FORM THREE PHYSICS EXAM

Total Marks: 100 **Series One.** **Duration: 2.5 hrs**

Instructions:

- **Answer all questions.**
- **Each question carries 10 marks.**
- **Show all working for the calculation question:**

SECTION A

Multiple Choice (10 marks)

Choose the correct answer for each question.

1. Which of the following is an example of friction?

   a) A book resting on a table

   b) A person walking

   c) A car speeding on a highway

   d) Water flowing in a river

2. The unit of vector quantity is:

   a) Meter

   b) Newton

   c) Joule

   d) None of the above

3. Which of the following substances is the best conductor of heat?

   a) Rubber

   b) Copper

   c) Wood

   d) Air

4. Which of these is an example of a non-ideal current conductor?

   a) Copper wire

   b) Aluminium wire

   c) Plastic wire

d) Iron wire

5. The angle of refraction in refraction of light depends on:

a) The speed of light

b) The wavelength of light

c) The angle of incidence

d) The medium of light

6. Humidity refers to:

a) The temperature of the air

b) The amount of water vapor in the air

c) The speed of air molecules

d) The pressure of air molecules

7.The main function of a cell in a circuit is to:

a) Provide energy to the circuit

b) Produce heat

c) Increase the resistance

d) Conduct electricity

8. The coefficient of thermal expansion is:

a) The change in volume per degree temperature change

b) The change in mass per degree temperature change

c) The change in length per degree temperature change

d) None of the above

9. Which of the following methods of heat transfer involves the movement of particles in a fluid?

a) Convection

b) Radiation

c) Conduction

d) Refraction

10.Which of the following is an example of a vector quantity?

a) Time

b) Speed

c) Displacement

d) Temperature

Question 2: Matching Items (10 marks)

Match the items in Column A with the correct description in Column B.

Column A	Column B
1. Friction	A. Quantity with both magnitude and direction
2. Scalar quantity	B. Heat transfer through direct contact
3. Conduction	C. Resistance in a wire
4. Vector quantity	D. Force that opposes motion
5. Refraction of light	E. The bending of light as it passes through a boundary
6. Thermal energy	F. The internal energy of a substance due to its temperature
7. Current electricity	G. The movement of electrons through a conductor
8. Humidity	H. The amount of water vapor in the air
9. Thermal expansion	I. Change in the size of an object due to temperature change
10. Cell	J. A device that supplies energy to a circuit

Question 3: Fill in the Gaps (10 marks)

Fill in the blanks with the correct terms:

1. Friction is a force that opposes the __ of an object.

2. The process of heat transfer through the movement of fluids is called __.

3. The SI unit of electric current is __.

4. The formula for calculating thermal energy is $Q = mc\Delta T$, where Q is the ___.

5. The angle between the incident ray and the normal is called the angle of ___.

6. The bending of light when passing from one medium to another is called __.

7. A vector quantity has both magnitude and ___.

8. A __ is a device that converts chemical energy into electrical energy.

9. The amount of water vapor present in the air is called __.

10. The total internal energy of a substance is affected by its __ and ___.

SECTION B

Question 4:

(a) Define conduction, convection, and radiation.

(b) Which material is the best conductor of heat and why?

(c) Describe how heat is transferred in a vacuum (i.e., in space).

Question 5:

Define

i} a) Mirrage b)Critical Angle c) Refraction d) Refraction index e) Bimetallic Strip.

ii} The speed of light is 2.25 $*10^8$ m/s in water and $3.00*10^8$ m/ in air

a) Determine the refractive index from air to water

b) A ray of light travelling from air into water is incident at the surface at angle 30'.Calculate the angle of refraction in water

Question 6:

a) i. State two advantages of friction

ii. State two disadvantage of reducing friction

iiii. State two disadvantage of friction

b) A block of mass 12 kg is placed on a horizontal surface. The coefficient of friction between the block and the surface is 0.4. Calculate the frictional force acting on the block.

Question 7:

a) Define

i. Absolute Humidity

ii. Relative Humidity

iii. Vapour Pressure

iv .Dew Point

b) Explain the difference between a vapour and a gas.

c)The temperature of a room is 30°C, and the relative humidity is 70%. If the saturation vapor pressure at 30°C is 4.24 kPa, calculate the actual vapor pressure in the room.

Question 8:

a)Differentiate between Primary and Secondary colours

b) Differentiate between complimentary colours and Additive colours

c) Give one uses example of concave mirror and convex mirror .

Question 9:

i. State a). Boyle's law b) Charles Law c) Pressure Law

ii .At a temperature of 30' and Pressure of 740 mmHg .The volume o a gas is 300cm^3 calculator the volume of gas at STP.

Question 10:

a)Draw a diagram of simple cell.

b) Explain the Action of Simple Cell

c) Briefly Explain the Defects of a simple cell.

FORM FOUR CHEMISTRY EXAMINATION

Time: 2 Hours

Instructions:

- Answer all questions.
- Show all your workings where necessary.
- Write your answers in the spaces provided.
- Each question carries 10 marks unless otherwise stated.

SECTION A: Multiple Choice Questions (1-5)

Each question carries 2 marks. Choose the correct answer.

1. Which of the following is an example of an alkane?

a) C_2H_6

b) C_2H_4

c) C_3H_6

d) C_2H_2

2. Which of the following pollutants is released during the combustion of fossil fuels?

a) Carbon dioxide (CO_2)

b) Sulphur dioxide (SO_2)

c) Nitrogen oxides (NO_x)

d) All of the above

3. The chemical formula of methane is:

a) CH_4

b) C_2H_6

c) C_3H_8

d) CH_3OH

4. Which of the following processes is associated with soil erosion?

a) Waterlogging

b) Desertification

c) Leaching

d) All of the above

5. Which of the following is a property of organic compounds?

a) High melting and boiling points

b) They are non-conductors of electricity

c) They contain metals

d) They are typically ionic

SECTION B: Short Answer Questions (6-8)

Each question carries 3 marks.

6. Explain the difference between organic and inorganic compounds. Provide two examples of each.

7. Describe the process of pollution caused by industrial activities. What are the major pollutants produced, and how do they affect the environment?

8. Outline the different types of soil erosion and the factors that contribute to it.

SECTION C: Long Answer Questions (9-10)

Each question carries 10 marks.

9. A compound has the molecular formula C4H10.

a) Name the compound.

b) Draw the structural formula of the compound.

c) Describe the physical properties and uses of this compound.

10. Discuss the impact of soil pollution on plant growth.

a) Identify three types of soil pollutants.

b) Explain the effects of each pollutant on soil fertility.

c) Suggest three methods to reduce soil pollution.

SECTION D: Application Questions (11-13)

Each question carries 10 marks.

11. The equation for the combustion of methane is:

$CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O$

a) Balance the equation.

b) Calculate the amount of CO_2 produced when 8 grams of methane are burned.

(Molar mass of methane = 16 g/mol, CO_2 = 44 g/mol)

12. Explain the role of nitrogen in soil fertility.

a) What are nitrogen-fixing bacteria?

b) How do they contribute to soil health?

c) What happens when nitrogen is in excess in the soil?

13. Describe the process of eutrophication caused by excessive use of fertilizers in agricultural lands.

a) What are the consequences of eutrophication?

b) Suggest preventive measures that can be taken to avoid eutrophication.