Unit 1
Chapter 1
First encounter with physics

I) Write the scientific term :

1. The simplest form to express the relation between the physical quantities .

……………………………………………………………………………

2. Physical quantities represent constant values which don't change from experiment to another .

……………………………………………………………………………

3. Physical quantities which is characterized by magnitude only .

……………………………………………………………………………

4. Physical quantities which is characterized by both magnitude and direction .

……………………………………………………………………………

5. cylinder of iridium and platinum has fixed dimension hept at 0° c .

……………………………………………………………………………

6. Standered references of measurable quantities that are help in special labs .

……………………………………………………………………………

7. Labs used to keep the standered units .

……………………………………………………………………………

8. Instruments use number to measure a physical quantities .

……………………………………………………………………………

9. Is the science that seeks the explanation of all physical and universal phenomena and sets up the mathematical laws that explain these phenomena .

……………………………………………………………………………

10. Instruments use pointers to measure a physical quantity .

……………………………………………………………………………

11. Are the laws used to describe any universal phenomena .

……………………………………………………………………………

II- Give reason for :

1. The velocity can not be added to mass .

……………………………………………………………………………

2. Acceleration is derivable quantity .

……………………………………………………………………………

3. It is impossible to measure any physical quantities with 100 % accuracy .

……………………………………………………………………………

4. Length is basic quantity .

……………………………………………………………………………

5. The importance of measurement in physics .

……………………………………………………………………………

III- Mention the physical quantity which is measured by the following units

1. Newton ……………………   2. Joule ………………………….

3. m / s ……………………….   4. Kg m / s ……………………….

5. farad …………………..   6. coulomb …………………….

7. ohm …………………..   8. Ampere …………………….

IV- Put (√) or (x) and correct the wrong :

1. The ribbon meter from instrument depending on the direct reading .   [   ]

2. Force is a vector quantity while time is ascalar quantity .   [   ]

3. The mass is calibrated by the atomic cesium watch .   [   ]

4. The accuracy of cesium atomic clock is one part of ten thousand .   [   ]

5. One centimeter equals 10^{-3} while one micrometer equals 10^{-7} .   [   ]

V- Compare between Basic quantities and Derivable quantities

Basic quantities	Derivable quantities

Chapter 2
Motion

I) Choose the correct answer :

1. The body is projected vertically upwards at a speed of 63 m / s if g = 9.8 m / sec^2 the maximum height reached is ………………...
a) 617.4 m   b) 101.25 m   c) 202.5 m   d) 222.5 m

2. The motion of the body between two points is an example of ……..motion .
a) periodic   b) translational   c) wave   d) vibrational

3. A body starts from rest with an acceleration of 2 m / s^2. It covers a distance of 100 m in time of
 a) 50 sec   b) 20 sec   c) 2.5 sec   d) 10 sec

4. The body moves with uniform acceleration when ………….
a) Its final velocity equals its initial one .
b) Its velocity increases with equal quantities in equal interval of times .
c) It covers equal distance in equal interval of time .
d) The graphical relation between displacement and time is linear .

5. An object falls freely under the effect of gravity , the object move …………...
a) By uniform velocity
b) By an increasing acceleration
c) By acceleration = zero
d) By constant acceleration = 9.8 m / s

6. The ratio between the total displacement and the total time is the ……………...
a) average velocity   b) instantaneous acceleration
c) average acceleration   d) acceleration

7. A body moves by a uniform velocity equals 100 m / sec so its acceleration equals .
a) 100 m / s^2 b) 1 m / s^2 c) 50 m / s^2 d) Zero

8. A body moves with an acceleration , so its ……………
a) $v_t > v_0$ b) $V_t < V_0$ c) $V_t = V_0$ d) velocity is uniform

II) Give reason for

1. When a body moves with a uniform velocity its acceleration equals to zero .
…………………………………………………………………………………
2. When a body falls freely from rest its velocity increases .
…………………………………………………………………………………

4. When a body moves by an acceleration , its displacement – Tim graph is not represent by a straight line .
…………………………………………………………………………………
5. The velocity of the throwing body upwards decreases unit it reaches zero .

……………………………………………………………………………………
6. Displacements is a vector quantity while distance is a scalar quantity .

……………………………………………………………………………………

III. Problems

1. In the opposite figure , a person moves from point (A) to (B) to (C) to (D) then to (E) find

a. The displacement   b. The distance
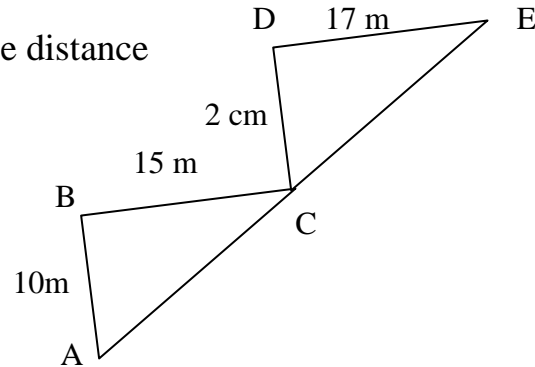
2. Find the displacement when a person covers a distance of 2 km from his home to school then returned back to home .

3. A car moves with a velocity 40 m / sec then the brakes are applied and decelerate with -4 m / s calculate .
a) The time takes to stop .
b) The total distance covered by the car
c) The average velocity during interval of time .

4. A body falls freely from a height 32 m on the moon surface calculate the acceleration due to gravity of the moon if the falling time is 2 sec .

5. A bullet is projected upwards with velocity 490 m / s . If $g = 9.8$ m / s^2 find :
a) The maximum height it reaches .
b) Time taken to reach the ground
c) The velocity at the moment it hits land .
d) The instantaneous velocity at 60 sec .

6. A bicycle rider start motion from rest and moves with a uniform acceleration 1.5 m / s^2, his velocity reaches 7.5 m / s . Find the covered distance .

7. A car covered 800 m in 80 sec calculate its average velocity .

8. A body moves according to the relation x = 16 t + 1.5 t find
a) The intial velocity of the body
b) The acceleration of the body

9. The opposite figure represents (velocity – time) graph :-

a) Describe the type of motion in the first 4 sec and the last 4 second
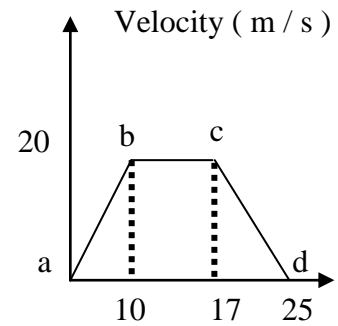
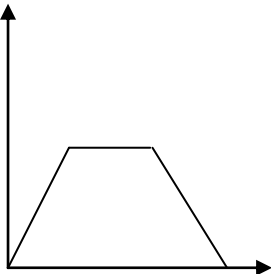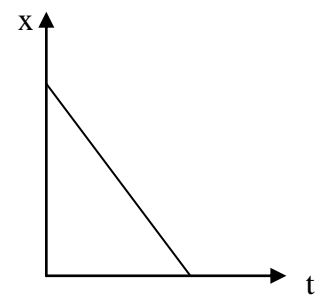b) Calculate the acceleration of the moving body from

1. A ⟶ B   2. B ⟶ C   3. C ⟶ D

c) Calculate the distance covered by the body

Velocity (m / s)

IV- Describe the motion of the body in each of the following : -
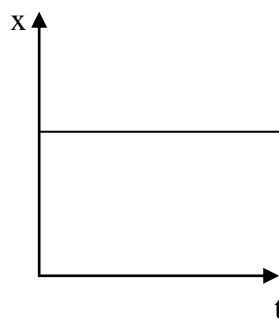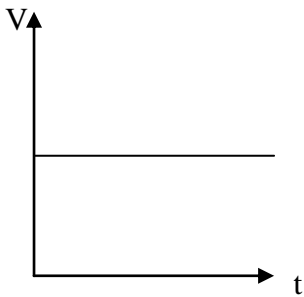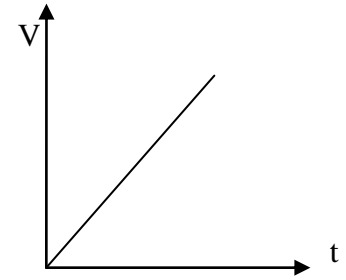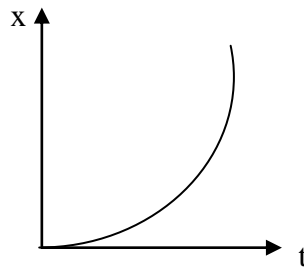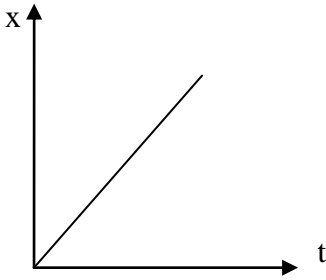
V- What is meant by :-

1. The distance covered by a body is 100 m

………………………………………………………………………………
………………………………………………………………………………

2. The displacement of a body is 10 m

………………………………………………………………………………
………………………………………………………………………………

3. The acceleration of a moving body equals 4 m / s^2 .

………………………………………………………………………………
………………………………………………………………………………

4. The acceleration of a moving body equals – 5 m / s^2

………………………………………………………………………………
………………………………………………………………………………

5. The free fall acceleration = 9.8 m / s^2

………………………………………………………………………………
………………………………………………………………………………

6. An object moves in a straight line although its acceleration is zero .

………………………………………………………………………………

Chapter 3
Newton ' s law of motion

I) What is meant by :

1. The linear momentum of a body = 10 kg m / sec .

……………………………………………………………………………
……………………………………………………………………………

2. The inertial mass of the body equals 80 kg .

……………………………………………………………………………
……………………………………………………………………………

3. The force acting on the body equals 60N.

……………………………………………………………………………
……………………………………………………………………………

4. The gravitional mass of a body equals 20 kg.

……………………………………………………………………………
……………………………………………………………………………

5. The rate of change in linear momentum equals 25 kg m/ s^2

……………………………………………………………………………
……………………………………………………………………………

6. The weight of a body equals 30 N .

……………………………………………………………………………
……………………………………………………………………………

7. The centripetal force of a body equals 200 N

……………………………………………………………………………
……………………………………………………………………………

8. The linear momentum of a body = 0

……………………………………………………………………………
……………………………………………………………………………

9. The centripetal acceleration = 25 m / s^2

……………………………………………………………………………
……………………………………………………………………………

Compare between

1] Mass & weight
2] Types of force (equilibrium & non equilibrium)
3] Centripetal force and Force

II) Choose

1. ……………….of the body is considered as a measure for its inertia .
a) velocity   b) motion   c) mass   d) acceleration

2. The force acting on a mass 5 kg to change its velocity from 7 m / s to 3 m / s in 2 sec .
a) 10 N   b) -10 N   c) 20 N   d)5 N

3. Which body is acted upon by the largest force ?
a) A body of mass 5 kg moves with an acceleration 10 m / s^2
b) A body of mass 2 kg moves with an acceleration 20 m / s^2
c) A body of mass 100 kg moves with a constant velocity 50 m / s
d) A body of mass 4 kg moves with an acceleration 12 m / s^2

4. If the force on moving body is doubled ………….
a) The acceleration will be doubled
b) The velocity will be doubled
c) The body stops immediately
d) The mass will be doubled

5. If the acting force on a body is doubled and its mass is decreased to its half the acceleration will be …………….
a) 2 a   b) 3a   c) 4a   d) a

6. When a body is falling freely with acceleration 9.8 m/s^2 we can conclude that …………
a) weight x mass = 9.8
b) The acceleration increases with the rate 9.8 m / s^2
c) The velocity increases with a rate 9.8 m / s
d) The intial velocity = 9.8 m / s

7. The unit of momentum is …………….
a) Kg.m. s^{-1} b) Kg.m.s^{-2}
c) kg.m^{-1}.s^{-1} d) Kg.m .s

8. If the mass of a body decreases to one third , its inertia …………..
a) increases 3 times   b) decreases to one third
c) decreases to one sixth   d) remains constant

9. A car of mass 500 kg and another of 1000 kg moves with the same acceleration , the acting force on the car of the greater mass …………that of the car of the smaller mass .
a) equals to   b) equals half
c) equals double   d) equals 3 times

10.If a body moves in a circular path , its velocity changes ……………………..
a) only in value   b) is doubled
c) increases 4 times   d) does not change

11. the Newton first law is ……….
a) The body maintains its state of rest or motion in a straight line with uniform velocity unless acted upon by a net force .
b) The net force = mass x acceleration
c) for every action there is an equal and opposite reaction
d) The law of inertia

12. The mass of the body at the earth's surface is …………its mass in the moon's surface
a) >   b) <   c) ≤   d) =

13. The weight of a ball on the earth's surface ……..its weight on the moon's surface
a) =   b) >   c) <   d) ≤

III] Write the mathematical relation that express the following :
a) Newton's 1st law …………………………………………………………………
b) Newton's 2nd law …………………………………………………………………..
c) Newton's 3rd law …………………………………………………………………..
d) centripetal force …………………………………………………………………..
e) centripetal acceleration …………………………………………………………….
f) The change in linear momentum ……………………………………………..
g) The rate of change in momentum …………………………………………….

IV) Problem
1. A car of mass 1200 kg moves with velocity of 20 m/ s when the brakes are applied it stops after 5 sec . Find
a) It's deceleration
b) The distance covered to stop the car
c) The linear momentum just before using the brakes
d) The linear momentum at the end of 5 s

2. A trolley of mass 10 k.g is pulled a long a frictionale s surface with a velocity 20 m / s . If a force of 5 N acts on it in time interval 20 sec . Calculate its velocity .

3. Two equal forces acted on two different bodies the first of mass 1 kg moves with an acceleration of 2.5 m / s^2 while the second of unknown mass moves with an acceleration of 5 m / s^2 Calculate the unknown mass

4. When using air pump the mass of one of the two riders is 1 kg and its velocity is 20 m/ s . Find the mass of the other where moves by a velocity 5 m / sec ?

5. A body is pushed with a force of 5000 N , if the mass of the body is 100 Kg neglecting the fractional force find the acceleration if the mass of the body is doubled , will the acceleration remain constant ? why ?

6. A force of 4000 N acts on a car of mass 2000 kg to move in a circular path of diameter 100m with a velocity 10 m / s . Find the centripetal acceleration in two different methods .

7. A bullet of mass 5 g is projected on a body , its velocity at collision 20 m / s , the bullet stopped inside the body after 1 / 200 sec .
a) the linear momentum of the bullet just before collision .
b) The change of linear momentum after 1 / 200 sec of collision .

8. Two equal forces acting on two bodies , if the first body has a mass of 5 kg , and gained an acceleration 8 m / s^2 and the velocity of the second body changes from rest to 48 m / s during 3 sec. Find the mass of the second body .

9. A body of mass 80 kg at the earth's surface (acceleration due to gravity $= 9.8$ m / s^2) Find
a) The weight of the body on the earth .
b) The weight of the body on the moon's surface .
c) The mass of the body on the moon's surface .

10. Calculate the acting force on a body of mass 30 kg :
a) To accelerate it by 3 m / s^2
b) To gain it a velocity of 8 m / s in 6 sec from rest .
c) To make it moves 50 m in 5 sec from rest .
d) To change its velocity from 20 m / s to 10 m / s through a distance 25 m .

11. A body of weight 300 N calculate its mass ($g = 10$ m / sec^2) .

12. If the centripetal force acting on a body , of mass 10 kg , equals 1800 N to keep its motion in a circular path its radius 5 m . Calculate .
a) The speed of the body .
b) The centripetal acceleration .

Chapter " 4 "
General low of gravition

I) Write the scientific term :
1. The path of a projectile thrown vertically upward with inclination angle . [..................]
2. The mutual attractive force between two bodies of mass 1 kg and the distance between them is 1 meter . [..................]
3. The ratio between the mass and the volume of earth . [..................]
4. The gravitional force between two bodies is directly proportional to the product of two masses and inversely proportional to the square of the distance between their centers . [..................]

Choose the correct answer :

1. Two bodies of masses m_1 , and m_2 , in space and the distance between them is r when the distance between them is doubled , the gravitional force between them .
a) Does not change
b) Becomes double its value
c) Decrease to $\frac{1}{4}$ its original value .
d) Becomes 4 times its original value .

2. The path of pushed water from fountain takes the shape of ....
a) circule
b) spiral
c) straight line
d) parabola

3. The attractive force of earth for a body of mass 10 kg , where $g = 9.8 \text{ m} / \text{s}^2$
a) 9.8 N
b) 9800 N
c) 100 N
d) 98 N

4. The unit of the gravitional constant is
a) $\text{N.m}^2 \text{ kg}^2$
b) $\text{Nm}^{-2} \text{ kg}^{-2}$
c) $\text{N.m}^{-2} \text{ kg}$
d) $\text{Nm}^2 \text{ kg}^2$

5. The ratio between the density of the Earth's crust to the density of the Earth's core is
a) equal 1
b) less than 1
c) greater than 1
d) no correct answer

6. A body moves over an inclined smooth plane by angle (θ) from the horizontal surface the acting force can be given by the relation
a) $mg \tan \theta$
b) $mg \theta$
c) $mg \sin \theta$
d) $mg \cos \theta$

7. Eratosthenes' method should be preformed at
a) At noon
b) after noon
c) at sunrise
d) at sunset

Compare between
*Eratosthenes & Burini methods

8. Given that the diameter of the moon is $\frac{1}{4}$ that of the earth and its density is $\frac{2}{3}$ that of earth the the gravitional acceleration on the moon surface relative to that of earth is

a) $\frac{1}{3}$
b) $\frac{1}{6}$
c) $\frac{1}{2}$
d) 6

Give reason for :

1. A driver finds a difficulty in ascending a bridge of large inclination angle .
…………………………………………………………………………………

2. When the angle of inclined plane is 90 the body falls freely .
…………………………………………………………………………………

3. A driver applies the brakes in going down a bridge .
…………………………………………………………………………………

4. The gravitional force is clear between the celestial bodies .
…………………………………………………………………………………

5. Doubling the distance between two masses decreases the mutual gravitional force between them into quarter its original value .
…………………………………………………………………………………

6. The density of the earth is more than the value of the average density of the earth's crust .
…………………………………………………………………………………

Problems :

1) A helicopter plane flies at a height of 3900 m from the earth's surface when the pilot recorded the angle of sun rays inclination at sun which was 2º calculate the radius of earth .
…………………………………………………………………………………
…………………………………………………………………………………
…………………………………………………………………………………

2) Two balls the mass of the first is 30 kg while the second is 20 kg , the distance between their centers 0.5 m . Find the gravitional force between them ($G = 6.67 \times 10^{-10}$ N.m^2 / kg^2).
…………………………………………………………………………………
…………………………………………………………………………………
…………………………………………………………………………………

3) A body of mass 15 kg moves on an inclined smooth plane with angle 20º calculate .
a) The value of force affecting the studying of the body down wards .
b) The value of the reaction of the surface on the body .
…………………………………………………………………………………
…………………………………………………………………………………
…………………………………………………………………………………

4) Two lead balls whose masses are 5.2 kg and 0.25 kg respectively placed with their centers 50 cm a part . Calculate the force of attraction between them . ($G = 6.67 \times 10^{-11}$ Nm^2 kg^2)

……………………………………………………………………………………

……………………………………………………………13………………………………

……………………………………………………………………………………

5) A newly discovered planet has twice the density of the earth but the acceleration due to gravity on its surface is exactly the same as on the surface of the earth what is its radius ? Given the radius of the earth is 6.38×10^{6} m .

……………………………………………………………………………………

……………………………………………………………………………………

……………………………………………………………………………………

Chapter (5)
Law of conservation of energy

I] What is meant by :
1. The mechanical energy of a body = 250 Joule

……………………………………………………………………………

2. The work done equals 300 J

……………………………………………………………………………

3. The work done by a force of 4 N is 20 J

……………………………………………………………………………

4. The K.E of an object = 7 J

……………………………………………………………………………

5. The P.E of an object = 5 J

……………………………………………………………………………

II] Choose the correct answer :
1. The work done by the frictional force against a moving body is ……………
a) –ve   b) zero   c) + ve   d) no correct answer

2. The uniform velocity , the total work is …….
a) –ve   b) + ve   c) zero   d) natural

3. When the work done is maximum , the acting force on a body makes an angle ………..with the displacement direction .
a) 45º   b) 90º   c) 60 º   d) zero

4. Doubling the velocity of a body increases its K.E to …………of its value
a) 2 times   b) 4 times   c) 8 times   d) half

5.On moving a body up , the sum of its P.E and K.E ………….
a) decrease   b) increase   c) remains constant   d) equal zero

6. All of the following are the units of measuring the work except ………………
a) Joule   b) $kg.m^{-2}.s^2$ c) N.m   d) kgms

7. The velocity of a body is doubled and its mass decreased to its quarter , so its K.E ………
a) decrease to half   b) remains constant
c) is doubled   d) decrease to quarter

8. The increase in the P.E of a body of a mass 50 kg climbing a mountain of a height 5 m equals ……………joule (g = 10 m / s^2)
a) 500   b) 250   c) 2500   d) 25000

Give reason for :

1. When a body moves in the same direction of the acting force , the work done by the force is maximum .

……………………………………………………………………………………

2. The work is a scalar quantity .

……………………………………………………………………………………

3. The centripetal force acting on a body does not do work .

……………………………………………………………………………………

What happens when :

1. The body is projected upward against gravity .

……………………………………………………………………………………

2. The force doing work acts perpendicular to the direction of motion .

……………………………………………………………………………………

Problems :

1] Fill the missing information :

A)

	Force	Displacement	Angle between d & f	Work done
a	18 N	5 m	90°	………….
b	…………..	8 m	60°	48 J
C	46 N	20 cm	………	9.2 J

B)

	Mass	Velocity	K.E
a	4 kg	……………..	50 J
b	……..kg	18 km / hour	1 J
C	50 kg	10 m / s	………

2] A man whose mass is 60 kg ascending a mountain 25 m height calculate the work done ($g = 10 \text{ m} / \text{s}^2$)

3] An elevator of mass 40 kg moved vertically from a height 40 m to 25 m above the surface of the earth . Calculate the decrease in its P.E ($g = 9.8 \text{ m} / \text{s}^2$)

4] A body is projected up ward with a velocity 10 m / s . If its P.E at the maximum height is 10 J . Calculate its mass knowing that $g = 10 \text{ m} / \text{s}^2$

5] A car of mass 1000 kg moves with a velocity 2 m / s , then the brakes are applied , to stop the car after 2 sec calculate .
a) The force of brakes
b) The work done by brakes

6] The following table shows the relation between P.E of a body and its height from the earth's surface .

P.E (J)	16	32	48	64	80
Displacement (m)	2	4	6	8	10

   a) Draw the graphical relation between P.E on y axis and height on x –axis
   b) From the graph find 1) P.E at height 7 m
                                 2) The mass of body ($g = 9.8$ m / s^2)

Chapter " 6 "
Law of conservation of linear momentum

1] Choose the correct answer :

1. The factors on which the momentum of a body depends are ……………
a) The mass of the body only
b) The velocity of the body only
c) The force acting on the motion of the body
d) Both the mass and velocity of the body

2. The change in total momentum of two isolated bodies before and after collision equals ……
a) zero
b) 1
c) <1
d) > 1

3. The momentum of an object at a given instant is independent of its ….
a) mass
b) inertia
c) velocity
d) acceleration

4. The physical quantity impulse , has the same unit as that of ……..
a) force
b) power
c) momentum
d) work

5. When a body of velocity (v) colloid with another body at rest and their masses are equal , after collision they move together as a one body with a common velocity ………..
a) $\frac{1}{4}$ v
b) 2 v
c) $\frac{1}{2}$ v
d) v

Give reason for :

1. As a bullet is shot from a gun , the gun recoils .
………………………………………………………………………………
2. If an object falls on someone's head , he is harmed . But if the object bounces off the person's head , the harm is even greater .
………………………………………………………………………………
3.The linear momentum is a vector quantity
………………………………………………………………………………
4. It is necessary to use the seat belt while driving .
………………………………………………………………………………

Problems :

1) A smooth ball of mass 4 kg moving horizontally with velocity 0.6 m / s colloides with another one of mass 10 kg moving with velocity 2.56 m / s in the direction of the first ball . After collision they move together as one body , find their velocity after collision .
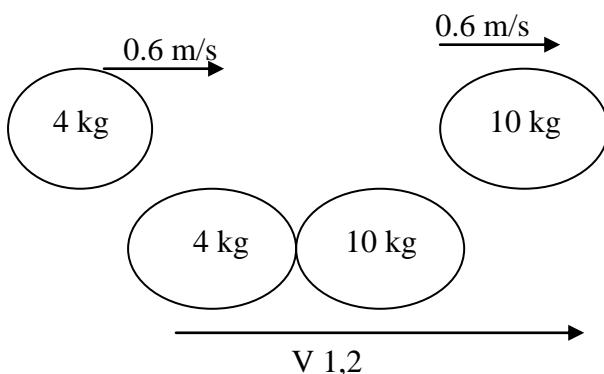
2) A ball of mass 150 gm moving horizontally with velocity 11.2 m / s collides with a racket . the ball recoils with velocity 7 m / s find
a) The change of K.E of the ball due to the collision .
b) The impulse of the rocket on the ball .

4) Calculate the impulse of billiards ball when it is affected of 30 N during 0.01 sec .

5) An object of 6 kg moving to right at velocity 12 m / s colloids with another one of mass 4 kg moving to left at velocity 10 m / s after collision the first body moves to left at velocity 10 m / s . Calculate the magnitude and direction of the velocity of the second object after collision .

6) Burning gases thrust out of a rocket with a rate 1500 kg / s and at velocity 13000 m / s . Find the thrust force acting on the rocket .

Compare between
1) Elastic inelastic collision

Chapter 7
Space exploration

I) Choose the correct answer :

1) The escape velocity from the gravitional earth's field depends on ………..
a. The mass of the rocket only   b. The radius of earth only
c. The force of free fall acceleration only   d. Both (a) and (b)

2) A satellite will be stable in its orbit when
a. It is in the equatorial plane
b. Rotates in the same direction of rotation of the earth
c. Rotates in the opposite direction of rotation of the earth
d. Both (a) and (b)

3.To fire a rocket from the earth's surface and give it an energy to escape from the earth's gravitional field …………….
a. The K.E after firing must equal work done by the engine
b. The work done by the engine of the last stage .
c. The P.E of the rocket on the Earth's surface is greater than that it on its orbit .
d. The K.E after its ejection must be equal to its p.E at the earth's surface

4. The no of engine in the third stage of space rocket is …………..
a. 5   b. 3   c. 2   d. 1

II) Give reason for :

1. In the multi staged rocket ,the first stage is provided by a number of engines greater than that of the third stage .
……………………………………………………………………………………
2. The final appearance of the rocket resembles a cigar .
……………………………………………………………………………………
3. You can lift a big man with one finger inside a space ship .
……………………………………………………………………………………
4. The satellites continue rotation around the earth although it is affected by the earth's gravity .
……………………………………………………………………………………
5. Inside the space ship on flight it is not necessary to wear a space suit .
……………………………………………………………………………………

III) What happen when :

1. The direction of rotation of the satellite is the opposite direction of rotation of the earth .
……………………………………………………………………………………
2. An elevator cable breaks .
……………………………………………………………………………………
3. An a astronaut pushes a body forward inside a space ship .
……………………………………………………………………………………
4. Three satellites are spaced at 120º a part .
……………………………………………………………………………………

IV) Problems :

1. A satellite revolves in a circular orbit at a height 800 Kg from Earth's surface . Calculate its orbital velocity if the mass of the Earth 6×10^{24} kg and $G = 6.67 \times 10^{-11}$ N.m^2 / kg^2 radius of earth = 6400 kg .

2. If the gaseous products from the end of the space rocket with rate of 2.5×10^{3} Kg / s , with thrust force 8×10^{7} N . Calculate the escape velocity of the rocket .

3. If the orbital velocity of a satellite is 8 km / sec . Calculate the radius of the orbit in which the satellite rotates knowing that ($g = 8.6$ m / s^2).

4. A mass of 5 kg is hanged in a spiral balance placed inside an elevator . Find the apparent weight of that mass when moving of the elevator :-
a) Upwards with a uniform velocity 4 m / s ^{2}
b) Down wards with acceleration 4 m / s ($g = 10$ m / s ^{2})

V- What are the factors affecting :
a- The escape velocity
…………………………………………………………………………………………………
b- The orbital velocity
…………………………………………………………………………………………………
c- The stability of the satellite in its orbit .
…………………………………………………………………………………………………

Compare between
1) Orbital velocity – Escape velocity

Unit 2
Chapter (8)
Temperature measurement

I) Choose the correct verb :

1. In Joule's experiment to find the relation between the mechanical work and the heat energy , the function of fixed vanes inside the vessel is ……………
a) increasing the rotation velocity of water .
b) preventing water from rotation
c) Allowing water to rotate in clock wise direction
d) increasing the mass of water

2. If the temperature of a person increases by 2 on the Celsius scale , the temperature increases on kelivin scale by …………..
a) 2°   b) 275°   c) 371°   d) 375°

3. The normal temperature of the human body on Fahrenheit scale is ……………
a) 237   b) 37   c) 98.5   d) 310

4. If the resistance of platinum thermometer at 0^0C is 6 ohm and at 100^0C is 6.12 ohm , its temp . corresponding to resistance = 6.36 ohm is ………………
a) 7.1 ℃   b) 14.2 ℃   c) 21.6 ℃   d) 28.4 ℃

5. A material in a state of thermal with surrounding medium so its temp is ……….the temp of medium
a) less than   b) greater than   c) equal to   d) no correct answer

Write the scientific term :

1. The property , which indicates wiether the body is in thermal equilibrium with the surrounding medium or not .
……………………………………………………………………………………
2. The sum of the K.E and P.E of the molecules of the body .
……………………………………………………………………………………
3. The movement of hot air upward and the cold air down ward .
……………………………………………………………………………………
4. The measuring unit of temp. in the international system unit .
……………………………………………………………………………………
5. a type of thermometer in which the pressure of gas changes regularly with change in temperature .
……………………………………………………………………………………

Give reasons for :

1. The temperature is a measure of the internal energy of the body .

……………………………………………………………………………

2. When technicians install railway tracks a small space is left between each two sector .

……………………………………………………………………………

3. The electric heater is put at the ground of the room .

……………………………………………………………………………

4. Matter expands by heating .

……………………………………………………………………………

5. Matter contracts by cooling .

……………………………………………………………………………

Problems :

1. If the gas pressure inside a constant volume gas thermometer was 60 cm . Hg when it is placed in crushed ice and 70 cm . Hg when it is placed in boiling water at the normal pressure . Calculate the temp. of an oven if the pressure of the gas in the thermometer was 90 cm .Hg when it is placed inside it .

2. If the length of mercury column inside mercuric thermometer is 12 cm at melting point of ice , find the temp . at which the length of mercury column equal 15.2 cm knowing that the length of mercuric column at boiling point equals 24.8 cm .

3. If the temp. of a body equals $60^0 f$, calculate the temp of that body on
a) Celsius scale   b) Kelvin scale

Put < or > or =

1. Internal energy for body at 72 ºC (….) internal energy for the same body at 39º F

2. Thermal equilibrium for two system A and B means that the temp. of system A (…..) temp of system B.

3. Internal energy for a body at 50º C (……) internal energy for the same body at 323 ºK .

What will happen when :

1. A body gains a quantity of heat .

……………………………………………………………………………

2. A body loses a quantity of heat .

……………………………………………………………………………

3. Two bodies of different temp . become in contact with each other .

…………………………………………………………………………

Compare between

1) Types of thermometers

I] Write the scientific term :

1. The quantity of heat required to raise the temp. of whole the body by 1^0k . [……………]

2. The quantity of heat energy needed to change 1 kg of the substance from solid state into liquid state without changing in its temp . [……………]

3. The sum of the kinetic and the potential energy of the molecules of a body . [……………]

4. The quantity of heat required to raise the temp . of 1 kg of the matter by 1^0K [……………]

5. Energy transferred from one body to another according to the difference in temp.[……………]

6. The quantity of heat energy needed to change 1 kg of the substance from liquid state into gaseous state without changing in its temp .   [……………]

7. An insulated beaker from the surrounding medium to prevent heat transfer from it or to it .

                                [……………]

II] Choose the correct answer :

1. The heat required to raise the temp of a body from 20 °C to 60 °C is 7000 J thus on raising the temp . of the same body from 360 °k to 400° k the required heat energy in joules is ……

a. 7000 x $\dfrac{1}{2}$ b. 7000 x 1

c. 7000 x 2   d. 7000 x $\dfrac{3}{2}$

2. If the same quantity of heat is given to too equal masses of water and aluminium , then the rise in temp. of Al is greater than that of water . this is due to ………..
a) The density of the Al is less than that of water .
b) The density of Al is larger than that of water .
c) The specific heat of Al is less than that of water .
d) The specific heat of Al is larger than that of water .

3. Heat capacity of body of a mass ………..gm equals numerically the specific heat of its material .
a) 1   b) 10   c) 100   d) 1000

4. If the mass no of an element (x) equals 4 times the mass no of element (y) , so the specific heat capacity of element (x) equals ………….. of that of element (y)

a) $\dfrac{1}{4}$ b) 1   c) 3   d) $\dfrac{1}{12}$

5. A body has a mass 0.4 kg and has a heat capacity 320 $J/^0K$ then its specific heat is ………….
a) 8000 J / kg^0K b) 800 J / Kg^0K c) 8000 J / ^0Kg d) 800 J /^0k

6. The specific heat is considered as a distinguishing characteristic for the materials as it changes by the change of …………

a) the volume of the substance
b) the mass of the substance
c) the kind of the material
d) the density of material

7. If the quantity of heat gained by the body increased to the double , then its specific heat will be ………………

a) doubled
b) halved
c) remains constant
d) Decreased to quarter

8. A body made of copper has a mass 0.64 kg and has specific heat capacity $= 400$ J/kg ^{0}k. Then its heat capacity is …………….

a) 2560 J/^{0}k
b) 2.560 J/^{0}K
c) 2560 J / kg
d) 2560 J/ kg^{0}K

What is meant by ;

1. The latent heat of fusion of ice equals 3.34 x 10 J / kg

……………………………………………………………………………

2. The latent heat of vaporization of water equals 2.27 x 10 J / kg

……………………………………………………………………………

3. The specific heat capacity of water equals 4200 J / kg^{0}K

……………………………………………………………………………

4. The heat capacity of a body $= 500$ J / ^{0}k

……………………………………………………………………………

What does the slope of each graph of the following equal to ?
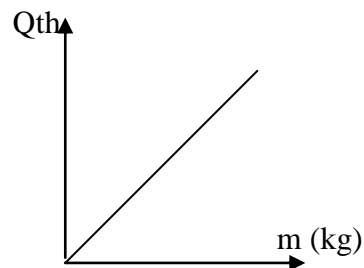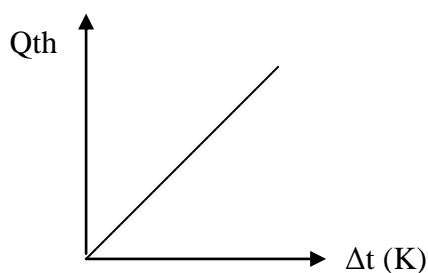
Problems :

1. What is the quantity of heat required to heat 100 gm of copper from $10°$ c to $100°$ c given that the specific heat of copper is 385 J/ kg ^{0}K.

2. A piece of copper of mass 0.42 kg is heated to $60°$ c , then it is dropped into water of mass 100 gm at $25°$ c , if the temp. of water increases by $10°$ c , find the specific heat capacity of copper knowing that the specific heat capacity of water is 4200 J / kg ^{0}k

3. 100 gram of water at 24 $°$c are mixed with 300 gm of water at $70°$ c . Calculate the temp. of the mixture .

4. A piece of copper of mass 0.279 kg is heated to 100 ^{0}C and dropped in aluminum container of mass 0.2 kg whose specific heat is 900 J / kg ^{0}K and continuing 0.09 kg of water at 40 ^{0}c , the final temp . becomes 50 $°$C .Calculate the specific heat capacity of copper if you know that the specific heat of water is 4200 J / Kg^{0}K

5. A liquid of mass of 4 kg and specific heat 5000 J / Kg^{0}K find
a) the heat capacity of this liquid
b) The heat energy needed to raise the temp . of this liquid from $10°$ C to $60°$ C

6. In an experiment to determine the latent heat of fusion of ice the following result are obtained:
The mass of empty calorimeter = 0.064 Kg
The specific heat capacity of calorimeter = 400 J / Kg^{0}K
The mass of water = 0.05 Kg
The specific heat capacity of water = 4200 J / Kg^{0}K
The mass of ice = 0.0072 Kg
The temp of the water and the calorimeter = 26^{0}C
The final temp of the mixture = 14^{0}C
Uses these result to calculate the latent heat of fusion

Compare between
1- Heat capacity & specific heat capacity

Unit 3
Chapter 10
Static electricity

What is meant by :

1. The gravitional field intensity at a point = 10 N / kg

……………………………………………………………………………………

2. The gravitional potential difference between two points = 10 J kg

……………………………………………………………………………………

3. The electric potential at a point 3 V

……………………………………………………………………………………

4. The electric capacity of a conductor = 3 x 10^{-8} farad

……………………………………………………………………………………

Choose the correct answer :

1. A free electron (e) is placed in an electric field its flux lines as shown in fig . In what direction shown the electron can move ?

a. 1   b. 2
c. 3   d. 4
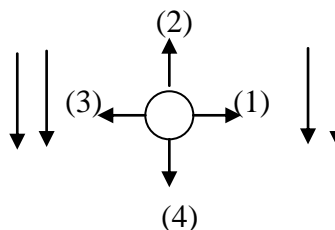
2. Two electric charges q_1 and q_2 . The distance between them is (d) . If the quantity of one of them is doubled and the distance is doubled therefore the mutual force between them is …..
a) remains constant   b) increases to its double
c) decreases to half   d) decreases to its quarter

3. The unit of the proportional constant is the
a) Nm^2 / kg^2 b) $Nm^2 kg$
c) $N / m^2 kg^2$ d) N / m^2

4. The electric potential difference at a point equals the intensity of the electric field when the distance equals ………..m from the point .
a) 1   b) 2
c) 4   d) $\frac{1}{2}$

5. Two equal charges , separated by distance (d) , the attraction force between them (f) , if the proportion constant (k) , the charge of each equals ………..coulomb .

a) k $\sqrt{fd}$ b) d $\sqrt{\frac{f}{k}}$

c) d $\sqrt{k/f}$ d) f d^2 / k

6. Two positive charges placed on one line , if the first equals 3 times the second , the ratio between the electrostatic force acting on them respectively is ……….

a) $\frac{1}{6}$

b) $\frac{1}{3}$

c) $\frac{1}{2}$

d) 1

7. Volt is equivalent to ………….
a) N/ c
b) J/ c
c) J / kg
d) N / kg

8. The electric field intensity is ……………..
a) Ascalor quantity , its unit is N / c
b) a vector quantity , it unit N/ c
c) Sacalor quantity , its unit is N
d) a vector quantity , its unit is N

9. The gravitional potential energy at the Earth's surface equal
a) 0
b) 1
c) 2g
d) g

Write the factors affecting :
1. The electrostatic force between two charges
……………………………………………………………………………………
2. The electric capacity of conductor consists of two metal plates between them an insulator material .
……………………………………………………………………………………
3. The electrical potential at a point
……………………………………………………………………………………

Problems :
1. A body of mass 20 kg , if the gravitional potential difference of that body between two different heights from the earth's surface is 1960 J , Calculate the gravitional potential difference between these points .

2. If the mass of the earth is 6 x 10^{24} kg , the mass of the moon is 74 x10 kg and the average distance between the earth and the moon is 3.9 x 10 m .Calculate the gravitional force between them G $= 6$ x 6 7 x 10 Nm^2 kg^{-2}

3. If the electric field intensity of electric charges 12.8 x 10 C at a point is 76 N/ c ,Find the distance of this point from the charge K $= 9$ x 10 Nm ^{2} / ^{2}c

4. Calculate the capacitance of a capacitor when the potential difference across its plates 4 v and the quantity of charge on one of its plates is 8 x 10 C .

Give reason for :

1. The difference in potential energy of a body at the Earth's surface equals zero .

……………………………………………………………………………………

2. The presence of static potential difference across two plates of capacitor .

……………………………………………………………………………………

3. The gravitional potential is equal at all the points of the normal surface to the direction of the earth's gravity .

……………………………………………………………………………………

4. If a capacitor is charges by Dc potential no current of laws in the final state .

……………………………………………………………………………………

Chapter 11
Dynamic electricity

What is meant by
1. The potential difference between two points is 4 volt .

……………………………………………………………………………………

2. The electric current intensity is 5 ampere .

……………………………………………………………………………………

3. Electric device does a work of 20 J in 0.5 sec .

……………………………………………………………………………………

4. The power of an electric lamp is 6 watt .

……………………………………………………………………………………

5. The electromotive force of an electric device is 8 volt .

……………………………………………………………………………………

Choose the correct answer :
1. The appearance of magnetic property for the material …………
a) The no of atoms of material   b) The shape of the atom of material
c) The kind of the atoms of materials   d) The arrangement of atoms in the material

3. An electric heater of power 700 watt is used to raise the temp of an amount of water 80 C in 10 minutes , knowing that the specific heat of water is 4200 J / kg^0K , so the mass of water equals …
a) 0.25 kg   b) 1.25 kg   c) 1 kg   d) 12.5 kg

4. The kilowatt is the unit of measuring ………
a) energy consumed   b) power
c) work   d) electric charge

5. Kilowatt hour equivalent to ……….Joule
a) 3.6×10^6 b) 3.6×10^5
c) 3.6×10^4 d) 3.6×10^3

6. Electric lamp is marked (220 V – 5 A) , the time taken to consume energy of 4400 J is …….second
a) 4   b) 880
c) 20   d) 40

7. When the electric conductor is put inside a magnetic field , the direction of motion of the electron is …….the direction of the acting field .
a) normal to   b) same to
c) opposite to   d) no correct answer

8. An air condition of power 5 kilowatt , the potential difference in volt needed for its function when an electric current of 20 A flows through it equals ……….
a) 200 v   b) 220 V
c) 250 V   d) 110 V

Give reason for :
1. Generating heat due to the passage of an electric current has desired result and undesired results .
………………………………………………………………………………
2. It is necessary to know the electric power of electric appliances before use .
………………………………………………………………………………
3. It s wrong to repair the fuse by using hick wire .
………………………………………………………………………………
4. Magnetic properties appear in some materials only
………………………………………………………………………………
5. It is preferred to use electric wires of suitable length and resistance inside the electric heater .
………………………………………………………………………………

Problems :
1) T.V (220 V – 110 Watt)
a- What does this mean ?
b- Calculate the current energy consumed in one hours .
c- Calculate the current intensity flowing in this T. V
d- Calculate the cost of consuming the electrical energy for 30 hours if the price of one kilowatt hour is 5 piaster .

2. An electric lamp . (60 watt – 240 volt) is used to heat the water in a fish basin for 7 minutes . If the mass of water is 2 kg and the specific heat of water is 4200 J / kg^{0}k .calculate :
a) The current intensity flowing through the lamp .
b) The raise in the temp of water .
c) The cost of consumed electric energy through 10 hours if the price of one kilowatt hour = 10 P.T

3. The following are the data obtained in an experminant to determinl the specific heat of aluminium electrically , mass of aluminum = 0.8 kg , the room temp = 23° c , the passing time of the electric current = 2.5 minutes , intensity of the electric current = 4 A,
Potential difference across the end of the heater = 12 volts,temp at the end of experiment = 33° C

4. Calculate the quanity of electric charges that passes through a conductor if the potential difference across its terminal is 100 volt and the work done to transfer these charges between them is 15 v .