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Al-naruura Primary and secondary school		**Grade: Form four**
Subject: Physics		**Date: 10/2/2021**
Chapter (1):		**Teacher: Hassan Abdullahi Hussein Abdi**

Chapter one: oscillatory motion

PART ONE: CIRCLE THE CORRECT ANSWER FOR THE FOLLOWING QUESTIONS.

1) Which of the following is not an example of periodic motion?

a) An object orbiting the sun. b) A pendulum swinging.

c) A mass on a spring **d) A ball falling to the ground.**

2) If an object in periodic motion completes one full cycle in 0.5 seconds, what is the frequency of the motion?

a) 0.5HZ b) 1HZ **c) 2HZ** d) 4HZ

3) A mass oscillates in a simple harmonic motion with amplitude A, if the mass is halved, but the amplitude is not changed, what will happen to the total mechanical energy of the system?

a) It will increase b) It will decrease

c) It will stay at the same d) None of these

4) If the is 48kg and the spring constant is 12N/m, what is the period of oscillation?

a) 8π s **b) 4π s** c) π s d) $\frac{\pi}{2}$ s

5) If the mass is displaced 0.35 m from equilibrium position, the restoring force is 7 N. what is the spring constant?

a) $5x10^{2}$ N/m b) $2x10^{2}$ N/m c) $5x10^{-2}$ N/m **d) $2x10^{1}$ N/m**

6) Which of the following does not affect the period of the mass spring system?

a) Mass b) Spring constant

c) Amplitude of vibration d) All of these above.

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7) The total energy of the spring is 100J. What is the kinetic energy of the mass at equilibrium point?

a) 25 J b) 75 J c) 50 J **d) 100 J**

8) A pendulum bob hangs from a string and moves with simple harmonic motion, which of the following does not affect the period of the pendulum?

a) the length of string b) the acceleration due to gravity

c) the mass of pendulum bob d) All of the above.

9) A mass oscillates horizontal spring with period T=S2.0s. what is the frequency?

a) 0.50HZ b) 1.0HZ c) 3.0HZ d) 4.0HZ

10) A mass on a spring oscillates between point A ad C as shown. Use the figure 1.16 to answer this question

At which point is the acceleration of the greatest?

a) A b) B c) C **d) A and C**

11) Which of the following provides the best example of simple harmonic motion?

a) riding a regular bus route b) Sliding down a water slide

c) running a constant daily jog **d) swinging on a playground**

12) Hooks law states that the extension in an elastic material is proportional to the stretching force which of the following devices makes use of this effect?

a) Lover balance b) Meter balance **c) Spring balance** d) pendulum

13) The period of simple pendulum increase to

a) Length increase b) Length decrease c) Mass increases d) Mass decreases

PART TWO: FILL THE BLANK SPACE WITH A SUITABLE TERMS.

1) Motion that regularly repeats at equal interval of time is called **Periodic motion_**

2) The force applied to the spring id directly proportional to the displacement this statement is known as **_Hooks law_**

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3) The time taken from on complete oscillation is **___Period _____**

4) Give two examples of simple harmonic motion which are not mentioned in the lesson
__Motion of the around the sun_____ The motion of the moon around the earth

5) A mass on spring undergoes SHM. The maximum displacement from Equilibrium is called **_Amplitude_**

6) Is the number of cycle made in one second is known as **_____Frequency___**

7) A simple pendulum is moved from earth to the moon, its period **__Decrease__**

8) The maximum displacement from either direction is called **___Amplitude __**

PART THREE: DIRECT QUESTION AND ANSWERS

1) Define Oscillatory Motion?

Ans: Oscillatory motion is defined as To and fro motion of an object from its mean position.

2) Define periodic motion?

Ans: periodic motion is a motion of an object that regularly repeats or returns to a given position after fixed time interval.

3) What is period?

Ans: Period is the time taken to make one complete cycle.

4) What is the SI unit of period?

Ans: the SI unit of period is second (S)

5) What is frequency?

Ans: Frequency is number of cycle made in one second.

6) What is the SI unit of frequency?

Ans: the SI unit of frequency is Hertz (HZ).

7) List some examples of repetitive motion of Human body.

Ans: Some examples of repetitive motion of Human body are:-

a) Heart beat
b) Breathing

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8) Define simple harmonic motion.

Ans1: Simple harmonic motion (SHM) is a type of motion under the influence of restoring force described by Hook's law.

Ans2: Simple harmonic motion SHM is a motion in which a body moves back or forth over a fixed path, returning to each position and velocity after definite interval of time.

9) What is the force constant or restoring force?

Ans: force constant is the spring constant refers to the property of the material and shows the stiffness of the spring.

10) What is the displacement of Simple harmonic motion SHM?

Ans: It the distance from equilibrium position in either direction.

11) State Hook's law?

Ans: Hook's law states that the restoring force applied by a spring is proportional to the displacement of the spring and opposite in direction.

12) Define Amplitude.

Ans: Amplitude is the maximum displacement from mean position in either direction.

13) What is simple pendulum?

Ans: Simple pendulum is the mass on the end of the string which oscillates in a harmonic motion.

14) What is the period of simple pendulum depend on?

Ans: The period of simple pendulum depend on

- The length of the string.
- Acceleration due to gravity.

15) What is equilibrium position?

Ans: Equilibrium position is the rest position of particles.

16) A vibrating simple pendulum of a period is placed in a lift is accelerating downwards. What will be the effect on the time period?

Ans: Time period increases as effect value of acceleration due to gravity decrease.

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17) If you doubled the period of a pendulum, what happens to its length?

Ans: Its length will be doubled

Table about units and its symbol			
No	**Name**	**Units**	**Symbol**
1.	**Period**	**Second (S)**	**T**
2.	**Frequency**	**Hertz (Hz)**	**F**
3.	**Force**	**Newton (N)**	**F**
4.	**Acceleration**	**Meter per second square (M/s^2)**	**A**
5.	**Mass**	**Kilogram (Kg)**	**M**
6.	**Displacement**	**Meter (M)**	**X**
7.	**Amplitude**	**Meter (M)**	**A**
8.	**Spring constant**	**Newton per meter (N/m)**	**K**
9.	**Gravitation**	**Meter per second square (M/s^2)**	**G**
10.	**Angular frequency (Omega)**	**Rad per second (R/s)**	**Ω**
11.	**Potential Energy**	**Joule (J)**	**P.E**
12.	**Kinetic energy**	**Joule (J)**	**K.E**
13.	**Velocity**	**Meter per second (M/s)**	**V**

THE END CHAPTER ONE

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Al-naruura Primary and secondary school		**Grade: Form four**
Subject: Physics		**Date: 10/2/2021**
Chapter (2):		**Teacher: Hassan Abdullahi Hussein Abdi**

Chapter two: wave motion

PART ONE: CIRCLE THE CORRECT ANSWER FOR THE FOLLOWING QUESTIONS.

1) Which of the following is not transferred by waves?

a) Matter b) Information c) Energy d) All of them

2) Which of the following waves are longitudinal?

a) Light **b) Sound** c) Seismic S – waves d) None of them

3) The number of complete waves passing a point on the rope each second is the _____

a) Period **b) Frequency** c) Amplitude d) Wavelength

4) When the oscillations are at right angles to the direction of the energy transferred, the wave is:

a) Longitudinal wave **b) Sound wave** c) Transverse wave d) Standing wave

5) When two particles are moving exactly in the same way they are called _____

a) all of them b) out phase c) opposite phase **d) same phase**

6) When diffraction occurs, there is a change in

a) Direction b) Velocity c) Frequency d) Wavelength

7) The distance covered by the disturbance in one second is _____

a) Wavelength **b) Wave velocity** c) Amplitude d) Period

8) Which of the below has the greatest wavelength

a) Infrared b) X – ray c) Visible light **d) Microwave**

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9) A train emits sound of wavelength 0.6 m and frequency 550 Hz. Then the velocity is

a) 916.6 m/s b) 917 m/s **c) 300 m/s**

10) Which of the following Electromagnetic wave has the highest frequency?

a) X-ray b) Gamma rays c) Ultraviolet d) All of them

PART TWO: FILL THE BLANK SPACE WITH A SUITABLE TERMS.

1) **__Radio Waves__** are on the low – frequency end of the spectrum.

2) When electromagnetic radiations enter living tissue it is often harmless, but sometimes it creates **__havoc (harm)_**

3) When the motion of two particles in a vibrating medium is not similar in any respect, they are said to be in **__out of phase__**

4) The speed of S – waves generally increases with **__depth__** in Earth.

5) A stationary wave occurs when two waves, which are travelling in opposite directions and which have the same speed and frequency are **__super positioned__**.

6) A system using electromagnetic waves to communicate must contain a **__transmitter__** to send a signal and a **__receiver__** to receive it.

7) Radio waves transfer **__pictures_** and **_sound_** information from the transmitter to your television set at home.

8) When more than one wave is present, the total **_oscillation_** of any point is the sum of the **__oscillations__** from each individual wave.

9) **__Constructive interference__** occurs when the wave amplitudes are in phase and thus reinforce each other. This results in a wave of even greater amplitude.

10) There is no change in the **__direction__** of a wave when it is incident normally at a boundary, from deep water to shallow water.

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PART THREE: DIRECT QUESTION AND ANSWERS

1) Define wave?

- ❖ A wave can be described as disturbance that travels through a medium from one location to another location.
- ❖ A wave is a disturbance or vibration which travels through medium.

2) List types of waves?

- ❖ There are two types of waves and they are:
- ✓ Mechanical waves
- ✓ Electromagnetic waves

3) Define mechanical waves?

- ❖ Mechanical waves are waves which propagate through a material medium. **NB:** Mechanical waves require material medium.

4) List types of mechanical waves?

- ❖ Types of mechanical waves are:
- ✓ Water waves
- ✓ Sound waves
- ✓ Spring waves
- ✓ String waves
- ✓ Seismic waves

5) Define electromagnetic waves?

- ❖ Electromagnetic waves are waves which propagate through an empty space (Vacuum). **NB:** Electromagnetic waves do not require a material medium

6) List types of electromagnetic waves?

- ❖ Types of electromagnetic waves are:

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- ✓ Radio waves
- ✓ Infra-red radiation
- ✓ X-rays
- ✓ Gamma-rays
- ✓ Visible light
- ✓ Ultraviolet radiation
- ✓ Micro-waves

7) What is the difference between mechanical waves and electromagnetic waves?

- ❖ The difference between mechanical waves and electromagnetic waves
- ✓ Mechanical waves propagate through material medium
- ✓ Electromagnetic waves propagate through empty space (Vacuum)

8) Define wave motion?

- ❖ Wave motion is on the basis of the direction of movement of the individual particles of the medium relative to the direction which the waves travel.

9) List types of wave motion?

- ❖ There are two types of wave motion and they are:
- ✓ Transverse waves
- ✓ Longitudinal waves

10) Define transverse wave?

- ❖ Transverse wave is a wave in which particles of the medium move in a direction perpendicular to the direction which the wave moves.

11) Define longitudinal wave?

- ❖ Longitudinal wave is a wave in which particles of the medium move in a direction parallel to the direction which the wave moves.

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12) List characteristics or terms of wave motion?

❖ Characteristics or terms of wave motion include:

✓ **Velocity (V)** is the distance covered by the disturbance in one second.

✓ **Period (T)** is the time taken to make one complete cycle of wave motion.

✓ **Frequency (F)** is the number of cycles or waves per second and its unit is hertz (Hz).

✓ **Wavelength (λ)** is the distance between two consecutive crests or through.

✓ **Amplitude (A)** is the maximum displacement on either side of the undisturbed or rest position.

✓ **Phase (Φ)** there are two phases, the highest point is called **crest** and the lowest point is called **through**.

13) What is the velocity of wave equation?

❖ The velocity of wave equation is the product of the wavelength and the frequency.

14) List properties of waves?

❖ Properties of waves are:

✓ Rectilinear propagation

✓ Reflection

✓ Refraction

✓ Diffraction

✓ Interference

15) Define rectilinear propagation?

❖ Rectilinear propagation means waves travel in straight lines.

16) Define reflection?

❖ Reflection occurs when waves strike a surface and bounces off.

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17) Define refraction?

- ❖ Refraction occurs when waves deviate from their original path while passing from one medium to another of different optical media.

18) Define diffraction?

- ❖ Diffraction is the change of wave path when passing through a slit or an aperture.

19) Define interference?

- ❖ Interference is the phenomenon produced from the superposition of two waves in a medium.

20) List types of interference?

- ❖ Types of interference are:
- ✓ Constructive interference
- ✓ Destructive interference

21) When constructive interference occurs?

- ❖ Constructive interference occurs when reflected waves that are in phase with the incoming waves.

22) When destructive interference occurs?

- ❖ Destructive interference occurs when waves that are out of phase.

23) Define superposition principle?

- ❖ Superposition principle is when more than one wave is present; the total oscillation of any point is the sum of the oscillations from each individual wave.

24) Define beat?

- ❖ The result is an alternation of loudness called beat.

25) Define standing (stationary) waves?

- ❖ A wave that is confined between boundaries is called standing wave.

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26) Define node?

- ❖ Node is the position at which the amplitude is zero

27) Define anti-node?

- ❖ Anti-node is the position at which the amplitude is maximum.

28) State two uses of microwaves.

An: 1) Heating 2) Photographic field

29) Describe the difference between Gamma rays and x-rays.

- ❖ Gamma rays are emitted nucleus of an unstable atom during radioactive decay.
- ❖ X-ray is generated by an x-ray machine when high speed electrons collided with metals.

30) Describe the Similarities between Gamma rays and x-rays.

- ❖ They are both ionizing radiation, can cause damage when the interact cells.

31) Why must great care be broken when using x-ray and gamma ray?

Ans= Because they are both dangerous and have high frequency, so they can much more dangerous.

32) What type of wave is a) p-wave b) S-wave? Which type of wave travels faster p-wave or s-wave?

An: a) p-wave is a longitudinal wave b) s-wave is transverse wave. P-wave travels faster.

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THE END CHAPTER TWO

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Al-naruura Primary and secondary school		**Grade: Form four**
Subject: Physics		**Date: 10/2/2021**
Chapter (3): Sound waves		**Teacher: Hassan Abdullahi Hussein Abdi**

Chapter three: Sound Waves

PART ONE: CIRCLE THE CORRECT ANSWER FOR THE FOLLOWING QUESTIONS.

1) Sound wave travels from air into water which following changes?
a) frequency b) Wavelength **c) Velocity** d) non-of them
2) We determine speed of sound by the method of echoes
a) v= 2d/t b) v=d/t C) V=d t d) All of them
3) The practical application based on the reflection of sound is:-
a) Hearing aid b) bulb horn c) Sonometer **d) both a and b**
4) To locate its prey in the darkness the owl or the bat emits.
a) Infrasonic wave **b) ultrasonic wave** c) sonic wave d) Infra red wave
5) The voice of women is shrill as compared to men because of the difference in their
a) Speed b) loudness **c) frequency** d) All of these
6) Which kind of sound is produced in an earthquake before the main shock wave begins?
a) ultrasound **b) infrasound** c) Audible sound d) none of the above
7) One of the following can hear infrasound. Which one?
a) Dog b) bat **c) rhinoceros** d) humans
8) Sound travels through:-
a) Liquids b) Gas c) Solids **d) All of them**
9) Sound waves produced by
a) radio station b) object under pressure **c) vibrating objects**
10) An echo is produced when sound wave are :-
a) Absorbed by an object **b) Reflected back by an object** c) Transmitted by an object.
11) The loudness of a sound is determined by mainly by its
a) Amplitude b) Speed c) Frequency d) pitch
12) In hospitals, doctors use machines that utilize a sound wave for imaging unborn babies (fetuses). This type of sound wave is:-
a) Infrasonic b) Sonic c) Ultrasonic d) Audible sonic

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PART TWO: FILL THE BLANK SPACE WITH A SUITABLE TERMS.

1) Sound is **_longitudinal_** wave created by Vibrating objects.
2) **Sound waves _** is a mechanical that produce sensation of hearing.
3) Where there is no **_medium_**, no sound can be transmitted.
4) Sound travels **_lowest_** in gases, faster in liquids and **_Fastest_** in solids.
5) Sound cannot travel through **_____An empty space_____**
6) The bouncing back of sound when its hits a hard surface is called **_Reflection_**
7) The reflection of sound wave is called **_____An echo____.**
8) There are many applications of the reflection of sound such as **_Hearing Aid__** and **_Stethoscope__.**
9) Pitch is the change of **___Frequency_____**
10) The number of harmonic contests determines the **_Quality_** of the sound.
11) The human ear can hear sounds having frequencies of **_20_** hertz to **_20,000_** hertz.
12) Infrasonic are vey **_low__** frequency sound, and ultrasonic sounds are very **_high_** frequency sounds.
13) **__Resonance__** is the tendency of a system to vibrate at a maximum amplitude at the natural frequency of the system.
14) A harmonic frequency is a frequency at which **_Standing waves_** can be made.

PART THREE: DIRECT QUESTION AND ANSWERS

1) Define sound waves?

❖ Sound wave is a mechanical wave that produces a sensation of hearing.

2) What is the sound travels through?

❖ Sound travels through liquids, gases and solids.

3) What is the best transmitter of sound?

❖ Solid is the best transmitter of sound.

4) What are the conditions must be fulfilled for hearing a sound?

❖ For hearing a sound, the following conditions must be fulfilled:

✓ There must be a vibrating body.

✓ There must be material medium.

✓ There must be receiver.

5) List sources of sound waves?

❖ Sound waves are produced by:

✓ Vibrating strings.

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✓Vibrating surfaces

✓Tubes

6) What is the velocity of sound in air?

❖The velocity of sound in the air is **330m/s** at **00C,** for every **10C** rise of temperature, the velocity is increased by **0.6m/s.**

7) A sound persists for 1/10 seconds in our ear after exciting sound dies off. What is called this time?

❖A sound persists for 1/10 seconds in our ear after exciting sound dies off. This time is called persistence of audibility.

8) Define echo?

❖The reflection of sound wave is called echo.

9) What are the conditions for formation of echoes?

❖The conditions for formation of echoes are:

✓The minimum distance between the source of sound and the reflecting body should be 17m.

✓The wave length of sound should be less than the height of reflecting body.

✓The intensity of sound should be sufficient so that it can be heard after reflection.

10) Define reverberation?

❖Reverberation is series of reflections that fall on ear from various reflectors one after another in a closed room forming a continuous rolling sound.

11) List uses of echoes?

❖Uses of echoes are:

✓Determination of the depth of ocean (sea).

✓Echoes guide insect eating bats and protect them avoid colliding with objects or with one another.

✓Dolphins communicate with each other.

✓Echoes are used by army to locate gun positions of enemy.

✓Echoes are used by geologists for mineral prospecting

12) List properties of sound?

❖Properties of sound are:

✓Intensity

✓Frequency

✓Harmonic content

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13) What is the intensity of sound?

❖ The intensity of sound is rate at which the sound energy flows through a unit area normal to the direction of sound waves.

14) Define pitch?

❖ Pitch is the change of frequency.

15) What is the pitch of a note depends on?

❖ The pitch of a note depends on the frequency of the wave reaching the ear.

16) What is the number of harmonic contents determines?

❖ The number of harmonic contents determines the quality of the sound.

17) What is the fundamental tone?

❖ Fundamental tone is the simplest harmonic content.

18) State types of sound?

❖ Types of sound are:

✓ Sonic vibration

✓ Ultrasonic sound

✓ Infrasonic sound

19) Define sonic vibration?

❖ Sonic vibration is the vibration whose frequency from 20Hz—20,000Hz.

20) Define ultrasonic sound?

❖ Ultrasonic sound is the frequency which exceeds 20,000Hz.

21) Define infrasonic sound?

❖ Infrasonic sound is the frequency which below 20Hz

22) List some animals that can hear ultrasonic sound?

❖ Some animals that can hear ultrasonic sound are dogs, some fish, bats and dolphins.

23) List some animals that can hear infrasonic sound?

❖ Some animals that can hear infrasonic sound are elephants and whales.

24) What are uses of ultrasonic sound?

❖ Uses of ultrasonic sound are

✓ Echo sounders

✓ Ultrasound scanning

✓ Ultrasonic cleaning

✓ Homogenizing milk and cosmetics

✓ Sonar (sound navigation and ranging)

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25) Define Doppler Effect?

❖ Doppler Effect is the change in pitch produced by relative motion of source and observer.

26) What is the sonometer?

❖ Sonometer is the instrument that the properties of vibrating strings can be studied.

27) Define forced vibration?

❖ Forced vibration is the setting up of vibrations in an object by a vibrating force.

28) Define resonance?

❖ When the frequency of an applied force matches the natural frequency of an object, energy is transferred very efficiently. The condition is called resonance.

29) Name three Characteristics of sound?

An: a) Loudness b) pitch c) quality

30) How does pitch of a sound depends on frequency?

An: The pitch of a sound depends on frequency of vibration**.**

31) Name that part of ear which vibrates when outside sound falls on?

An: Ear drum is the part of ear which vibrates when any outside sound falls on it.

32) Name three tiny bones present in middle part of ear?

An: a) Malleus b) Incus c) Stapes

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THE END CHAPTER THREE

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Al-naruura Primary and secondary school		**Grade: Form four**
Subject: Physics		**Date: 10/2/2021**
Chapter (4):Reflection of light		**Teacher: Hassan Abdullahi Hussein Abdi**

Chapter Four: Reflection of light

PART ONE: CIRCLE THE CORRECT ANSWER FOR THE FOLLOWING QUESTIONS.

1) No matter how far you understand from a mirror, your image appears erect. The mirror may be:-

a) Plane b) Concave c) Convex **d) Both A and C**

2) A ray of light is incident on a plane mirror making an angles of 90^0 with the mirror surface. The angle of reflection for this ray of light will be.

a) 45^0 b) 90^0 **c) 0^0** d) 60^0

3) The image of an object formed by a plane mirror is:-

a) Virtual b) real c) diminished d) upside-down

4) Magnification produced by a convex mirror is always.

a) Less than 1 b) more than 1 c) equal to 1 d) more or less than 1

5) Magnification produced by a plane mirror is.

a) less than 1 b) Zero c) greater than 1 **d) equal to 1**

6) In order to obtain a magnification of, -0.6 (minus 0.6) with a concave mirror, the object must be placed.

a) At the focus b) Between pole and focus c) between focus and center of curvature d) Beyond the center of curvature

7) The image formed by spherical mirror is virtual. The mirror will be.

a) Concave b) Convex **c) Either concave or convex** d) metallic

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8) Whatever be the position of the object, the image formed by a mirror is virtual, eract and smaller than the object. The mirror then must be:-

a) Plane b) Concave **c) Convex** d) Either concave or convex

9) The mirror used by a dentist to examine the teeth of a person is

a) Concave **b) Convex** c) Plane d) any one of the above

10) A concave mirror cannot be used as:-

a) A magnifying mirror b) A torch reflector c) A dentist's mirror **d) A rear view mirror.**

PART TWO: DIRECT QUESTION AND ANSWERS

1) List common characteristics of light?

 Common characteristics of light are:

 Light is an invisible energy which on rebounding from the surface of matter cause sensation of vision. Light travels along a straight-line path.

 Light produces shadows, when obstructed by opaque objects.

 The velocity of light in vacuum is 3 108m/s.

2) Define reflection of light?

 Reflection of light is the bouncing back of light rays from a surface.

3) What are the kinds of reflection?

 There are two kinds of reflection and they are:

 Regular reflection or specular reflection

 Irregular reflection or diffused reflection

4) Define regular reflection?

 Regular (Specular) reflection is the reflection of light from a smooth surface.

5) Define irregular reflection?

 Irregular (Diffused) reflection is the reflection of light that occurs on rough surface.

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6) List terms associated with reflection of light?

 Terms associated with reflection of light:

 Mirror Incident ray Reflected ray Point of incident

 Normal Angle of incident Angle of reflection

7) Define mirror?

 Mirror is a smooth and highly polished reflecting surface.

8) What are the kinds of mirror?

 There are two kinds of mirror

 Plane mirror Curved mirror

9) Define plane mirror?

 Plane mirror is a highly polished plane surface.

10) Define curved mirror?

 Curved mirror is a highly polished curved surface.

11) What are the other names of curved mirror?

 The other names of curved mirror are spherical mirror, parabolic mirror.

12) How many surfaces have all mirrors? And what are they ?

 All mirrors have two surfaces. They are: Polished surface. Reflecting surface.

13) Define incident ray?

 Incident ray is a ray of light which falls on a mirror or any polished surface.

14) Define reflected ray?

 Reflected ray is a ray of light which bounces off the mirror surface after reflection.

15) What is a point of incident?

 Point of incidence is the point on the mirror surface where an incident ray strikes.

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16) What is the normal?

 Normal is a perpendicular drawn on the mirror surface at the point of incidence.

17) Define angle of incident?

 Angle of incidence is the angle that the incident ray makes with the normal.

18) What is the angle of reflection?

 Angle of reflection is the angle that the reflected ray makes with the normal.

19) Define reflex angle of incident?

 Reflex angle of incident is the angle that the incident ray makes with plane mirror.

20) Define reflex angle of reflection?

 Reflex angle of reflection is the angle that the reflected ray makes with plane mirror.

21) State the laws of reflection?

 Laws of reflection

 First law of reflection: The angle of incidence is always equal to angle of reflection.

<i = <r

 Second law of reflection: At the point of incidence, the incident ray, the reflected ray and the normal lie in the same plane.

22) What is the normal incidence?

 Normal incidence is when a ray of light strikes a plane mirror at an angle 90°, i.e., its path coincides with normal, the normal incidence takes place.

23) What are the characteristics of normal incidence?

 Characteristics of normal incidence: As the incident ray coincides with normal, therefore, angle of incidence <i is zero.

 As the <i= <r, therefore, angle of reflection <r is zero. The incident ray of light retraces its path in opposite direction, The angle between the incidence and reflected ray is zero.

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24) Define image?

 When the rays of light diverging from a point, after reflection or refraction, either actually meet at some other point or appear to meet at some other point, then that point is called image of the object.

25) What are the kinds of images?

 There can be two kinds of images: Virtual image. Real image.

26) Define virtual image?

 When the rays of light diverging from a point, after reflection or refraction appear to diverge from another point, then the image so formed is called virtual image.

27) Define real image?

 When the rays of light diverging from a point, after reflection or refraction actually converge at some other point, then the image so formed is called real image.

28) Differentiate between virtual image and real image?

 The differences between virtual image and real image Virtual image Real image

1 The rays of light after reflection or refraction appear to meet at some other point or appear to diverge from some other point. The rays of light after reflection or refraction actually meet at some other point. 2 It cannot be taken on a screen. It can always be taken on a screen. 3 It is always erect, but laterally inverted. It is always inverted.

29) Define lateral?

 The phenomenon due to which the image of an object turns through an angle of 180° through vertical axis rather than horizontal axis, such that the right side of the image appears as left or vice versa is called lateral.

30) What are the characteristics of an image formed in plane mirror?

 Characteristics of an image formed in plane mirror

 Image is virtual, i.e., it cannot be taken on screen. **Image is erect.** Image is of same size as the size of object. Thus, magnification of image is one Here, it is important to remember that magnification is the ratio of the size of an image to the size of an object.

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Image is laterally inverted, i.e, the left side of object appears as right side of the image.
 Image is formed as far behind the plane mirror as the object is in front of it.

31) Define spherical mirror ?

 Spherical mirror is a mirror which is made from a part of a hollow sphere.

32) Define concave mirror ?

 Concave mirror is a mirror which is polished from the outer side of a hollow sphere, such that the reflecting side is towards its hollow side.

33) Define convex mirror ?

 Convex mirror is a mirror which is polished on the hollow side of the sphere, such that the reflecting surface is towards its bulging side.

34) What is the pole ?

 Pole is the midpoint of a spherical mirror.

35) What is the center of curvature ?

 Center of curvature is the centre of the hollow sphere, of which the spherical mirror is a part.

36) What is the principle axis ?

 Principle axis is an imaginary line passing through the pole and the centre of curvature of a spherical mirror.

37) What is the linear aperture ?

 Linear aperture is the diameter of a spherical mirror

38) What is the principle focus ?

 Principle focus is a point on the principal axis, where a parallel beam of light after reflection, either actually meets or appears to meet.

39) Define focal length ?

 Focal length is the linear distance between the pole and the principal focus.

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40) Define radius of curvature ?

 Radius of curvature is the linear distance between the pole and the centre of curvature.

41) Define focal plane ?

 Focal plane is an imaginary plane passing through principal focus, such that it is at right angles to principal axis.

42) Why the other positions are not possible for formation of the image in convex mirror ?

 Because the focus and the centre of curvature are behind the reflecting surface of the convex mirror.

43) List uses of concave mirror ?

 Uses of concave mirror are:

 It is used as a shaving mirror.

 It is used as a reflector in the head lights of automobiles.

 It is used by doctors to focus a parallel beam of light on a small area.

 Concave mirror is used as a reflector in dish type solar cookers and solar furnace.

44) List uses of convex mirror ?

 Uses of convex mirror are:

 It is used as a rear view mirror in automobiles.

 It is used as a reflector for street lights.

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THE END CHAPTER FOUR

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Al-naruura Primary and secondary school		**Grade: Form four**
Subject: Physics		**Date: 10/2/2021**
Chapter (5): Refraction of light		**Teacher: Hassan Abdullahi Hussein Abdi**

Chapter Five: Refraction of light

PART ONE: CIRCLE THE CORRECT ANSWER FOR THE FOLLOWING QUESTIONS.

1) Lateral displacement produced by an optial block is related to:

a) Thickness of the block b) Refractive index of the block

c) Angle of incidence **d) All of them**

2) The speed of light in air is:

a) $3x10^8$m/s **b) $3x10^8$m/s** c) $3x10^8$km/s d) $3x10^8$m/s

3) A ray of light travelling in waterfalls at right angles to the boundary of a parallel sided glass block. The ray of light is:

a) Refracted towards the normal. **b) Does not get refracted.**

c) Refracted away from the normal. d) Is reflected along the same path.

4) A ray of light passes from glass into air. The angle of reflection will be:

a) Equal to the angle incidence. b) Smaller than the angle of incidence.

c) Greater than the angle of incidence. d) 45^o

5) You have blindfolded your friend and then gave him a lens for recognition. He moves his finger on the lens and declares it convex lens. State the reason for choice of his answer:

a) It has tapering edges. b) It is thicker in the middle .

c) Both a) and b) d) None of the above

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6) An object is at infinity with respect to the optical of a conferging lens . the image formed by it is:

a) Diminished and erect. **b) Diminished**

c) Diminished to a point and inverted. d) Magnified and erect.

7) Which on the following materials cannot be used to make a lens?

a) Water b) Glass **c) Clay** d) Plastic

PART TWO: FILL THE BLANK SPACE WITH A SUITABLE TERMS.

1) When a ray of light is travelling obliquely in denser medium, enters **_rare__**

Medium, it always bends away from the **_normal draw** a denser medium to medium

2) A person suffering from this defect can see the nearer objects clearly, but can not see the **_Far off objects__** clearly.

3) **_Aqueous hormor_** is watery, saline fluid, filing the anterior portion of the eye.

4**_Iris_** is a circular contractile diaphragm, suspended in front of the crystalline lens.

5) The ability of an eye focus the distant objects as well as the nearby objects on the retina by changing the focal length (or converging power) of its lens is called **_accomodation**

6) **_Shutter _** of the variable speed is used to control the exposure time of film.

7) The distances measured from the optical center against the direction of the incident light are taken as **_Negative_.**

8) The perpendicular shift in the of incident ray, while emerging out of rectangular optical slab is called **_lateral displacement_**.

9) A man having myopic uses to concave lens of focal length 30cm. the power of the lens is **_-3.3D_**.

PART THREE: DIRECT QUESTION AND ANSWERS

1) Define refraction of light ?

 Refraction of light is when the ray of light is travelling from one optical medium to another optical medium.

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2) Define incident ray ?

 Incident ray is a ray of light travelling towards another optical medium.

3) Define point of incidence ?

 Point of incidence is the point where an incident ray strikes another optical medium.

4) Define normal ?

 Normal is a perpendicular drawn at the point of incidence.

5) Define angle of incidence ?

 Angle of incidence is the angle made by the incident ray with the normal at the point of incidence.

6) Define refracted ray ?

 Refracted ray is a ray of light which deviates from its path on entering another optical medium.

7) Define angle of refraction ?

 Angle of refraction is the angle that the refracted ray makes with the normal.

8) Define emergent ray ?

 Emergent ray is a ray of light which emerges out from another optical medium, into the original optical medium.

9) Define angle of emergence ?

 Angle of emergence is the angle that the emergent ray makes with the normal.

10) Define lateral displacement ?

 Lateral displacement is the perpendicular shift in the path of incident ray, while emerging out of a rectangular optical slab.

11) State laws of refraction (Snell's law) ?

 Laws of Refraction (Snell's law) :

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 The incident ray, the refracted ray and the normal to the surface of the separation of two media at the point of incidence, all lie in the same plane.

 The ratio of the sine of angle of incidence to the sine of angle of refraction is a constant, for the light of given colour, for the given pair of media.

12) Define refractive index ?

 Refractive index is the ratio between the sine of angle of incidence in one optical medium to the sine of angle of refraction in another optical medium.

13) Define optical density ?

 The ability of a medium to refract light is expressed in terms of optical density.

14) How to Distinguish between a Rare and Dense Medium?

 The media with lesser refractive index is rare and the medium with more refractive index is dense.

15) Define lens?

 A lens is defined as a portion of a transparent optical material, having one or two spherical surfaces.

16) List types of lens?

 Lenses are divided into two broad classes:

 Converging lens or convex lens.

 Diverging lens or concave lens.

17) Define converging lens or convex lens?

 A piece of transparent optical material, having one or two spherical surfaces, such that it is thicker in the middle and tapering (thinner) at the edges.

18) Convex lens are classified into three what are they?

 They are:

 Double convex lens.

 Plano-convex lens.

 Concavo-convex lens.

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19) What are the characteristics of convex lens?

 Convex lens are thicker in the middle and tapering at their edges.

20) Define diverging or concave lens?

 A piece of transparent optical material, having one or two spherical surfaces, such that it is tapering (thinner) in the middle and thicker at its edges.

21) Concave lens are classified into three what are they ?

 They are:

 Double concave lens.

 Plano-concave lens

 Convex-concave lens.

22) What are the characteristics of concave lens ?

 Concave lens are thicker at their edges and tapering in the middle.

23) Define power of a lens ?

 Power of a lens is a measure of degree of convergence or divergence of light rays incident on it.

24) What is the SI unit of power of a lens ?

 The SI unit of power of a lens is dioptre. It is denoted by the letter D.

25) What is the linear magnification ?

 Linear magnification is the ratio between the height of the image produced by a lens to the height of the object.

26) List common defects of the eye ?

 Common defects of the eye are:

 Short sightedness (Myopia)

 Long sightedness (Hypermetropia)

 Presbyopia

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27) How can be corrected short sightedness ?

 Short-sightedness can be corrected by using a concave lens.

28) How can be corrected long sightedness ?

 Long sightedness can be corrected by using convex lens.

THE END CHAPTER FIVE

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Al-naruura Primary and secondary school		**Grade: Form four**
Subject: Physics		**Date: 10/2/2021**
Chapter (6): Dispersion of light		**Teacher: Hassan Abdullahi Hussein Abdi**

Chapter Six: Dispersion of light

PART ONE: CIRCLE THE CORRECT ANSWER FOR THE FOLLOWING QUESTIONS

1) Abeam of white light is shone on to glass prism. The light cannot be:

a) Deviated **b) Focused** c) Refracted d) Displacement

2) Abeam of white light falls on a glass prism. The colour of light which undergoes the least bending on passing through the glass prism is:

a) Red b) Green c) Blue d) Violet

3) The color of white light suffers the maximum bending or maximum refraction on passing through a glass prism is:

a) Orange b) Red **c) Violet** d) Yellow

4) The splitting up of white light into seven colors on passing through glass prism is called.

a) Refraction **b) Dispersion** c) Scattering d) Deflection

5) Which of the following color of white light has the least wavelength?

a) Violet b) Red c) Blue d) Orange

6) We get white color when the following pairs of colors are mixed addictively.

a) Blue and yellow b) Blue and green c) Blue and cyan d) Blue and magenta.

7) Out of the following is the color of light having the maximum wavelength?

a) Green b) Violet c) Indigo **d) Orange**

8) During sunset or sun rise, the sun appears reddish because:

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a) At this time sun is not very hot.

b) Sun produces red light at this time.

c) Due to longer passage in atmosphere, even red light in the sunlight scatters.

d) None of the above.

9) Rainbow is formed due to:-

a) refraction of light **b) Dispersion of light** c) Reflection of light

10) The danger signals installed at the top of the tall buildings are red in color. These can be easily see from a distance because among all other colors, the red light:-

a) Is absorbed the most by smoke or fog

b) Is scattered the least by smoke or fog

c) Move Fastest in air

d) Is the scattered the most by smoke or fog

11) The following color of white is least deviated by the prism

a) green b) violet c) Indigo **d) Yellow**

PART TWO: FILL THE BLANK SPACE WITH A SUITABLE TERMS.

1) The color of white light which is deviated from the maximum on passing through the glass prism is **__Violet__**

2) As light ray emerge From s glass prism in air, are they refracted towards **__Violet_**

3) The color of spectrum has longest wave length is **__Red__**

4) The color of light depends on **__on its wavelength__**

5) A piece of cloth appears blue in bright sunlight but when held in the red portion of solar spectrum it will appear **_Black__**

6) The light which has longer wavelength is **__Red_**

7) The color that lie on the two side of the green color in the spectrum of white light are **_Blue_** and **_Yellow_**

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8) **_Loupe_** is used for detecting original diamonds from fake diamonds

9) _____ do not affect ordinary photographic films however, special prepared film can record them.

PART THREE: DIRECT QUESTION AND ANSWERS

1) What is the dispersion?

❖ Dispersion is the phenomenon due to which a white light splits into its component colours, when passed through a prism.

2) What is the spectrum?

❖ Spectrum is the band of seven colours obtained on the screen, when a white light splits into its component colours.

3) List the seven colors ?

❖ The seven colors are: violet, indigo, blue, green, yellow, orange and red.

4) Tell the word that the order of colours can be easily remembered ?

❖ The order of colours can be easily remembered by the word VIBGYOR.

5) What is the monochromatic light ?

❖ Monochromatic light is the light of a single colour or single wavelength.

6) What is the polychromatic light ?

❖ Polychromatic light is a light which made of two or more colours.

7) How to rainbow is produced ?

❖ The rainbow is produced due to the dispersion of sunlight by tiny droplets of water suspended in air, just after rain.

8) What is the maximum wavelength of seven colours ?

❖ The maximum wavelength of seven colours is red.

9) What is the minimum wavelength of seven colours ?

❖ The minimum wavelength of seven colours is violet.

10) Why does not appear bigger during sunset or sunrises.

❖ Because of atmospheric refraction.

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11) Why do planets not twinkle ?

❖ Because they are very large.

12) What is the scattering ?

❖ Scattering is the phenomenon due to which a particular wave of light is absorbed by a particle, which is greater in diameter than the wavelength of light and then transmits it in all possible directions.

13) Why does sky appear blue ?

❖ Because when the white sunlight passes through the atmosphere, the violet, indigo and blue wavelengths, encounter suspended particles in air whose diameter is more than their wavelengths.

14) Why is the sunlight reaching the earth yellowish ?

❖ Because when the white sunlight passes through upper atmosphere, the violet, indigo and blue colours scatter which makes the sky to appear blue.

15) Why does the sun appears yellowish ?

❖ Because when the violet, indigo and blue colours scatter in the upper **atmosphere,** the resultant sunlight is yellowish in colour.

16) Why does the sky appears dark instead of blue to an astronaut ?

❖ Because in space no particles are present. Thus, no scattering of light takes place.

17) Why do the sun and the horizon appear reddish during sunset or sunrise ?

❖ Because during sunset and sunrise, the sun light travels the maximum distance through the atmosphere. With the increase in distance, the size and number of particles suspended in air increases.

THE END CHAPTER SIX

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Al-naruura Primary and secondary school		**Grade: Form four**
Subject: Physics		**Date: 10/2/2021**
Chapter (7): Electromagnetic induction		**Teacher: Hassan Abdullahi Hussein Abdi**

Chapter Seven: Electromagnetic induction

PART ONE: CIRCLE THE CORRECT ANSWER FOR THE FOLLOWING QUESTIONS

1) Electromagnetic is the process of producing a voltage by using a magnetic field and current in complete circuit.

a) open circuit **b) Complete circuit** c) A & B d) Non of them

2) The principles of electromagnetic induction are applied in many devices and systems such as

a) Graphic tablet b) Computers c) Induction Cookers **d) A & B**

3) Farady used To explain the phenomenon of electromagnetic induction the concept is

a) Magnetic flux b) Magnetic field lines c) Induced current d) Non- of them

4) SI unit of Magnetic flux is

a) Tesla-meter b) Tesla c) weber **d) A & C**

5) We express the Magnetic flux mathematically as follows :-

a) $\phi = B.A\cos\theta$ b) $\phi=B.A$ c) $\phi=F.A$ **d) a & b**

6) When a conductor is moved across a magnetic field, an EMF is induced between its ends this is called electromotive force (EMF) and it's denoted by the symbol .

a) ϕ b)α c) β **d) ε**

7) SI Unit of induced of electromotive force is:

a) Tesla meter square b) Joule c) Weber **d) Volt**

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PART TWO: FILL THE BLANK SPACE WITH A SUITABLE TERMS.

1) It is possible to induce a current in a circuit without the use of **_battery_** or an **_Electrical power of supply__**.

2) Faraday's observed that no electrical was generated in the wire when the wire was _____or_____.

3) The electric current is generated only when the wire cuts through the **_Lines of magnetic field_** during its movement.

4) Magnetic flux (ø) is measure of the number of **_Magnetic in flux_** passing through an **_Area of a given surface_** magnetic field strength and is denoted by the symbol (B) and its unit is of measurement **_Tesla (T)_**

5) When a magnetic is moving towards the oil, the current produced by the induced EMF will generate a flux that tends to cancel the **_increasing_** influx.

6) We can easily determine the direction of the induced current by applying **__Right hand rule__**

7) Lenz's law is equivalent to **_Energy conservation_**

8) Lenz's law states that the induced **_EMF_** will be In such a direction of as to oppose the change in the **_Magnetic influx_** that created the current.

9) Lenz's law tells us the **_Direction_** of this induced current

PART THREE: DIRECT QUESTION AND ANSWERS

1) Define Electromagnetic induction?

- ❖ IS the process of generating electric in a closed electrical circuit.
- ❖ IS the process of producing a voltage By using a magnetic field and current in a complete circuit.

2) Explain induced current?

- ❖ The current induced in a conducting loop that is exposed to a changing magnetic field is known as induced current.

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3) State farady's law in words?

- Faraday's is the basic law of electromagnetism which helps us to predict how a magnetic field would interact with an electric circuit to produce an electromotive force.

4) What is the name of the phenomenon of generating induced emf?

- Magnetic flux

5) List three real-life applications of faraday's law?

- Induced stoves
- Tape players
- Transformers

6) What is the SI unit of electromagnetic?

- The SI unit of electromagnetic flux is Tesla-meter square $T.M^2$ or weber (web)

7) What is induced electromotive force depends on?

- The magnetic field
- The length of the wire in the magnetic field
- The vertical component of the wire speed on the field v=(sin θ)

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THE END CHAPTER SEVEN

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Al-naruura Primary and secondary school		**Grade: Form four**
Subject: Physics		**Date: 10/2/2021**
Chapter (8): Alternating current		**Teacher: Hassan Abdullahi Hussein Abdi**

Chapter Eight: Alternating Current

PART ONE: CIRCLE THE CORRECT ANSWER FOR THE FOLLOWING QUESTIONS

1) Nowadays most of the electrical energy is produced by AC generators using:

a) water power b) solar energy **c) biomass energy** d) none of them.

2) The electricity by a generator is known as

them a) AC b) DC **c) a and b** d)none of

3) The SI unit for alternating current is?

a) H b) T **c) Hz** d) m/s

4) The power P dissipated by the alternating current in the resistor is:

a) $P=R^2I=R^2/V$ **b) $P=I^2R=V^2/R$** c) a and b d)none of them

5) "A.C. generator" means "alternating current generator" and also known as

a)alternative **b) alternators** c) current d)none of them

6) The change on the capacitor is at any instant is giving by?

a) c=qv **b) c=qv** c) q=cv d) none of them

7) The unit of reactant of a capacitor is

a) ohm b) tesla c) meter d) none of them

PART TWO: FILL THE BLANK SPACE WITH A SUITABLE TERMS.

1) Some for the sources which produce alternating current (or AC) are **_Power house_**

And **_Car alternator_**.

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2) Alternating current (AC) is current that flows in **_one direction_** in a conductor,

Then changes direction and flows in the **_other direction_**.

3) Peak here means either **_Maximum_** or **_Minimum_.** Since the flow of current has the same magnitude.

4) A generator is essentially a device for producing _____from _____

5) The working of an AC generator is based on the principle of **_Faraday's law of induction_**.

6) Where _____ is the peak value of the alternating voltage.

7) Where the X_c is called **_reactive capacitance_**.

8) _____ is measure of the opposition offered by a capacitor to the flow of A.C.

9) A transformer is a devise used to **_Raising_** or **_Lowering_** the voltage in an AC circuit.

10) In transformers there is _____ connection between the primary coil and the secondary coil.

11) When $N_S > N_P$ the output voltage is greater than the input voltage. This is known as **_step up transformer_**.

12) When Ns < Np the output voltage is less than the input voltage. This is known as **_Step down transformer_**.

PART THREE: DIRECT QUESTION AND ANSWERS

1) **Define the concept of alternating current?**

- Alternating current (AC) is current that flows in one direction in a conductor then changes direction and flows in the other direction . or
- Alternating current (AC) is an electric current which periodically reverses direction and changes its magnitude continuously with time in contrast to direct current (DC) which flows only in one direction.

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2) **Define AC generator?**

- ❖ AC generator is an electric generator that converts mechanical enrgy into electrical energy in form of alternative emf or alternating current. AC generator works on the principle of "Electromagnetic induction

3) **What are the essential requirements for an AC generator?**

- ❖ Rotating coil
- ❖ A magnetic field
- ❖ Relative movement between the coil and the magnetic field
- ❖ A suitable connection to the outside world

4) **Name the unit of X_L AND X_C ?**

- ❖ X_L =inductive reactive
- ❖ X_c =reactive capacitance

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THE END CHAPTER EIGHT

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Al-naruura Primary and secondary school		**Grade: Form four**
Subject: Physics		**Date: 10/2/2021**
Chapter (9): Electronics		**Teacher: Hassan Abdullahi Hussein Abdi**

Chapter Nine: Electronics

PART ONE: CIRCLE THE CORRECT ANSWER FOR THE FOLLOWING QUESTIONS

1) The function of transistor is

a) rectification **b)amplification** c) regulation d)none

2) A transistor has _____ in junction

a) one **b) two** c) three d) four

3) The forward resistance of the diode is _____ than its reverse resistance

a) much less **b) more** c) none

4) The resistivity of semiconductor lies in between conductors and _____

a) insulator b) inductor c) semiconductor d) none

5) The region where the free electrons and holes are emptied is called

a) Conduction region b) forbidden region **c) depleted region** d)none

6) When p type a semiconductor is suitable joined to an- type semiconductor, its called

a) NP- junction **b) PN- junction** c) junction d)none

7) The positively charged particles are called

a) electrons **b) holes** c) neutral d) none

8) Circuits of microchips and other semiconductor devices are called

a) electronic circuit b) Electric circuit c) Aand B D) None

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9) Electronics deals with flow of electronic through

a) metal **b) none metal** c) A and B d) none

10) A pure form aof semiconductor is

a) extrinsic semiconductor **b) intrinsic semiconductor** c) Anad B d) none

PART TWO: DIRECT QUESTION AND ANSWERS

1) Define rectification?

- Is the conversion of alternating current to direct electric current

2) What D.C supply used for?

- The D.C supply is used for charging storage batteries, field supply of D.C generators, electroplating, etc.

3) What is amplification?

- Is the process of raising the strength of weak signal

4) What is called the device that raise the strength of weak signal?

- Amplifiers

5) What Amplifiers is used for?

- Used in radios et , public address system, television so that the weak signal can be heard loudly.

6) Define the fallowing terms: Control devices, Generation, Conversion of light into electricity, photo-electricity, Conversion of electricity into light and photo-electric?

- Control devices are devices that are widely applied in automatic control. Speed of a motor, voltage across the refrigerator can be automatically controlled with the help of such devices.
- Generation is an electronic device that can convert d.c power to a.c power of any frequency.
- Conversion of light into electricity. Electronic devices can convert light to electricity.
- photo-electricity conversion of light into electricity

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- ❖ Photo-electric devices are used in Bugler alarms, sound recording on motion pictures etc.
- ❖ Conversion of electricity into light. Electronic devices can convert electricity to light .This valuable property is utilized in television and radar.

7) Define semiconductors?

- ❖ is a substance which has resistivity (10−4 to 0.5 Ω m) in between conductors and insulators e.g. germanium, silicon, selenium, carbon etc.

8) What are properties of semiconductors ?

- ❖ The resistivity of a semiconductor is less than an insulator but more than a conductor.
- ❖ Semiconductors have negative temperature co-efficient of resistance
- ❖ When a suitable metallic impurity (e.g. arsenic, gallium etc.) is added to a semiconductor, its current conducting properties change appreciably.

9) What are the most commonly used semiconductors?

- ❖ Germanium (Ge) and silicon (Si).
- ❖ Germanium is an earth element and was discovered in 1886. It is recovered from the ash of certain coals or from the flue dust of zinc smelters. Generally, recovered germanium is in the form of germanium dioxide powder which is then reduced to pure germanium The atomic number of germanium is 32. Therefore, it has 32 protons and 32 electrons.
- ❖ Silicon. Silicon is an element in most of the common rocks. Actually, sand is silicon dioxide. The silicon compounds are chemically reduced to silicon which is 100% pure for use as a semiconductor. The atomic number of silicon is 14. Therefore, it has 14 protons and 14 electrons.

10) Define intrinsic semiconductor ?

- ❖ A semiconductor in an extremely pure form is known

11) Define doping?

- ❖ The process of adding impurities to a semiconductor.

12) What is n-type semiconductor?

- ❖ When a small amount of

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13) What is p-type semiconductor?

- ❖ When a small amount of trivalent impurity is added to a pure semiconductor

14) Differentiate the difference the two types of transistors?

- ❖ An n-p-n transistor is composed of two n-type semiconductors separated by a thin section of p-type
- ❖ A p-n-p transistor is formed by two p-sections separated by a thin section of n-type

15) Define Not gate?

- ❖ Is the NOT gate is an electronic circuit that produces an inverted version of the input at its output. It is also known as an inverter

THE END CHAPTER NINE

Al-naruura secondary school

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Al-naruura Primary and secondary school		**Grade: Form four**
Subject: Physics		**Date: 10/2/2021**
Chapter (10): Modern physics		**Teacher: Hassan Abdullahi Hussein Abdi**

Chapter Ten: Modern physics

PART ONE: CIRCLE THE CORRECT ANSWER FOR THE FOLLOWING QUESTIONS

1) Which of these statements is ture

a) Light waves always have the same speed b) Sound waves always have the same speed

c) Sound waves can travel through space **d) Light waves can travel through space**

2) Which of these is not part of the electromagnetic specrtum

a) Radio wave b) visible wave **c) Sound waves** d) x-rays

3) Which of this is particularly hazardous?

a) Radio wave **b) x-rays** c) visible d) infrared wave

4) The electromagnetic spectrum with higher frequency is ome

a) More harmful b) Less harmful c) a and b d) none of them.

5) The frequency of electromagnetic spectrum increase form.

a) Radio wave to Ultra-violet b) Ultra-violet to radio wave

a) visible to infra-red radiation d) infra-red radiation to radio wave

6) When we need to consider the wave properties of radiation we use.

a) photon energy b) Wavelength c) both a and b d) none of them

7) Which of the following are properties of cathode rays?

a) They travel in strainght lines from the cathode b) They possess kinetic energy

c) They are deflected by magnetic and electric fields **d) All of them**

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8) The work function for lithium metal is:

a) ϕ =3.2eV **b) ϕ =2.3eV** c) ϕ =2.2eV d) ϕ =3.3eV

9) Which of this electromagnetic spectrum has the least wavelength?

a) Microwave b) infrared c) ultraviolet **d) Gamma rays**

10) Which of this electromagnetic spectrum has least frequency?

a) Micro wave b) infrared c) ultraviolet d) Gamma rays

PART TWO: DIRECT QUESTION AND ANSWERS

1) What are the properties of electromagnetic waves?

The properties of electromagnetic waves include:

- They travel at the speed of light, i.e., 3 x 10^8m/s in vacuum.
- They are transverse waves.
- They travel in straight lines.
- They transfer energy (E = hf).

2) Define cathode rays?

- Cathode rays are streams of electrons moving at high speed from a heated cathode.

3) What are properties of cathode rays?

- The properties of cathode rays are as follows:
  - They travel in straight lines from the cathode.
  - They cause certain substances to florescent.
  - They possess kinetic energy.
  - They are deflected by magnetic and electric fields.
  - They produce X-rays on striking a metal target.

4) Name the three parts of cathode ray oscilloscope consists?

- The cathode ray oscilloscope consists of three parts, namely;
  - The electron gun.
  - The deflecting plates.
  - A fluorescent screen.

5) What are uses of cathode rays ?

- The cathode ray oscilloscope is used for:
  - ✓ Measuring a.c. and d.c. voltages.

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- ✓ Measuring frequencies.
  Measuring phase differences.
- ✓ Measuring small time intervals.
- ✓ Study wave pattern (forms).

6) Define x-rays ?

❖ X-rays are electromagnetic radiations of short wavelengths of the order 10-10m.

7) What is the difference between soft x-rays and hard x-rays ?

❖ The difference between soft x-rays and hard x-rays:

❖ Soft X-rays have low penetrating power, and are produced by relatively low voltage.

❖ Hard X-rays have high penetrating power, produced by high voltage.

8) What are properties of x-rays ?

❖ The properties of x-rays are:

- ✓ They travel in straight lines, at the speed of light.
- ✓ They cannot be deflected by electric or magnetic fields.
- ✓ They can be reflected through very large angles of incidence.
- ✓ Refractive indices of all materials are very close to unity for X-rays.
- ✓ There is mining boundary. They can be diffracted.

9) What are the defective of x-rays ?

❖ X-rays are detected by the following properties:

- ✓ They cause fluorescence in certain substances.
- ✓ They affect photographic emulsion.
- ✓ They ionize gases.
- ✓ They are not deflected by electric or magnetic fields.

10) What are uses for x-ray ?

❖ X-rays are used for:

- ✓ Locating bone fractures.
- ✓ Destroying cancer cells.
- ✓ Locating internal imperfections in welded joints and castings.
- ✓ Studying of crystal structures.

11) What is the precautions when using x-rays ?

❖ Precautions when using x-rays:

- ✓ Minimize the exposure time as much as possible.

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Al-naruura Primary and secondary school		**Grade: Form four**
Subject: Physics		**Date: 10/2/2021**
Chapter (11):		**Teacher: Hassan Abdullahi Hussein Abdi**

Chapter Eleven: Nuclear physics

DIRECT QUESTION AND ANSWERS

1) What Rutherford discover ?

An: Rutherford discovered that atoms have central positively charged part known as nucleus of the atom and the electrons revolve in an empty space of the atom.

2) What Bohr discover?

An: Bohr discovered that the electrons revolve around the nucleus in a special orbit known as the energy levels and he proved that the angular momentum of the electron.

3) What is the nucleus consists of ?

An: A nucleus consists of nucleons comprising of protons and neutrons.

4) Define atomic number ?

An: Atomic number is the number of protons inside a nucleus.

5) Define mass number ?

An: Mass number is the combined number of all the protons and neutrons in a nucleus.

6) Define isotopes ?

An: Isotopes are such nuclei of an element that have the same atomic number but have different mass number.

7) Define mass-spectrograph ?

An: Mass-spectrograph is a device with the help of which not only the isotopes of any element can be separated from one another but their masses can also be determined quite accurately.

8) Define radioactivity ?

An: Radioactivity is the explosion of the nucleus of the atom.

9) Who was discovered radioactivity ?

An: Henary Bacquerel.

10) List nature of radioactivity ?

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An: Nature of radioactivity include:
- ✓ They affect photographic plates.
- ✓ They ionize the air molecules.
- ✓ They have a fluorescent effect.
- ✓ They have physiological effect.
- ✓ They pass through a sequence of decay.

11) What are radioactive elements ?

An: Radioactive elements are:
- ✓ Alpha-particles (α)
- ✓ Beta-particles (β)
- ✓ Gamma (γ) rays

11) Define alpha-particles ?

An: Alpha-particles (α) are helium nuclei ( ) that are positively charged.

12) Define beta-particles ?

An: Beta-particles (β) is similar to electrons with high velocity ( ) and negatively charged.

13) Define Gamma rays ?

An: Gamma (γ) rays are electromagnetic waves and are uncharged.

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THE END CHAPTER ELEVEN