

THE WEST AFRICAN EXAMINATIONS COUNCIL

**West African Senior School Certificate Examination
for School Candidates**

SC 2025

PHYSICS 1
[50 marks]

1½ hours

Do not open this booklet until you are told to do so. While you are waiting, read and observe the following instructions. Write your name and index number in the spaces provided above.

1. Use **2B** pencil throughout.
2. On the pre-printed answer sheet, check that the following details are correctly printed:
 - (a) In the space marked **Name**, check your **surname** followed by your **other names**.
 - (b) In the spaces marked **Examination**, **Year**, **Subject** and **Paper**, check 'WASSCE', '(SC) 2025', 'PHYSICS', and '1' respectively.
 - (c) In the box marked **Index Number**, your **index number** has been printed vertically in the spaces on the left-hand side, and each numbered space has been shaded in line with each digit. **Reshape** each of the shaded spaces.
 - (d) In the box marked **Subject Code**, the digits 512113 are printed vertically in the spaces on the left-hand side. **Reshape** the corresponding numbered spaces as you did for your index number.

3. An example is given below. This is for a male candidate whose name is Ben Abu TETTEH. His **index number** is 7102143958 and he is offering **Physics 1**.

THE WEST AFRICAN EXAMINATIONS COUNCIL
ANSWER SHEET

PRINT IN BLOCK LETTERS		
Name:	TETTEH BEN ABU	GHA
Examination:	WASSCE	Year: SC 2025
Subject:	PHYSICS	Paper: 1

INSTRUCTIONS TO CANDIDATES

1. Use grade **2B** pencil throughout.
2. Answer each question by choosing one letter and shading like this:
3. Erase completely any answer you wish to change.
4. Leave extra spaces blank if the answer spaces provided are more than you need.
5. Do not make any markings across the heavy black marks at the right hand edge of your answer sheet.

INDEX NUMBER									
7	0	1	2	3	4	5	6	7	8
1	0	1	2	3	4	5	6	7	8
0	0	1	2	3	4	5	6	7	8
2	0	1	2	3	4	5	6	7	8
1	0	1	2	3	4	5	6	7	8
4	0	1	2	3	4	5	6	7	8
5	0	1	2	3	4	5	6	7	8
9	0	1	2	3	4	5	6	7	8
5	0	1	2	3	4	5	6	7	8
8	0	1	2	3	4	5	6	7	8

SUBJECT CODE									
5	0	1	2	3	4	5	6	7	8
1	0	1	2	3	4	5	6	7	8
2	0	1	2	3	4	5	6	7	8
1	0	1	2	3	4	5	6	7	8
1	0	1	2	3	4	5	6	7	8
3	0	1	2	3	4	5	6	7	8

For Supervisors only

If candidate is absent
shade this space

Answer all the questions.

Each question is followed by four options lettered A to D. Find the correct option for each question and shade in pencil on your answer sheet, the answer space which bears the same letter as the option you have chosen.

Give only one answer to each question. An example is given below.

A body starts moving with a speed of 40 m s^{-1} and accelerates uniformly to 90 m s^{-1} in 4.0 s. Calculate the distance travelled.

- A. 360 m
- B. 260 m
- C. 200 m
- D. 180 m

The correct answer is 260 m, which is lettered B, and therefore answer space B would be shaded.

=A= -B- =C= =D=

Think carefully before you shade the answer spaces; erase completely any answers you wish to change.

Do all rough work in this question paper.

Now answer the following questions:

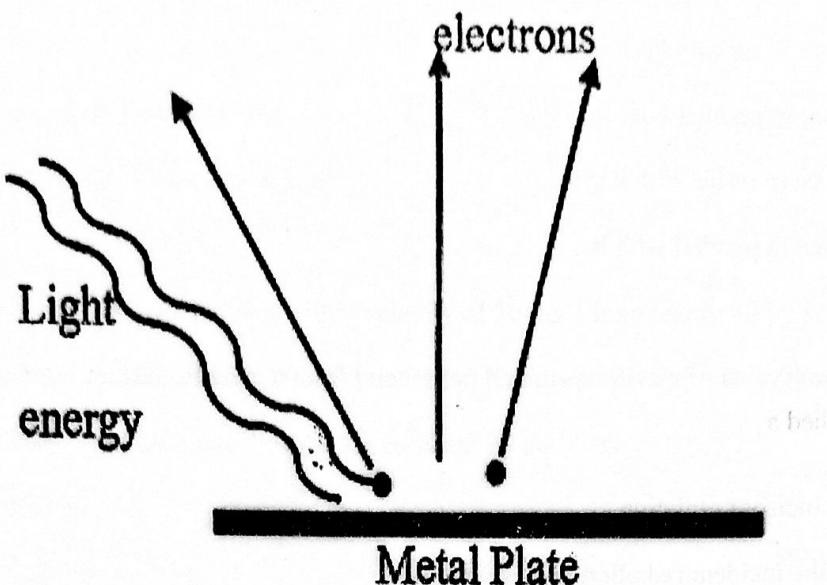
1. A ball, X is dropped from a height of 200 m at the same instance that another ball, Y is projected vertically from the ground with an initial velocity of 100 ms^{-1} . At what height above the ground will the two balls meet? [$g = 10 \text{ ms}^{-2}$]
 - A. 20 m
 - B. 220 m
 - C. 100 m
 - D. 180 m

2. Hot liquid in a vacuum flask cools extremely slowly because some modes of heat transfer cannot take place in a vacuum. These modes are
 - A. conduction and radiation only.
 - B. conduction, convection and radiation.
 - C. convection and radiation only.
 - D. conduction and convection only.

3. A cargo truck of mass 8000 kg is moving at a constant speed of 15 ms^{-1} . The brakes are suddenly applied and the truck comes to rest in 3 s. Determine the average braking force.
- A. 40 kN
 - B. 24 kN
 - C. 120 kN
 - D. 80 kN
4. Sound waves are produced in a stretched string by plucking it. Which of the following situations occurs as the waves travel along the string?
- A. Matter is transferred
 - B. Energy is transferred
 - C. Amplitude increases
 - D. Frequency increases
5. The number of electrons in uranium nucleus $^{235}_{92}\text{U}$ is
- A. 164.
 - B. 327.
 - C. 92.
 - D. 143.
6. When the direction of vibration of particles of a medium is parallel to the direction of propagation of a wave, the wave propagated is said to be
- A. electromagnetic.
 - B. standing.
 - C. longitudinal.
 - D. transverse.

7. How long will it take a radioactive material with a half-life of 10 days to reduce to $\frac{1}{32}$ of its original number ?
- A. 40 days
B. 30 days
C. 20 days
D. 50 days
8. A projectile, P is launched at an angle of 30° to the horizontal. A second projectile, Q is launched at an angle of 60° to the horizontal. The range of P compared to Q is
- A. the same.
B. reduced to one-quarter.
C. doubled.
D. halved.
9. The maximum frequency of incidence radiation on a metal surface below which no electron is emitted from the surface of a metal is called
- A. threshold frequency.
B. resonance frequency.
C. maximum frequency.
D. critical frequency.
10. Which of the following statements about a curved mirror is correct?
- A. The focal length of a spherical mirror is twice the radius of curvature.
B. A converging mirror diverges parallel rays from a point call real focus.
C. The pole of a curved mirror is at the center of its reflecting surface.
D. A curved mirror converges parallel rays to a point called virtual focus.

11. The phenomenon illustrated in the diagram below is 5



- A. photoelectric effect.
- B. wave -particle paradox.
- C. reflection of light.
- D. thermionic emission.

12. A radio station broadcast covers a distance of 3.27 m away at a nearby stadium. At what frequency was the radio wave transmitted? [$c = 3.0 \times 10^8 \text{ ms}^{-1}$]

- A. 98.1 MHz
- B. 100.9 MHz
- C. 91.7 MHz
- D. 92.5 MHz

13. The distance between two successive troughs of a wave is 16.5 cm and the velocity of the wave is 247.5 ms^{-1} . Calculate the frequency of the wave.

- A. 1500.00 Hz
- B. 4083.75 Hz
- C. 15.00 Hz
- D. 40.84 Hz

14. Which of the following actions is a process of converting a moving-coil galvanometer into an ammeter? Connecting a resistor of
- A. large resistance in series with it.
 - B. large resistance in parallel with it.
 - C. small resistance in series with it.
 - D. small resistance in parallel with it.
15. In photoelectricity, the number of electrons emitted per second from a metallic surface is proportional to the
- A. energy of the incident radiation.
 - B. frequency of the incident radiation.
 - C. work function of the metal.
 - D. intensity of the incident radiation.
16. A metal of mass 10 kg falls freely to the surface of a planet with an acceleration of 1.70 ms^{-2} . Calculate the magnitude of the weight of the metal.
- A. 11.7 N
 - B. 17.0 N
 - C. 5.9 N
 - D. 8.3 N
17. An atom in an excited state is one whose
- A. electrons have moved to higher energy levels.
 - B. electrons are all in the allowed orbit.
 - C. electrons have moved to infinity.
 - D. potential difference is maximum.

18. The S.I. unit for work is derived from the combination of the units

- A. foot, pound and second.
- B. kilogram, centimetre and second.
- C. gram, metre and second.
- D. kilogram , metre and second.

19. A body, X of mass 5 kg moving with a velocity of 30 ms^{-1} is suddenly hit by another body, Y moving in the same direction. After the collision, X moves with a speed of 50 ms^{-1} in its original direction. Calculate the impulse received by body, X.

- A. 200 Ns
- B. 150 Ns
- C. 100 Ns
- D. 250 Ns

20. Two metals, A and B gain the same quantity of heat in warming through a temperature difference of 5°C .

Given that the ratio of their specific heat capacities are $\frac{A}{B} = \frac{2}{1}$, the ratio of their masses $\frac{M_A}{M_B}$ will be

- A. $\frac{1}{2}$.
- B. $\frac{1}{3}$.
- C. $\frac{2}{1}$.
- D. $\frac{3}{1}$.

21. When two substances are placed in contact with each other and no net exchange of thermal energy occurs between them during the contact, the substances must have the same

- A. heat of fusion.
- B. specific heat capacity.
- C. temperature.
- D. heat of vaporization.

22. In a simple pendulum experiment, a graph of the length of the pendulum is plotted on the vertical axis and the square of the corresponding period ⁸ on the horizontal axis. The acceleration due to gravity is given by the quantity

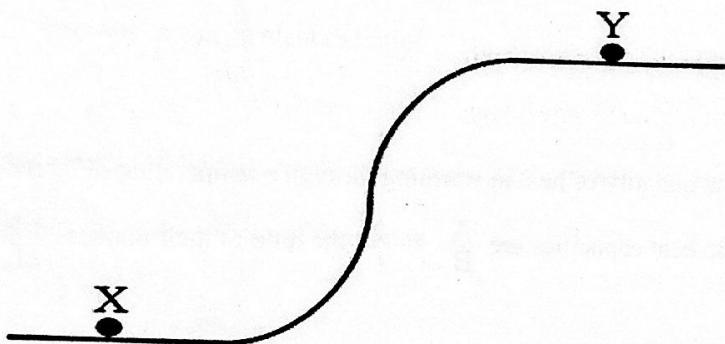
A. $4\pi^2 \times \text{slope}$.

B. $\frac{4\pi^2}{\text{slope}}$.

C. $\frac{\text{slope}}{4\pi^2}$.

D. slope.

23. A cyclist travels up a hill from point, X to point, Y as illustrated in the diagram below. The major energy transformation from X to Y is



A. gravitational potential to kinetic.

B. heat to kinetic.

C. kinetic to gravitational potential.

D. potential energy.

24. Which of the following properties of a material is temperature dependent?

A. Opacity

B. Weight

C. Density

D. Mass

25. A golf ball is kicked with an initial velocity of 20 ms^{-1} at an angle of 60° to the vertical . Calculate the magnitude of the horizontal component of the velocity of the ball.[$g = 10 \text{ ms}^{-2}$]
- A. 23.1 ms^{-1}
 - B. 40.0 ms^{-1}
 - C. 10.0 ms^{-1}
 - D. 17.3 ms^{-1}
26. Which of the following materials is used in nuclear reactors to moderate the speed of neutrons for the fission process?
- A. Uranium rod
 - B. Concrete shield
 - C. Graphite rod
 - D. Boron rod
27. A body acted upon by a variable force, F , produces a corresponding velocity each time. Assuming that the power of the body is constant, F and V are related by the expression
- A. $F \propto V^2$.
 - B. $F \propto V^{1/2}$.
 - C. $F \propto V^{-1}$.
 - D. $F \propto V^{-2}$.
28. The energy stored in a capacitor of capacitance $5 \mu\text{F}$ is 40 J . Calculate the voltage across the terminals of the capacitor.
- A. 400 V
 - B. 200 V
 - C. 4000 V
 - D. 2000 V
29. The induced emf of a transformer is 24.0 V when the output voltage is 240.0 V . What is the ratio of the numbers of turns in the primary coil to the numbers of turns in the secondary?
- A. $10 : 1$
 - B. $1 : 10$
 - C. $15 : 1$
 - D. $1 : 15$

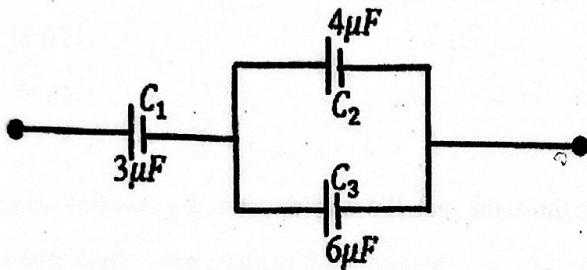
30. The **most** convenient way of charging a body without friction and contact with a charged body is by
- electrolysis.
 - induction.
 - catalyst.
 - demagnetization.
31. Two spherical bodies attract **each other** with a gravitational force of 4.0 N. What would be the magnitude of the force if the magnitude of the distance is quadrupled?
- 4.0 N
 - 2.0 N
 - 16.0 N
 - 8.0 N
32. Which of the following statements about X-rays is **correct**? They
- cause certain materials to fluorescence.
 - have long wave length.
 - are affected by electric fields.
 - have very low frequency.
33. What temperature **on the** kelvin scale is equivalent to 10 °C change in Celsius reading?
- 263 K
 - 273 K
 - 283 K
 - 10 K
34. The air resistance on a parachutist of mass 102 kg falling vertically downward is 150 N. Calculate the acceleration of the parachutist. [$g = 10 \text{ ms}^{-2}$]
- 4.8 ms^{-2}
 - 8.5 ms^{-2}
 - 25.5 ms^{-2}
 - 11.4 ms^{-2}

35. Which of the following pairs of light rays are most widely separated in the spectrum of white light?
- A. Orange and blue
 - B. Red and yellow
 - C. Blue and yellow
 - D. Orange and indigo
36. A ray of light is incident upon a plane mirror at an angle of 25° . The mirror is rotated clockwise through an angle of 15° . Determine the new angle of reflection.
- A. 65°
 - B. 80°
 - C. 40°
 - D. 55°
37. When an elastic material exceeds its elastic limit, the material would
- A. return to its original size.
 - B. not extend again.
 - C. break at that point.
 - D. yield at that point.
38. A swimmer coming out of a pool of water soon feels cold on a sunny day. The swimmer experienced coldness because
- A. water evaporates from the skin.
 - B. air is a bad conductor of heat.
 - C. convection occurs in the air.
 - D. water is a good conductor of heat.
39. The water vapor in the air is saturated at a temperature called the
- A. dew point.
 - B. freezing point.
 - C. ice point.
 - D. melting point.

- 40.** An object of mass 0.1 kg cools from 40° to 34° . Calculate the amount of heat released by the object. [specific heat capacity of the object is $0.4 \text{ J kg}^{-1}\text{K}^{-1}$]

- A. $0.24 \times 10^3 \text{ J}$
- B. $9.15 \times 10^3 \text{ J}$
- C. $5.61 \times 10^3 \text{ J}$
- D. $1.36 \times 10^3 \text{ J}$

- 41.** The network below is a combination of three capacitors. Calculate the effective capacitance of the connection.



- A. $1.67 \mu\text{F}$
- B. $4.40 \mu\text{F}$
- C. $12.00 \mu\text{F}$
- D. $4.00 \mu\text{F}$

- 42.** If Uranium – 234 disintegrates by emitting an alpha particle. The resultant atom would be

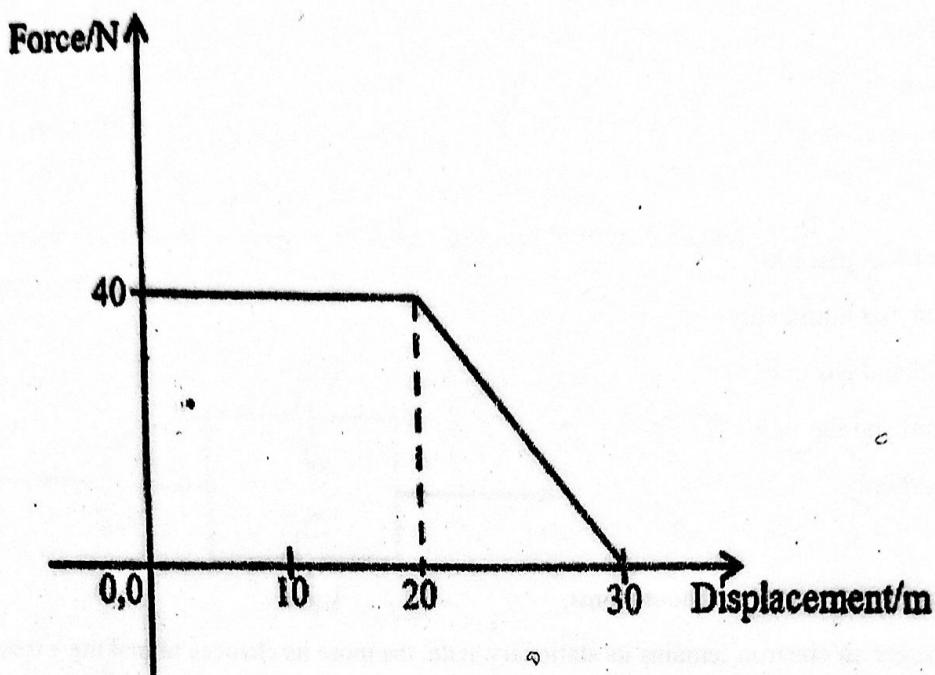
- A. 230 Th.
- B. 232 Th.
- C. 234 Th.
- D. 228 Th.

- 43.** Two masses, A and B have the same momentum. Mass B can have more kinetic energy than A if it

- A. is moving faster than A.
- B. has the same mass as A.
- C. has less mass than A.
- D. is moving at the same speed as A.

44. A car of mass 1000 kg travelling at 72 km hr^{-1} is brought to rest over a distance of 30 m. Calculate the retardation of the car.
- 6.2 ms^{-2}
 - 5.8 ms^{-2}
 - 7.1 ms^{-2}
 - 6.7 ms^{-2}
45. Convection takes place in
- solid and liquid only.
 - solid and gas only.
 - liquid and gas only.
 - liquid only.
46. According to Bohr's postulate about atoms,
- the longer an electron remains its stationary state, the more its chances of making a transition.
 - when an electron remains in its stationary state, it must emit electromagnetic radiation.
 - an electron undergoing excitation must move from a higher to a lower stationary state.
 - an electron undergoing excitation must move from a lower stationary state to a higher stationary state.
47. During a radioactive process, the number of active nuclei disintegrating per unit time is the
- decay constant.
 - undecayed sample.
 - half-life.
 - activity.

48. The diagram below illustrates the force – displacement graph for the motion of a body. Calculate the work done on the body.



- A. 750 J
- B. 500 J
- C. 1000 J
- D. 800 J

49. Hot ware of mass, X g is added to water of mass, $\frac{X}{2}$ g at 20°C . If the temperature of the mixture is 50°C , calculate the initial temperature of the hot water.
- A. 65°C
 - B. 86°C
 - C. 72°C
 - D. 55°C
50. The process by which heat is transferred from one point to another in a solid material is called
- A. radiation.
 - B. evaporation.
 - C. convection.
 - D. conduction.