NAMIBIA SENIOR SECONDARY CERTIFICATE

PHYSICS ORDINARY LEVEL 6118/1

PAPER 1 Multiple Choice 45 minutes

Marks 40 **2022**

Additional Materials: Multiple choice answer sheet
Non-programmable calculator
Soft clean eraser
Soft pencil (type B or HB is recommended)

INSTRUCTIONS AND INFORMATION TO CANDIDATES

- Write in soft pencil.
- Make sure that you receive the multiple choice answer sheet with **your examination number** on it.

- There are **forty** questions on this paper. Answer **all** questions.
- For each question, there are four possible answers **A, B, C** and **D**. Choose the **one** you consider correct and record your choice in soft pencil on the separate answer sheet.
- If you want to change an answer, thoroughly erase the one you wish to delete.
- The Periodic Table is printed on page 14.

- **Read the instructions on the answer sheet carefully.**

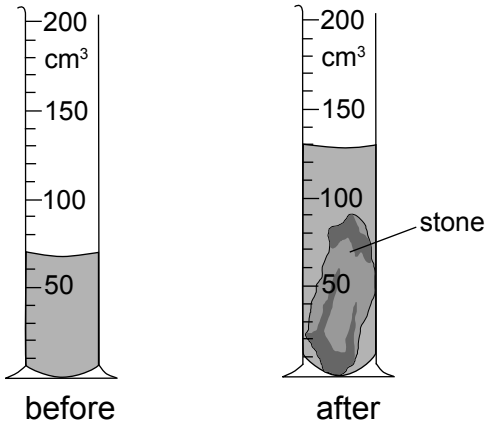
- Each correct answer will score one mark.
- Any rough working should be done in this booklet.
- All questions in this paper carry equal marks.
- You may use a non-programmable calculator.

This document consists of **14** printed pages and **2** blank pages.

Republic of Namibia

MINISTRY OF EDUCATION, ARTS AND CULTURE

1 The diagram shows a measuring cylinder filled with water up to a certain level, and the same measuring cylinder with a stone completely immersed in the water.



What is the volume of the stone?

A 51 cm^3

B 60 cm^3

C 70 cm^3

D 90 cm^3

2 Which quantity is a scalar?

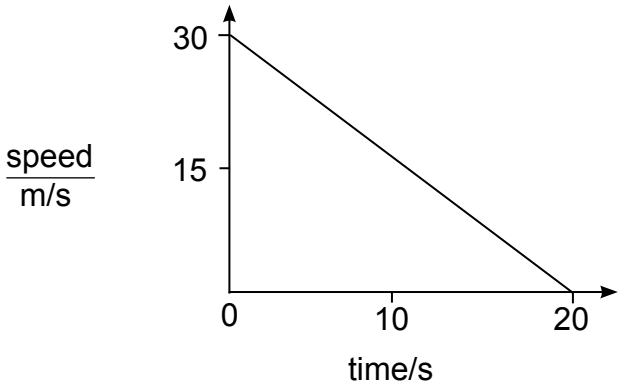
A acceleration

B displacement

C momentum

D temperature

3 The speed time graph shows part of the journey.



What is the total distance covered for this part of the journey?

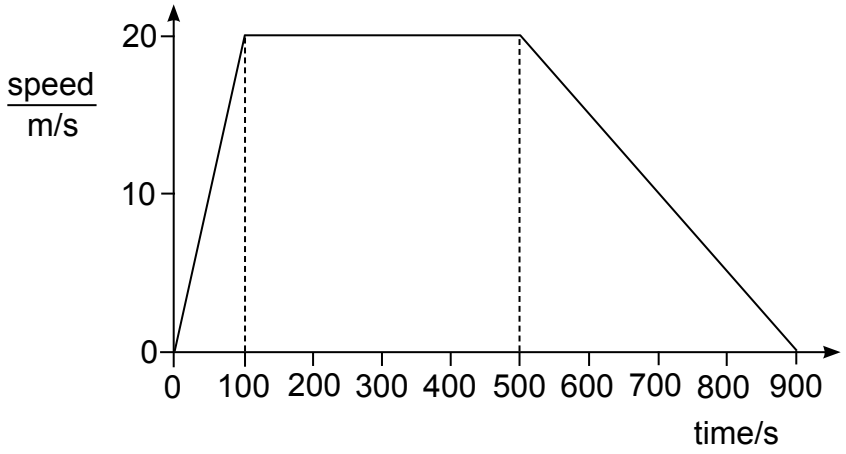
A 150 m

B 300 m

C 600 m

D 900 m

4 The speed time graph represents the motion of a motorist for 900 seconds.



Which row describes the motion?

	Time		
	0 - 100	**100 - 500**	**500 - 900**
A	at rest	constant speed	at rest
B	constant acceleration	at rest	constant deceleration
C	constant acceleration	constant speed	constant deceleration
D	constant speed	at rest	constant speed

5 The mass of an empty measuring cylinder is 8.5 g.

When 20 cm^3 of a liquid is added to the measuring cylinder, the mass increases to 26.5 g.

What is the density of the liquid?

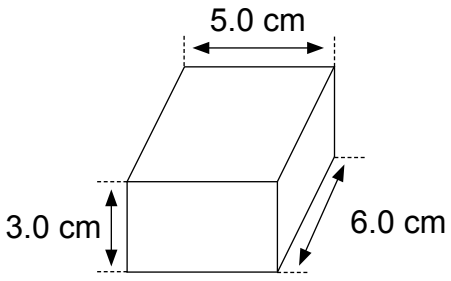
A 0.25 g/cm^3

B 0.90 g/cm^3

C 1.2 g/cm^3

D 1.4 g/cm^3

6 The diagram shows a block of steel of dimensions 6.0 cm × 5.0 cm × 3.0 cm.
The density of steel is 7.85 g/cm^3.



What is the mass of the block?

A 0.087 g

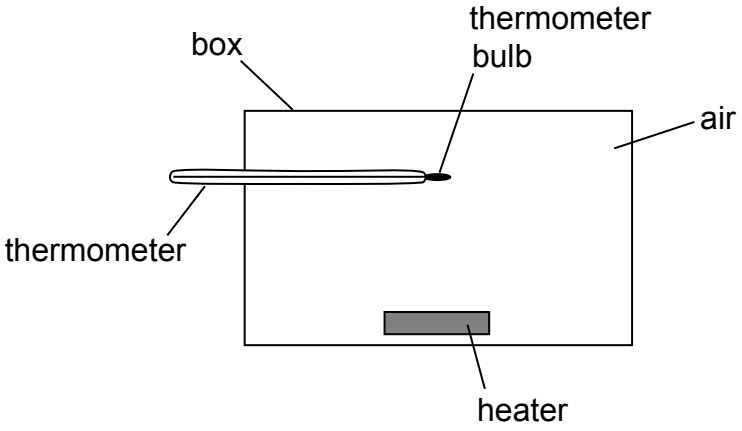
B 11.46 g

C 109.90 g

D 706.50 g

7 The diagram shows a heater in a box that contains air.

A thermometer is fixed in the box. The thermometer bulb is in the position as shown.

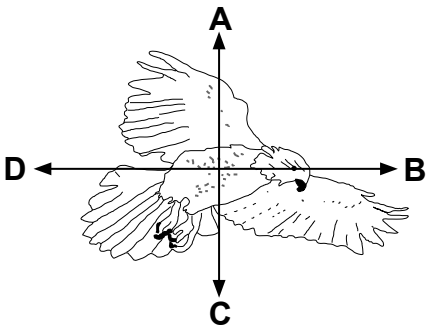


Which row shows the main process by which thermal energy is transferred through the air and from air particles to the thermometer bulb?

	through the air	from air particles to the thermometer bulb
A	conduction	convection
B	convection	radiation
C	convection	conduction
D	conduction	radiation

8 The diagram shows an eagle landing. The eagle is landing in a vertical direction downward.

In which direction does air resistance act on the eagle?



9 An electric wire has a diameter of about 0.23 mm.

Which instrument can be used to give the most accurate measurement of this wire?

A measuring tape

B meter stick

C micrometer

D rope and ruler

10 The gravitational field strength on the moon is 1.6 N/kg. An astronaut has a weight of 120 N on the moon.

What is the mass of the astronaut?

A 12 kg

B 75 kg

C 120 kg

D 192 kg

11 A ball of 0.4 kg mass moving at a speed of 10.0 m/s collides head on with another ball of 0.2 kg mass moving at a speed of 5.0 m/s in the opposite direction.
The two balls stick together after collision.

What is the velocity of the two balls after collision if momentum has been conserved?

A 5.0 m/s

B 6.7 m/s

C 8.3 m/s

D 15 m/s

12 The specific heat capacity of water is 4 200 J/(kg°C).

What is the amount of heat required to change the temperature of 5 kg of water from 5 °C to 20 °C?

A 105 kJ

B 315 kJ

C 420 kJ

D 525 kJ

13 A 600 g object is on top of the tower and has 9 600 J of energy due to its position above the ground.

How high is the tower?

A 16 m

B 160 m

C 1600 m

D 16000 m

14 Which type of energy is a result of regrouping of atoms?

A chemical

B geothermal

C nuclear

D solar

15 Which quantity is defined as the amount of heat energy absorbed or emitted when a kilogram of a substance changes state?

A the heat capacity of a substance

B the latent heat of a substance

C the specific heat capacity of a substance

D the specific latent heat of a substance

16 A fruit falls from a tree, then hits the ground and stops.

Which energy changes occur?

A gravitational potential energy → kinetic energy → sound energy

B gravitational potential energy → sound energy → kinetic energy

C kinetic energy → gravitational potential energy → sound energy

D kinetic energy → sound energy → gravitational potential energy

17 Temperature always remain constant during phase changes.

What is the reason for constant temperature during boiling?

A The heat energy is released to the surrounding by the system.

B The heat energy is used to overcome the inter-particle forces.

C The kinetic energy is increased without increasing the potential energy.

D There is no heat energy supplied during boiling.

18 Which term is the distance between two successive in phase points on a wave?

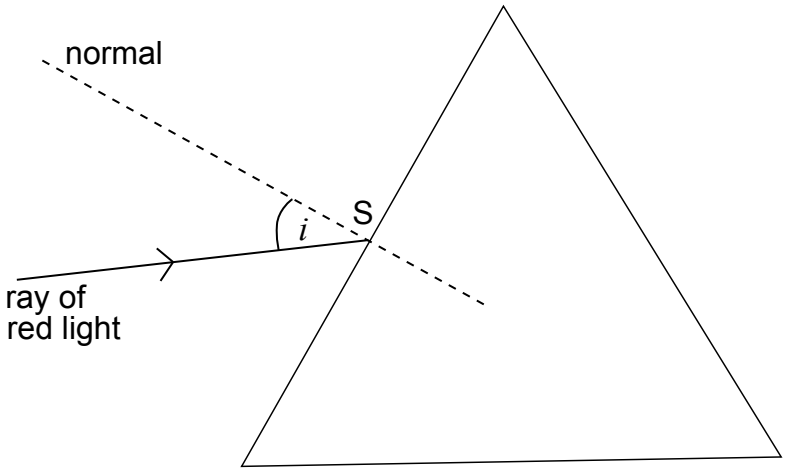
A amplitude

B frequency

C wavefront

D wavelength

19 The diagram shows a ray of red light travelling from air into a glass prism with a refractive index of 1.5 at point S.



The red light ray enters the glass prism at an angle of incidence, i, of 30.0º.

Which row gives the angle of refraction, r, and the change in direction of the ray inside the prism?

	angle of refraction, r	**change in direction**
A	19.5º	away from the normal
B	19.5º	toward the normal
C	30.0º	away from the normal
D	30.0º	toward the normal

20 Which row shows what happens to the properties of a wave as the wave enters a different medium?

	no change	**change**
A	frequency	period
B	frequency	wavelength
C	speed	wavelength
D	speed	frequency

21 The diagram shows the electromagnetic spectrum.

L	X-ray	ultraviolet	visible light	**M**	microwaves	**N**

Which types of wave are **L**, **M** and **N**?

	L	**M**	**N**
A	gamma rays	radio waves	infrared
B	gamma rays	infrared	radio waves
C	infrared	gamma rays	radio waves
D	infrared	radio waves	gamma rays

22 The amplitude of a sound wave is increased and the frequency is decreased.

What happens to the pitch and loudness of the sound heard?

A The sound has a higher pitch and is louder.

B The sound has a higher pitch and is softer.

C The sound has a lower pitch and is louder.

D The sound has a lower pitch and is softer.

23 What is the correct symbol for the units of loudness of sound?

A Db

B dB

C HZ

D Hz

24 A Physics student has trouble seeing distant objects clearly.

Which row gives the student's eye defect and the type of lenses that the student needs?

	eye defect	**needed lens**
A	far-sighted	concave
B	far-sighted	convex
C	short-sighted	concave
D	short-sighted	convex

25 Which term is referred to as workdone per unit charge?

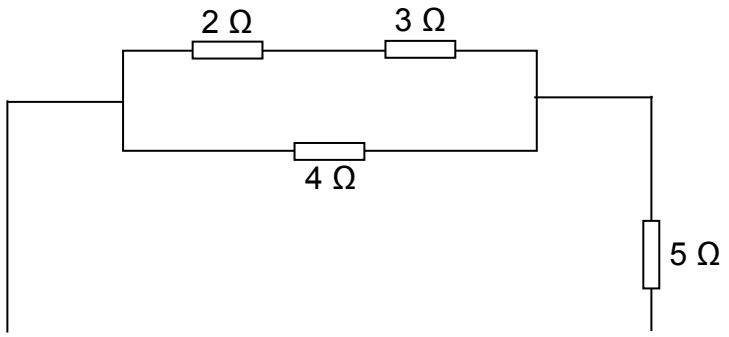
A current

B energy

C power

D voltage

26 The diagram shows part of an electric circuit.



What is the total resistance in the circuit?

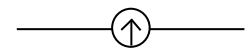
A 2.2Ω

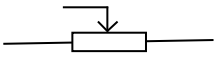
B 7.2Ω

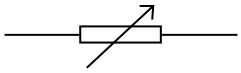
C 12.3Ω

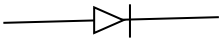
D 14.0Ω

27 Which electrical symbol represents a diode?

A 

B 

C 

D 

28 In an electric circuit, 40 C of electric charges passes through a bulb that runs on a 12 V supply in 5.0 s.

What is the electric power of the bulb?

A 1.50 W

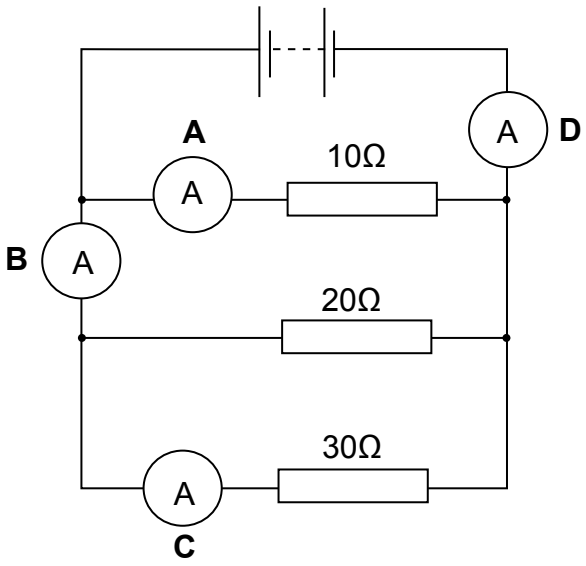
B 16.7 W

C 57.0 W

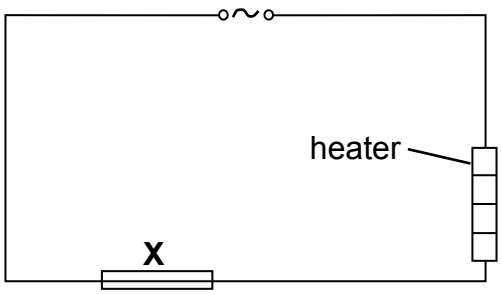
D 96.0 W

29 The diagram shows an electric circuit with three resistors connected in parallel and four ammeters **A**, **B**, **C** and **D**.

Which ammeter shows the largest reading?



30 The diagram shows an arrangement in an electric circuit.



Which row is correct about component **X**?

	component X	function
A	fuse	break the circuit when the current is too high
B	fuse	control the voltage in the circuit
C	rheostat	break the circuit when the current is too high
D	rheostat	control the voltage in the circuit

31 A student wishes to demonstrate electromagnetic induction. She has the connectivity wires and a voltmeter.

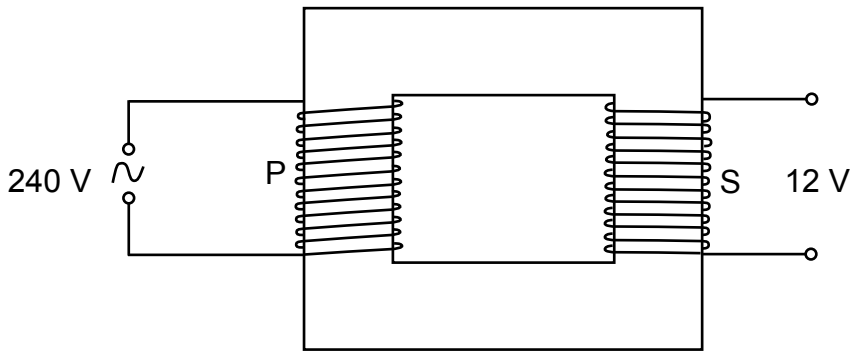
Which other apparatus does she need?

	power supply	magnet
A	✓	✓
B	✓	×
C	×	✓
D	×	×

Key
✓ = needed
× = not needed

32 The diagram shows a transformer. The primary coil has an input of 240 V.

The secondary coil has an output of 12 V.



Assuming it is an ideal transformer and has an output current of 40 A.

What is the input current?

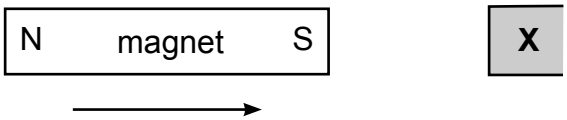
A 2 A

B 20 A

C 72 A

D 800 A

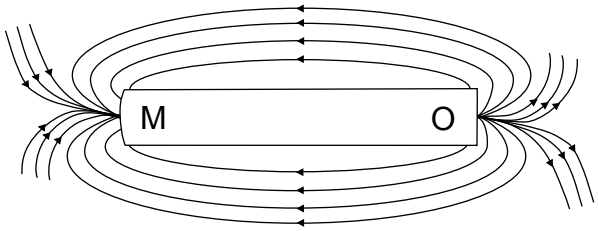
33 The diagram shows a bar magnet and bar **X**.
When the magnet is moved closer to bar **X**, it attracted bar **X**.



Which element is bar **X** made from?

A copper
B cobalt
C magnesium
D manganese

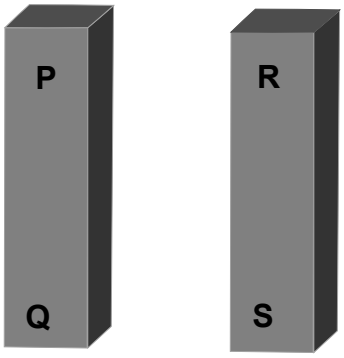
34 The diagram shows the magnetic field of a bar magnet with poles labelled M and O.



Which statement correctly identifies the poles of the magnet?

A M is the North pole because the field lines run from South to North.
B M is the South pole because the field lines run from North to South.
C O is the North pole because the field lines run from South to North.
D O is the South pole because the field lines run from North to South.

35 The diagrams shows two magnets **PQ** and **RS**.



When they are placed end-to-end, **P** attracts **S** and **Q** repels **S**. **R** is South pole.

Which row gives the correct poles of **P**, **Q** and **S**?

	P	Q	S
A	North	South	North
B	South	North	South
C	South	North	North
D	North	South	North

36 The nuclide notation of an isotope of carbon is $^{14}_{6}C$.

Which row gives the composition of a neutral atom of this isotope of carbon?

	number of protons	number of neutrons	number of electrons
A	6	8	6
B	14	8	8
C	6	8	14
D	6	14	6

37 Which statement correctly defines isotopes?

A Atoms of the same element with different numbers of electrons.

B Atoms of the same element with different numbers of neutrons.

C Atoms of the same element with different numbers of protons.

D Atoms of the same element with the same numbers of nucleons.

38 Which statement describes the nature of an alpha particle?

A a helium atom

B a helium nucleus

C an electron from the nucleus

D an electron from the shell

39 A uranium isotope decays according to the following equation.

$$^{234}_{92}U \rightarrow {}^{A}_{z}X + \beta$$

Which row gives the correct symbol for X and the correct value for A and z?

	A	X	z
A	232	Np	90
B	232	Th	90
C	234	Np	93
D	234	Th	93

40 A radioactive isotope sample contains 3 600 atoms.
The isotope has a half-life of 3 hours.
Which statement is correct?

A Only 450 atoms will have decayed after 3 half-lives.

B Only 450 atoms will survive after 3 half-lives.

C Only 450 atoms will have decayed after 3 hours.

D Only 450 atoms will survive after 3 hours.

DATA SHEET
The Periodic Table of the Elements

Group																	
I	II											III	IV	V	VI	VII	0
						1 H Hydrogen 1											4 He Helium 2
7 Li Lithium 3	9 Be Beryllium 4											11 B Boron 5	12 C Carbon 6	14 N Nitrogen 7	16 O Oxygen 8	19 F Fluorine 9	20 Ne Neon 10
23 Na Sodium 11	24 Mg Magnesium 12											27 Al Aluminium 13	28 Si Silicon 14	31 P Phosphorus 15	32 S Sulfur 16	35,5 Cl Chlorine 17	40 Ar Argon 18
39 K Potassium 19	40 Ca Calcium 20	45 Sc Scandium 21	48 Ti Titanium 22	51 V Vanadium 23	52 Cr Chromium 24	55 Mn Manganese 25	56 Fe Iron 26	59 Co Cobalt 27	59 Ni Nickel 28	64 Cu Copper 29	65 Zn Zinc 30	70 Ga Gallium 31	73 Ge Germanium 32	75 As Arsenic 33	79 Se Selenium 34	80 Br Bromine 35	84 Kr Krypton 36
85 Rb Rubidium 37	88 Sr Strontium 38	89 Y Yttrium 39	91 Zr Zirconium 40	93 Nb Niobium 41	96 Mo Molybdenum 42	Tc Technetium 43	101 Ru Ruthenium 44	103 Rh Rhodium 45	106 Pd Palladium 46	108 Ag Silver 47	112 Cd Cadmium 48	115 In Indium 49	119 Sn Tin 50	122 Sb Antimony 51	128 Te Tellurium 52	127 I Iodine 53	131 Xe Xenon 54
133 Cs Caesium 55	137 Ba Barium 56	139 La Lanthanum 57 *	178 Hf Hafnium 72	181 Ta Tantalum 73	184 W Tungsten 74	186 Re Rhenium 75	190 Os Osmium 76	192 Ir Iridium 77	195 Pt Platinum 78	197 Au Gold 79	201 Hg Mercury 80	204 Tl Thallium 81	207 Pb Lead 82	209 Bi Bismuth 83	Po Polonium 84	At Astatine 85	Rn Radon 86
Fr Francium 87	226 Ra Radium 88	227 Ac Actinium 89 †															

140 Ce Cerium 58	141 Pr Praseodymium 59	144 Nd Neodymium 60	Pm Promethium 61	150 Sm Samarium 62	152 Eu Europium 63	157 Gd Gadolinium 64	159 Tb Terbium 65	162 Dy Dysprosium 66	165 Ho Holmium 67	167 Er Erbium 68	169 Tm Thulium 69	173 Yb Ytterbium 70	175 Lu Lutetium 71
232 Th Thorium 90	Pa Protactinium 91	238 U Uranium 92	Np Neptunium 93	Pu Plutonium 94	Am Americium 95	Cm Curium 96	Bk Berkelium 97	Cf Californium 98	Es Einsteinium 99	Fm Fermium 100	Md Mendelevium 101	No Nobelium 102	Lr Lawrencium 103

***58 - 71 Lanthanoid series**
†90 - 103 Actinoid series

Key

a
X
b

a = relative atomic mass
X = atomic symbol
b = proton (atomic) number

The volume of one mole of any gas is 24 dm^3 at room temperature and pressure (r.t.p.).

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