diseases	165	November
22.	Environmental Management	173	November
23.	Visual Communication	181	December
	Practical Manual	183-200	
	Govt. Public Exam Question Paper April 2025	201	



S. No.	Formula		Unit
1.	Linear Momentum	$P = m \times v$	Kg ms^{-1}
2.	Torque	$\tau = F \times d$	Nm
3.	Moment of Couple	$M = F \times S$	Nm
4.	Resultant force parallel forces acting in the same direction	$F_{\text{net}} = F_1 + F_2$	N
5.	Resultant force parallel unequal forces acting in the same direction	$F_{\text{net}} = F_2 - F_1$	N
6.	Force	$F = m \times a$	N
7.	Impulse	$J = F \times t$	Ns
8.	Acceleration due to gravity	$g = \frac{GM}{R^2}$	ms^{-2}
9.	Change in momentum	$\Delta p = P_f - P_i$	Kg ms^{-1}
10.	Mass of the Earth	$M = \frac{gR^2}{G}$	kg



Textbook Evaluation

PAGE-13

I. CHOOSE THE CORRECT ANSWER

1. Inertia of a body depends on (APR-24)

- a) weight of the object
- b) acceleration due to gravity of the planet
- c) mass of the object
- d) Both a & b

Ans: c) mass of the object

2. Impulse is equal to (PTA-1)

- a) rate of change of momentum
- b) rate of force and time
- c) change of momentum

d) rate of change of mass

Ans: c) change of momentum

3. Newton's III law is applicable

- a) for a body is at rest
- b) for a body in motion
- c) both a and b
- d) only for bodies with equal masses

Ans: c) both (a) & (b)

4. Plotting a graph for momentum on the Y-axis and time on X-axis. Slope of momentum-time graph gives

- a) Impulsive force b) Acceleration
c) Force d) Rate of force

Ans: c) Force

5. In which of the following sport the turning of effect of force used

- a) swimming b) tennis
c) cycling d) hockey

Ans: c) cycling

6. The unit of 'g' is m s^{-2} . It can be also expressed as

- a) cm s^{-1} b) N kg^{-1}
c) $\text{N m}^2 \text{ kg}^{-1}$ d) $\text{cm}^2 \text{ s}^{-2}$

Ans: b) N kg^{-1}

7. One kilogram force equals to (APR-25)

- a) 9.8 dyne b) $9.8 \times 10^4 \text{ N}$
c) $98 \times 10^4 \text{ dyne}$ d) 980 dyne

Ans: c) $98 \times 10^4 \text{ dyne}$

8. The mass of a body is measured on planet Earth as M kg. When it is taken to a planet of radius half that of the Earth then its value will be _____ kg

- a) 4 M b) 2M
c) M/4 d) M

Ans: d) M

9. If the Earth shrinks to 50% of its real radius its mass remaining the same, the weight of a body on the Earth will

- a) decrease by 50% b) increase by 50%
c) decrease by 25% d) increase by 300%

Ans: d) increase by 300%

10. To project the rockets which of the following principle(s) is /are required?

(G.MQ.SEP-21.AUG-22, JULY-24)

- a) Newton's third law of motion
b) Newton's law of gravitation
c) law of conservation of linear momentum
d) both a and c

Ans: d) both a and c

ADDITIONAL QUESTIONS

11. F be the force between the two bodies placed at a certain distance. If the distance between them is doubled then the gravitational force F will be _____ (PTA-5)

- a) 2F b) F/2
c) F/4 d) 4F

Ans: c) F/4

12. The force required to produce an acceleration of 1 cm s^{-2} on a body of mass 1 g is (PTA-6)

- a) 1 N b) 10 N
c) 10^2 N d) 1 dyne

Ans: d) 1 dyne

II. FILL IN THE BLANKS

- To produce a displacement _____ is required. Ans: Force
- Passengers lean forward when sudden brake is applied in a moving vehicle. This can be explained by _____. Ans: Inertia of motion
- By convention, the clockwise moments are taken as _____ and the anticlockwise moments are taken as _____. Ans: Negative, Positive
- _____ is used to change the speed of car. Ans: Gear
- A man of mass 100 kg has a weight of _____ at the surface of the Earth. Ans: 980 N

**III. STATE WHETHER THE FOLLOWING STATEMENTS ARE TRUE OR FALSE.
CORRECT THE STATEMENT IF IT IS FALSE**

1. The linear momentum of a system of particles is always conserved.

Ans : False.

Correct Statement : The linear momentum of a system of particles is always conserved when **no external force is applied**.

2. Apparent weight of a person is always equal to his actual weight.

Ans : False.

Correct Statement : Apparent weight and actual weight is **not equal** during upward or downward motion.

3. Weight of a body is greater at the equator and less at the polar region.

Ans : False.

Correct Statement : Weight of a body is **less at the equator and greater** at the polar region.

4. Turning a nut with a spanner having a short handle is so easy than one with a long handle.

Ans : False.

Correct Statement : Turning a nut with a spanner having a **long handle** is so easy than one with a **short handle**.

5. There is no gravity in the orbiting space station around the Earth. So the astronauts feel weightlessness.

Ans : False.

Correct Statement : The space station and astronauts have equal acceleration, they are under free fall condition, So the astronaut and space station are in the state of weightlessness.

IV. MATCH THE FOLLOWING (PTA – 1)

S. No.	Column I	Column II	Answer
1.	Newton's I law	(a) propulsion of a rocket	b) stable equilibrium of a body c) law of force d) flying nature of bird a) propulsion of a rocket
2.	Newton's II law	(b) stable equilibrium of a body	
3.	Newton's III law	(c) law of force	
4.	Law of conservation of linear momentum	(d) flying nature of bird	

V. ASSERTION & REASONING

Mark the correct choice as

- a) If both the assertion and the reason are true and the reason is the correct explanation of assertion.
- b) If both the assertion and the reason are true, but the reason is not the correct explanation of the assertion.
- c) Assertion is true, but the reason is false.
- d) Assertion is false, but the reason is true.

1. Assertion : The sum of the clockwise moments is equal to the sum of the anticlockwise moments.

Reason : The principle of conservation of momentum is valid if the external force on the system is zero.

Ans : b) If both the assertion and the reason are true, but the reason is not the correct explanation of the assertion

2. Assertion : The value of 'g' decreases as height and depth increases from the surface of the Earth.

Reason : 'g' depends on the mass of the object and the Earth

Ans : c) Assertion is true, but the reason is false

ADDITIONAL QUESTIONS

3. Understand the assertion and the reason given and choose the correct choice.

(PTA-6)

Assertion : When a person swims he pushes the water using the hands backward and the water pushes the person in the forward direction

Reason : For every action there is an equal and opposite reaction

- a) Both the assertion and the reason are true and the reason is the correct explanation of assertion.
- b) Both the assertion and the reason are true, but the reason is not the correct explanation of the assertion.
- c) Assertion is true, but the reason is false.
- d) Both the assertion and the reason are false.

Ans : a) Both the assertion and the reason are true and the reason is the correct explanation of assertion.

VI. ANSWER BRIEFLY

1. Define inertia. Give its classification.

(AUG -22, APR -23)

The inherent property of a body to resist any change in its state of rest (or) the state of uniform motion, unless it is influenced upon by an external unbalanced force is known as Inertia.

Types of Inertia:

- ii) Inertia of rest.
- iii) Inertia of motion.
- iv) Inertia of direction.

2. Classify the types of force based on their application.

(AUG-22)

Like parallel forces.
Unlike parallel forces.

3. If a 5 N and a 15 N forces are acting opposite to one another. Find the resultant force and the direction of action of the resultant force.

$$F_1 = 5 \text{ N} \quad F_2 = 15 \text{ N}$$

Resultant Force	=	$F_2 - F_1$
	=	$15\text{N} - 5\text{N}$
	=	$10\text{N}.$

The direction of action of the resultant force will be in the direction of 15 N.

4. Differentiate mass and weight. (MAY-22)

Sl. No.	Mass	Weight
1.	Quantity of matter contained in the body.	Gravitational force exerted on a body due to the gravity.
2.	SI unit is kilogram.	SI unit is Newton.
3.	It is a Scalar quantity	It is a vector quantity

5. Define moment of a couple. (JULY-24)

Two equal and unlike parallel forces applied simultaneously at two distinct points constitute a couple. The line of action of the two forces does not coincide. It does not produce any translatory motion since the resultant is zero. But, a couple results in causes the rotation of the body. Rotating effect of a couple is known as moment of a couple.

$$M = F \times S$$

6. State the principle of moments. (APR-25)

When a number of like or unlike parallel forces act on a rigid body and the body is in equilibrium, then the algebraic sum of the moments in the clockwise direction is equal to the algebraic sum of the moments in the anticlockwise direction.

$$F_1 \times d_1 = F_2 \times d_2$$

7. State Newton's second law. (G.MQ, MAY-22)

The force acting on a body is directly proportional to the rate of change of linear momentum of the body and the change in momentum takes place in the direction of the force.

$$F = m \times a$$

8. Why a spanner with a long handle is preferred to tighten screws in heavy vehicles?

A spanner with a long handle give high tension with less force the turning effect of a body depends upon the distance of the line of action of the applied force from the axis of rotation. So spanner with long handle is preferred.

9. While catching a cricket ball the fielder lowers his hands backwards. Why?

The fielder lowers his hands to increase the interval of time to catch the ball, which resulting in a lesser impulse on his hands.

10. How does an astronaut float in a space shuttle? (JULY-24)

Astronauts are not floating but falling freely around the earth due to their huge orbital velocity. Since space shuttle and astronauts have equal acceleration, they are under free fall condition.

ADDITIONAL QUESTIONS

11. Use the analogy to the fill the blank (PTA-4)

a) opening a door : Moment of force

Opening a water tap : _____

Answer: moment of couple

b) pushing a bus by a group of people :

Like parallel forces

Tug of war : _____

Answer : unlike parallel forces

12. Why the apples weigh more at poles than at equator? (PTA - 3)

Weight of a body varies from one place to another place on the Earth since it depends on the acceleration due to gravity of the Earth (g), which is not the same at all places on the Earth. Since, weight $W = mg$, as g varies, the weight of a body is more at the poles than at the

equatorial region. So weight of apples will be more at poles than at equator.

13. Write short notes on gears. (SEP-20)

A gear is a circular wheel with teeth around its rim. It helps to change the speed of rotation of a wheel by changing the torque and helps to transmit power.

VII. SOLVE THE GIVEN PROBLEMS

1. Two bodies have a mass ratio of 3:4 the force applied on the bigger mass produces an acceleration of 12 ms^{-2} . What could be the acceleration of the other body, if the same force acts on it.

$$m_1 : m_2 = 3 : 4$$

$$a_2 = 12 \text{ ms}^{-2}$$

$$a_1 = ?$$

According to Newton's second law of motion.

$$F_1 = -F_2$$

$$m_1 \times a_1 = -(m_2 \times a_2)$$

$$3 \times a_1 = 4 \times 12$$

$$a_1 = \frac{48}{3}$$

$$a_1 = 16 \text{ ms}^{-2}$$

So acceleration due to the same force on the smaller body $a_1 = 16 \text{ ms}^{-2}$

2. A ball of mass 1 kg moving with a speed of 10 ms^{-1} rebounds after a perfect elastic collision with the floor. Calculate the change in linear momentum of the ball.

$$\text{Mass of the ball (m)} = 1 \text{ kg}$$

$$\text{Initial speed (u)} = 10 \text{ ms}^{-1}$$

$$\text{Final speed (v)} = 10 \text{ ms}^{-1}$$

Change in momentum

$$\Delta p = mv - mu$$

$$\Delta p = 1(-10) - 1(10)$$

$$= -10 - 10$$

$$\Delta p = -20 \text{ kg m s}^{-1}$$

3. A mechanic unscrew a nut by applying a force of 140 N with a spanner of length 40 cm . What should be the length of the spanner if a force of 40 N is applied to unscrew the same nut?

$$\text{Force } F_1 = 140 \text{ N}$$

$$\text{Length (l}_1\text{)} = 40 \text{ cm} = 0.4 \text{ m}$$

$$\text{Force, } F_2 = 40 \text{ N}$$

$$\text{Length, (l}_2\text{)} = ?$$

Length of the spanner,

$$F_1 l_1 = F_2 l_2$$

$$140 \times 0.4 = 40 \times l_2$$

$$l_2 = \frac{140 \times 0.4}{40}$$

$$\text{Length of the spanner (l}_2\text{)} = 1.4 \text{ m}$$

4. The ratio of masses of two planets is 2:3 and the ratio of their radii is 4:7. Find the ratio of their accelerations due to gravity.

Accelerations due to gravity (g)	=	$\frac{GM}{R^2}$
$g_1 : g_2$	=	?
$M_1 : M_2$	=	2 : 3
$R_1 : R_2$	=	4 : 7

$$\frac{g_1}{g_2} = \frac{M_1}{M_2} \times \frac{R_2^2}{R_1^2}$$

$$= \frac{2}{2} \times \frac{7^2}{4^2}$$

$$= \frac{98}{48} = \frac{49}{24}$$

Ratio of their Acceleration due to gravity

$$g_1 : g_2 = 49 : 24$$

ADDITIONAL QUESTIONS

5. A lift is moving downwards with an acceleration of 1.8 ms^{-1} . Then what is the apparent weight realised by a man of mass 50 kg **(PTA-1)**

Acceleration due to gravity for Earth (at sea level) is	=	9.8 ms^{-2} .
Acceleration (a)	=	1.8 ms^{-1}
mass (m)	=	50 kg
Apparent weight R	=	$m(g-a)$
R	=	$50(9.8 - 1.8)$
	=	50×8

$$= 400 \text{ N}$$

6. A force of 5 N applied on a body produces and acceleration 5 cm s^{-2} . Calculate the mass of the body. **(PTA-5)**

F	=	5 N
a	=	$5 \text{ cm s}^{-2} (0.05 \text{ m s}^{-2})$
F	=	Ma
m	=	$\frac{F}{a}$
m	=	$\frac{5}{0.05}$

$$m = 100 \text{ kg}$$

7. Calculate the velocity of a moving body of mass 5kg whose linear momentum is 2 KGms^{-1} **(GMQ)**

$$\text{Linear momentum} = 2 \text{ kg ms}^{-1}$$

$$\text{Mass} = 5 \text{ Kg}$$

$$\text{Linear momentum} = \text{Mass} \times \text{Velocity}$$

$$\text{Velocity} = \frac{\text{Linear momentum}}{\text{Mass}}$$

$$V = \frac{2}{5}$$

$$= 0.4 \text{ ms}^{-1}$$

VIII. ANSWER IN DETAIL

1. What are the types of inertia? Give an example for each type.

(PTA-3, AUG-22, APR-24)

There are 3 types of Inertia. They are

I) Inertia at rest

II) Inertia of motion

III) Inertia of direction

- I) Inertia at rest:**

The resistance of a body to change its state of rest is called inertia of rest.

Ex: When you vigorously shake the branches of a tree, some of the leaves and fruits are detached and they fall down.

II) Inertia of motion:

The resistance of a body to change its state of motion is called inertia of motion.

Ex: An athlete runs some distance before jumping because this will help him jump longer and higher.

III) Inertia of direction:

The resistance of a body to change its direction of motion is called inertia of direction.

Ex: When you make a sharp turn while driving a car, you tend to lean sideways,

2. State Newton's laws of motion?

(SEP-21, AUG-22)

Newton's First Law:

This law states that everybody continues to be in its state of rest or the state of uniform motion along a straight line unless it is acted upon by some external force.

Newton's Second Law:

According to this law, the force acting on a body is directly proportional to the rate of change of linear momentum of the body and the change in momentum takes place in the direction of the force.

Newton's Third Law:

Newton's third law states that for every action, there is an equal and opposite reaction. They always act on two different bodies.

3. Deduce the equation of a force using Newton's second law of motion. (APR - 23)

This law helps us to measure the amount of force. So it is also called as law of force.

Let 'm' be the mass of a moving body, moving along a straight line with an initial speed 'u' after a time interval of 't', the velocity of the body changes to 'v' due to the impact of an unbalanced external force 'F'.

Initial momentum of the body $P_i = mu$

Final momentum of the body $P_f = mv$

Change in momentum $\Delta p = P_f - P_i$
 $= mv - mu$

By Newton's second law of motion,

Force, $F \propto$ rate of change of momentum.

$F \propto$ change in momentum / time.

$F \propto (mv - mu) / t$

$$F = Km(v-u) / t$$

Here K is the proportionality constant. $K=1$ in all systems of units. Hence,

$$F = \frac{m(v-u)}{t}$$

Since, acceleration = change in velocity/time, $a = (v-u)/t$. Hence, we have

$F = m \times a$ $\text{Force} = \text{mass} \times \text{acceleration}$
--

4. State and prove the law of conservation of linear momentum. (G.M.Q, APR-25)



There is no change in the linear momentum of a system of bodies as long as no net external force acts on them.

Let two bodies A and B having masses m_1 and m_2 move with initial velocity u_1 and u_2 in a straight line. Let the velocity of the first body be higher than that of the second body. i.e, $u_1 > u_2$. During an interval of time t second, they tend to have a collision. After the impact, both of them move along the same straight line with a velocity v_1 and v_2 respectively.

Force on body B due to A,

$$F_A = m_2 (v_2 - u_2) / t$$

Force on body A due to B,

$$F_B = m_1 (v_1 - u_1) / t$$

By Newton's III law of motion,

Action force = Reaction force

$$F_B = -F_A$$

$$m_1 (v_1 - u_1) / t = -m_2 (v_2 - u_2) / t$$

$$m_1 v_1 + m_2 v_2 = m_1 u_1 + m_2 u_2$$

The above equation confirms in the absence of an external force, the algebraic sum of the momentum after collision is numerically equal to sum of the momentum before collision.

5. Describe rocket propulsion.

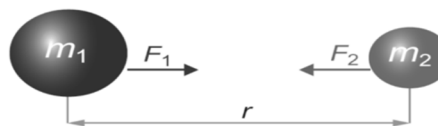
(PTA – 4, SEP-20, AUG-22)

- i) Propulsion of rockets is based on the law of conservation of linear momentum as well as Newton's third law of motion.
- ii) Rockets are filled with a fuel in the propellant tank.
- iii) When the rocket is fired, this fuel is burnt and a hot gas is ejected with a high speed from the nozzle of the rocket, producing a huge momentum.
- iv) To balance this momentum, an equal and opposite reaction force is produced in the combustion chamber, which makes the rocket project forward.
- v) While in motion, the mass of the rocket gradually decreases, until the fuel is completely burnt out.
- vi) Since, there is no net external force acting on it, the linear momentum of the system is conserved.
- vii) The mass of the rocket decreases with altitude, which results in the gradual increase in velocity of the rocket.
- viii) At one stage, it reaches a velocity, which is sufficient to just escape from the gravitational pull of the Earth. This velocity is called escape velocity.

6. State the universal law of gravitation and derive its mathematical expression (JUNE-23)

This law states that every particle of matter in this universe attracts every other particle with a force. This force is directly proportional to the product of their masses and inversely proportional to the square of the distance between the centers of these masses. The direction of the force acts along the line joining the masses.

Force between the masses is always attractive and it does not depend on the medium where they are placed



Let, m_1 and m_2 be the masses of two bodies A and B placed r metre apart in space

Force $F \propto m_1 \times m_2$

$$F \propto \frac{1}{r^2}$$

On combining the above two expressions

$$F \propto \frac{m_1 \times m_2}{r^2}$$

$$F = \frac{Gm_1 m_2}{r^2}$$

Where G is the universal gravitational constant.

Its value in SI unit is $6.674 \times 10^{-11} \text{ N m}^2 \text{ kg}^{-2}$.

7. Give the applications of universal law gravitation. (JULY-24)

- i) Dimensions of the heavenly bodies can be measured using the gravitation law.
- ii) Mass of the Earth, radius of the Earth, acceleration due to gravity, etc. can be calculated with a higher accuracy.
- iii) Helps in discovering new stars and planets.
- iv) One of the irregularities in the motion of stars is called 'Wobble' lead to the disturbance in the motion of a planet nearby. In this condition the mass of the star can be calculated using the law of gravitation.
- v) Helps to explain germination of roots is due to the property of geotropism which is the property of a root responding to the gravity.
- vi) Helps to predict the path of the astronomical bodies.

ADDITIONAL QUESTIONS**8. i) Shock absorbers are used in luxury buses.why? (PTA -2)**

Absorbers are used in luxury buses shock absorbers to reduce jerks while moving on uneven roads.

- ii) A weight of a man 686N on the surface of the earth. Calculate the weight of the same person on moon ('g' value of a moon is 1.625 ms⁻²)

w	$=$	686 N
w	$=$	mg
m	$=$	$\frac{W}{g}$
	$=$	$\frac{686}{9.8}$
	$=$	70 kg

Weight on moon,

w	$=$	mg
	$=$	70×1.625
		113.75 N

- iii) Name the law of motion used in flying of birds. Give another example for the same law Newton's third law of motion.

(E.g) Man swimming and Rocket propulsion.

When a person swims he pushes the water using the hands backwards (Action), and the water pushes the swimmer in the forward direction (Reaction)

9. A body of mass m is initially moving with a velocity u . When a force F acts on the body it picks up velocity v in t second so that the acceleration (a) is produced. Using this data derive the relation between the force, mass and acceleration. (PTA-5)

Let 'm' be the mass of a moving body, moving along a straight line with an initial speed 'u' after a time interval of 't', the velocity of the body changes to 'v' due to the impact of an unbalanced external force 'F'.

Initial momentum of the body $P_i = mu$

Final momentum of the body $P_f = mv$

Change in momentum $\Delta p = P_f - P_i$

$$= mv - mu$$

By Newton's second law of motion,

Force, $F \propto$ rate of change of momentum.

$F \propto$ change in momentum / time.

$F \propto (mv - mu) / t$

$F = Km (v-u) / t$

Here K is the proportionality constant. $K=1$ in all systems of units. Hence,

$$F = \frac{m(v-u)}{t}$$

Since, acceleration = change in velocity/time,

$a = (v-u)/t$. Hence,

$$F = m \times a$$

Force = mass $\times$ acceleration

10. At what height from the centre of the earth surface, the acceleration due to gravity will be 1/4 the of its value on the surface of the earth. (PTA-6)

The acceleration due to gravity $= g$

Height from the centre of the Earth, $R' = R + h$

The acceleration due to gravity at that height,

$$g' = \frac{g}{4}$$

g'	$=$	$GMm/(R')^2$
g	$=$	$GMm/(R)^2$
$\frac{g}{g'}$	$=$	$\left(\frac{R'}{R}\right)^2$
	$=$	$\left(\frac{R+h}{R}\right)^2$
	$=$	$\left(1 + \frac{h}{R}\right)^2$
4	$=$	$\left(1 + \frac{h}{R}\right)^2$
2	$=$	$1 + \frac{h}{R}$
h	$=$	R
Since R'	$=$	$R + h$
h	$=$	R'
So R'	$=$	2R

From the centre of the Earth, the object is placed at twice the radius of the earth.

IX. HOT QUESTIONS

1. Two blocks of masses 8 kg and 2 kg respectively lie on a smooth horizontal surface in contact with one other. They are pushed by a horizontally applied force of 15 N. Calculate the force exerted on the 2 kg mass.

Mass of block 1, m_1	= 8
Mass of block 2, m_2	= 2kg
Force, F_1	= 15N
Force exerted on 2 kg, F_2	= massXacceleration
	= $\frac{m_2}{m_1 + m_2} \times F$
	= $\frac{2}{8+2} \times 15$
	= 3 N
Force exerted on 2 kg, F_2	= 3N

2. A heavy truck and bike are moving with the same kinetic energy. If the mass of the truck is four times that of the bike, then calculate the ratio of their momenta. (Ratio of momenta = 1:2)

Since K.E are equal

$\frac{1}{2} m_1 v_1^2$	= $\frac{1}{2} m_2 v_2^2$
$\frac{1}{2} m_1 v_1^2$	= $\frac{1}{2} (4) (m_1) v_2^2$
v_1^2	= $4 v_2^2$
v_1	= $2 v_2$

Ratio of momenta	= $\frac{m_1 v_1}{m_2 v_2}$
	= $\frac{m_1 v_1}{4 m_1 \left(\frac{v_1}{2}\right)}$
	= $\frac{2}{4}$
	= $\frac{1}{2}$

The ratio of their momenta = 1:2

3. “Wearing helmet and fastening the seat belt is highly recommended for safe journey” Justify your answer using Newton’s laws of motion.

- According to Newton’s law of inertia, the passenger in the car are more likely to maintain the same state of motion, which will result in the banging the glass (wind shield) or thrown away in the front by breaking the glass windshield. So wearing seatbelts is highly recommended for a safe journey.
- According to Newton’s third law, an equal and opposite reacting force on the ground is exerted on your body or head. When you do not wear a helmet, this reacting force can cause fatal head injuries.

PRACTICALS

S. NO.		NAME OF THE EXPERIMENT	TIME
1.	PHYSICS	Determination of weight of an object using the principle of moments	40 minutes
2.		Determination of focal length of a convex lens	40 minutes
3.		Determination of resistivity	40 minutes
4.	CHEMISTRY	Identification of the dissolution of the given salt whether it is exothermic or endothermic	40 minutes
5.		Testing the solubility of the salt	40 minutes
6.		Testing the water of hydration of salt	40 minutes
7.		Test the given sample for the presence of acid or base	40 minutes
8.	BIO - BOTANY	Photosynthesis - Test tube and Funnel Experiment (Demonstration)	40 minutes
9.		Parts of a Flower	40 minutes
10.		Mendel's Monohybridcross	40 minutes
11.		Observation of Transverse Section of Dicot stem and Dicot Root	40 minutes
12.	BIO - ZOOLOGY	Observation of Models - Human Heart and Human Brain	40 minutes
13.		Identification of Blood Cells	40 minutes
14.		Identification of Endocrine Glands	40 minutes

PHYSICS

1. DETERMINATION OF WEIGHT OF AN OBJECT USING THE PRINCIPLE OF MOMENTS

Aim:

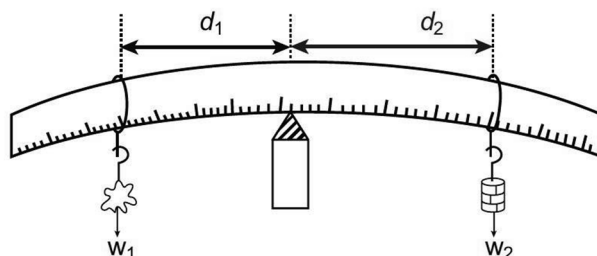
To determine the weight of an object using the principle of moments

Apparatus required:

A metre scale, a knife edge, slotted weights, thread

Procedure:

- A metre scale is supported at its centre of gravity by a knife edge or suspended by using a thread tied to its centre so that the scale is in the horizontal position. Ensure that the scale is in equilibrium position.
- A known weight W_2 and an unknown weight W_1 are suspended from to either side of the scale using the weight hangers.
- Fix the position of one weight hanger and adjust the position of the second weight hanger such that the scale is in equilibrium.
- Measure the distance d_1 and d_2 of the two weight hangers from the centre of the scale accurately.
- The experiment is repeated for different positions of the unknown weight. Measure the distances. The reading are tabulated as follows:

**Observation:**

S. No.	Weight in the weight hanger (W_2) kg	Distance of known weight d_2 (m)	Distance of unknown weight d_1 (m)	$W_2 \times d_2$ (kg x m)	Unknown weight $W_1 = \frac{W_2 \times d_2}{d_1}$ (kg)
1	0.050	0.2	0.13	0.01	0.077
2	0.100	0.2	0.255	0.02	0.078
3	0.150	0.2	0.375	0.03	0.080
				Mean	0.078

Calculations:

Moment of a force can be calculated using the formula

Moment of the force = Force x distance

Clock wise moment by unknown weight = $W_1 \times d_1$

Anticlockwise moment by known weight = $W_2 \times d_2$

$W_1 \times d_1 = W_2 \times d_2$ Unknown weight $W_1 = \frac{W_2 \times d_2}{d_1}$

Result:

Using the principle of moments, the weight of the unknown body $W_1 = 0.078$ Kg.

2. DETERMINATION OF FOCAL LENGTH OF A CONVEX LENS

Aim:

To determine the focal length of a convex lens by using

1. Distant object method

2. uv method

Apparatus required:

A convex lens, stand, wire gauze object, screen and measuring scale.

Formula:

$$f = \frac{uv}{(u + v)}$$

Here,

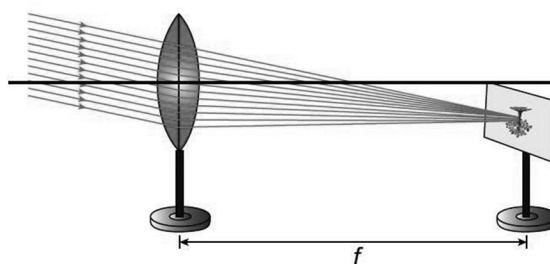
u is the distance between the object and the convex lens

v is the distance of the image from the convex lens

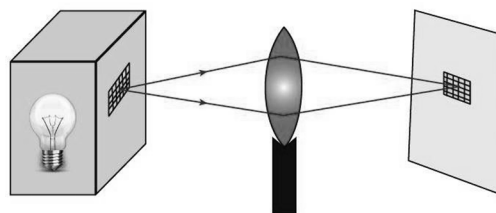
f is the focal length of the convex lens

1. Distant Object Method :

- Fix the given convex lens vertically on the stand and place it on the table near an open window of the laboratory.
- Locate a distant object through the open window. Place the screen behind the convex lens.
- Adjust the position of the convex lens and the screen so as to get a sharp, inverted and diminished image.
- Measure the distance between the screen and the convex lens. This distance is equal to the approximate focal length of the convex lens (f).

**2. uv - Method:**

- Fix the given convex lens vertically on the stand and place it on the table.
- Place the wire gauze object on the left side of the convex lens. The distance between the object and the lens (u) is measured.
- Place the screen on the right side of the convex lens and adjust its position to get a sharp, inverted and diminished image.
- Measure the distance between the screen and the lens (v).
- Repeat the same procedure, by changing the distance of the object (u) and tabulate your observations.

**Observation:**

Focal length of the convex lens (By distance object method) is (f) = 10.5 cm

GOVT. EXAM - APRIL 2025

PART - I

Note : (i) Answer all the questions.

12x1=12

(ii) Choose the most appropriate answer from the given four alternatives and write the option code and the corresponding answer.

1. One kilogram force equals to:

- a) 9.8 dyne b) 9.8×10^4 N c) 98×10^4 dyne d) 980 dyne

2. The eye defect 'Presbyopia' can be corrected by:

- a) convex lens b) concave lens c) convex mirror d) bifocal lens

3. The work done in moving a charge of 10 C across two points in a circuit is 100 J. What is the potential difference between the points?

- a) 0.1 V b) 10 V c) 100 V d) 1000 V

4. Artificial radioactivity was discovered by:

- a) Becquerel b) Irene Curie c) Roentgen d) Neils Bohr

5. _____ is an important metal to form amalgam.

- a) Ag b) Hg c) Mg d) Al

6. When the pressure is increased at constant temperature, the solubility of gases in liquid _____.

- a) no change b) increases c) decreases d) no reaction

7. The pH of a solution is 3. Its [OH⁻] concentration is:

- a) 1×10^{-3} M b) 3 M c) 1×10^{-11} M d) 11 M

8. $\text{C}_2\text{H}_5\text{OH} + 3\text{O}_2 \longrightarrow 2\text{CO}_2 + 3\text{H}_2\text{O}$ is:

- a) Reduction of ethanol b) Combustion of ethanol
c) Oxidation of ethanoic acid d) Oxidation of ethanal

9. Casparian strips are present in the _____ of the root.

- a) cortex b) pith c) pericycle d) endodermis

10. The centromere is found at the centre of the _____ chromosome.

- a) Telocentric b) Metacentric c) Sub-metacentric d) Acrocentric

11. World AIDS Day:

- a) December 1 b) May 31 c) April 22 d) October 2

12. Which software is used to create animation?

- a) Paint b) PDF c) MS Word d) Scratch

PART - II

Note : Answer any seven questions. Question No.22 is compulsory.

7x2=14

13. Define one Calorie

14. What is a longitudinal wave?

15. State two conditions necessary for rusting of iron.

16. Match the following:

- | | |
|---------------------------|-------------------------|
| 1. Functional group -OH | (i) Benzene |
| 2. Heterocyclic compounds | (ii) Potassium Stearate |
| 3. Unsaturated compounds | (iii) Alcohol |
| 4. Soap | (iv) Furan |
| 5. Carbocyclic compounds | (v) Ethene |

17. What is the importance of valves in the heart?

18. What is Bolting? How can it be induced artificially?

19. Identify the parts A, B, C and D in the given figure.
20. The degenerated wing of a Kiwi is an acquired character. Why is it called an acquired character?
21. What will happen if trees are cut down?
22. Find the mass percentage composition of methane (CH₄).

PART - III

Note : Answer any seven questions. Question No.32 is Compulsory.

7x4=28

23. Derive the ideal gas equation.
24. Differentiate the eye defects: Myopia and Hypermetropia.
25. Compare the properties of alpha, beta and gamma radiations.
26. Write the applications of Avogadro's Law.
27. (i) What is an alloy?
(ii) State the reasons for alloying.
28. Explain the mechanism of cleansing action of soap.
29. How does locomotion take place in leech?
30. With a neat labelled diagram, explain the structure of a neuron.
31. (i) What are the consequences of soil erosion?
(ii) How will you prevent soil erosion?
32. A source producing a sound of frequency 90 Hz is approaching a stationary listener with a speed equal to (1/10) of the speed of sound. What will be the frequency heard by the listener?

PART - IV

Note : Answer all the questions. Draw diagrams wherever necessary.

3x7=21

33. a) (i) State and prove the law of conservation of linear momentum.
(ii) State the principle of moments.

OR

- b) (i) What is meant by electric current?
(ii) Name and define its unit.
(iii) Which instrument is used to measure the electric current? How should it be connected in a circuit?
34. a) (i) In what way hygroscopic substances differ from deliquescent substances?
(ii) The aquatic animals live more in cold region. Why?
(iii) Define volume percentage.

OR

- b) (i) Differentiate reversible and irreversible reactions.
(ii) A solid compound 'A' on heating decomposes into gas 'B' and 'C'. On passing the gas 'C' through water, it becomes acidic. Identify A, B and C.
35. a) Differentiate the following:
(i) Monocot root and Dicot root
(ii) Aerobic and Anaerobic respiration

OR

- b) (i) Explain the structure of a chromosome.
(ii) Distinguish between somatic gene therapy and germ line gene therapy.

விடுதலைக் கிணடருக்கும் நேரமல்லாம் படித்தல் கிணடருப்போம்



ஂமது வெளிமீடுகள் (STATE BOARD)

6th to 12th Std - STEP TO SUCCESS ENGLISH

10th to 12th Std - ELITE ENGLISH

6th to 12th Std - ஁ன்னால் முடியும் தமிழ்

10th to 12th Std - அமுத சுரரி தமிழ்

**6th to 10th Std - சமூகஅறிவியல்
(Tamil & English Medium)**

**8th to 10th Std - அறிவியல்
(Tamil & English Medium)**



DOLPHIN PUBLICATIONS®

239, Keelappatti Street, Srivilliputtur - 626 125, Virudhunagar Dt. TN.

Cell : 98653 06197 / 89256 77710 / 99435 67646

93453 14146 / 93453 30937

Mail us : dolphin.pub2005@gmail.com | Visit us : www.kalvidolphin.com



63743 17883