SMARTWIZ

GRADE 10 Physical Science EXAM

MARKS: 150

MARKS	

TIME: 2 **hour**

SCHOOL_____

CLASS (e.g. 10A) _____

SURNAME_____

NAME_____

Instructions for Students:

> Read all instructions carefully before beginning the exam.

> Write your name and student ID clearly on the answer sheet/booklet.

> Answer all questions unless otherwise stated.

> Show all your work/calculations where applicable.

> Write clearly and legibly.

> Use blue or black ink only. * Do not use correction fluid/tape.

> No electronic devices (calculators, phones, etc.) are allowed unless explicitly permitted.

> Raise your hand if you have any questions.

> Do not talk to other students during the exam.

> Any form of cheating will result in disqualification.

QUESTION 1: MULTIPLE CHOICE [10 × 2 = 20 MARKS]

Circle the correct answer from the options given. Write the letter (A–D) below aswell

1.1 The unit for work done is:
A) Newton
B) Pascal
C) Joule
D) Watt

1.2 Which of the following is a renewable energy source?
A) Coal
B) Oil
C) Natural Gas
D) Wind

1.3 What is the speed of light in a vacuum?
A) 300 m/s
B) 3×10^6 m/s
C) 3×10^8 m/s
D) 30 000 km/s

1.4 The resistance in an electric circuit is measured in:
A) Volts
B) Amperes
C) Watts
D) Ohms

1.5 Which of the following is not part of the electromagnetic spectrum?
A) X-rays
B) Gamma rays
C) Sound waves
D) Infrared

1.6 The function of a circuit breaker is to:
A) Generate electricity
B) Increase resistance
C) Prevent overload
D) Store current

1.7 Acceleration is the rate of change of:
A) Distance
B) Speed
C) Mass
D) Velocity

1.8 Which of these materials is the best conductor?
A) Plastic
B) Wood
C) Copper
D) Rubber

1.9 A transformer is used to:
A) Store energy
B) Convert kinetic energy
C) Change voltage
D) Block current

1.10 Which law explains why rockets move in space?
A) Newton’s First Law
B) Newton’s Second Law
C) Newton’s Third Law
D) Ohm’s Law

QUESTION 2: MATCHING TERMS [10 MARKS]

Match the items in Column A with the correct definitions in Column B. Write only the question number and the matching letter.

Column A	Column B
2.1 Static electricity	A. Movement of energy through a substance
2.2 Frequency	B. Stored energy due to position
2.3 Potential energy	C. When charges build up on an object
2.4 Ohm's Law	D. Waves that move up and down
2.5 Longitudinal wave	E. Rate of vibration or oscillation
2.6 Reflection	F. V = IR (voltage = current × resistance)
2.7 Transverse wave	G. Light bouncing back from a surface
2.8 Conduction	H. Energy transfer through direct contact
2.9 Kinetic energy	I. Energy due to motion
2.10 Voltage	J. Electrical potential difference

2.1 _____

2.2 _____

2.3 _____

2.4 _____

2.5 _____

2.6 _____

2.7 _____

2.8 _____

2.9 _____

2.10 _____

QUESTION 3: MECHANICS [30 MARKS]

3.1 Define the term "acceleration".

3.2 A car moves with a velocity of 25 m/s for 10 seconds. Calculate the distance travelled.

3.3 A rock falls from a height of 45 m. How long will it take to reach the ground? Use g = 9.8 m/s^2.

3.4 Explain the difference between speed and velocity.

3.5 Calculate the acceleration of a car that changes its velocity from 10 m/s to 30 m/s in 4 seconds.

3.6 A force of 60 N is applied to a box of mass 15 kg. Calculate the acceleration.

3.7 State Newton's First Law and give one real-life example.

QUESTION 4: WAVES, SOUND & LIGHT [20 MARKS]

4.1 What is the wavelength of a sound wave travelling at 340 m/s with a frequency of 85 Hz?

4.2 Name one use of X-rays in daily life.

4.3 What happens when white light passes through a prism?

4.4 Define the term "amplitude" of a wave.

4.5 Why can't sound travel in a vacuum?

4.6 Describe what a concave mirror does to light.

4.7 Explain how echoes are formed.

QUESTION 5: ELECTRICITY [30 MARKS]

5.1 Draw and label a simple series circuit with a battery, two light bulbs and a switch.

5.2 What will happen if one bulb breaks in a series circuit?

5.3 If a current of 4 A flows through a 3 Ω resistor, what is the voltage?

5.4 Explain the difference between a series and a parallel circuit.

5.5 List two safety devices used in household wiring.

5.6 Name two good conductors and two insulators.

5.7 A heater uses 2000 W of power and runs for 3 hours. Calculate the total energy used in kWh.

QUESTION 6: ENERGY & POWER [40 MARKS]

6.1 What is the difference between renewable and non-renewable energy? Give two examples of each.

6.2 Calculate the work done when a person lifts a 10 kg object to a height of 2 m. (Use g = 9.8 m/s²)

6.3 Define the term "power" and state its SI unit.

6.4 Explain how energy-saving bulbs are different from traditional bulbs.

6.5 A person does 500 J of work in 10 seconds. Calculate the power.

6.6 List two ways you can save energy at home.

6.7 Describe one disadvantage of using coal to produce electricity.

6.8 What is gravitational potential energy?

TOTAL:150 MARKS

QUESTION 1: MULTIPLE CHOICE (20 MARKS)

1.1 C
1.2 D
1.3 C
1.4 D
1.5 C
1.6 C
1.7 D
1.8 C
1.9 C
1.10 C

QUESTION 2: MATCHING TERMS (10 MARKS)

2.1 C
2.2 E
2.3 B
2.4 F
2.5 A
2.6 G
2.7 D
2.8 H
2.9 I
2.10 J

QUESTION 3: MECHANICS (30 MARKS)

3.1 Acceleration is the rate of change of velocity.
3.2 Distance = velocity × time = 25 m/s × 10 s = **250 m**
3.3 Use formula: t=(2h/g)=(2×45)/9.8≈t = \sqrt{(2h/g)} = \sqrt{(2×45)/9.8} ≈t=(2h/g) =(2×45)/9.8≈ **3.03 s**
3.4 Speed is how fast an object moves; velocity is speed in a specific direction.
3.5 a=(v−u)/t=(30−10)/4=20/4=a = (v - u)/t = (30 - 10)/4 = 20/4 =a=(v−u)/t=(30−10)/4=20/4= **5 m/s²**
3.6 a=F/m=60/15=a = F/m = 60/15 =a=F/m=60/15= **4 m/s²**
3.7 Newton's First Law: An object stays at rest or in uniform motion unless acted upon by a force.
Example: A book stays still on a table until pushed.

QUESTION 4: WAVES, SOUND & LIGHT (20 MARKS)

4.1 λ=v/f=340/85=\lambda = v/f = 340/85 =λ=v/f=340/85= **4 m**
4.2 Medical imaging (e.g., X-ray scans)
4.3 It disperses into different colours (spectrum).
4.4 Amplitude is the maximum displacement from the rest position.
4.5 Sound needs a medium to travel, and a vacuum has none.
4.6 It focuses light rays to a single point.
4.7 Echoes form when sound reflects off a hard surface.

QUESTION 5: ELECTRICITY (30 MARKS)

5.1 Simple series circuit with correct components labeled.
5.2 The entire circuit stops working.
5.3 V=IR=4×3=V = IR = 4 × 3 =V=IR=4×3= **12 V**
5.4 Series: One path for current. Parallel: Multiple paths.
5.5 Fuses, circuit breakers.
5.6 Conductors: Copper, aluminium. Insulators: Rubber, plastic.
5.7 Energy = Power × Time = 2000 W × 3 h = **6 kWh**

QUESTION 6: ENERGY & POWER (40 MARKS)

6.1 Renewable: Can be replaced (e.g., solar, wind);
Non-renewable: Finite (e.g., coal, oil).
6.2 Work = m × g × h = 10 × 9.8 × 2 = **196 J**
6.3 Power is the rate at which work is done; unit: **Watt (W)**
6.4 They use less electricity and last longer.
6.5 Power = Work/time = 500/10 = **50 W**
6.6 Switch off unused lights, use energy-efficient appliances.
6.7 Causes pollution and contributes to climate change.
6.8 Energy stored due to height above the ground.