

MARCH 2023

<p>The Teachers' Resource Unit and the Regional Inspectorate of Pedagogy, in collaboration with NWAPT</p>	<p>SUBJECT CODE NUMBER 0580</p>	<p>PAPER NUMBER 1</p>
<p>GENERAL CERTIFICATE OF EDUCATION REGIONAL MOCK EXAMINATION</p>	<p>SUBJECT TITLE PHYSICS</p>	
<p>CANDIDATE NAME:</p>		
<p>CANDIDATE NUMBER:</p>		
<p>CENTRE NUMBER:</p>	<p>ORDINARY LEVEL</p>	

Time Allowed: One and a half hours
INSTRUCTIONS TO CANDIDATES:

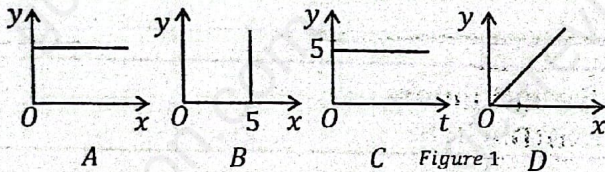
Mobile phones are **NOT ALLOWED** in the examination room.

- USE A SOFT HB PENCIL THROUGHOUT THIS EXAMINATION.
 - DO NOT OPEN THIS BOOKLET UNTIL YOU ARE TOLD TO DO SO.
- Before the Examination begins:**
- Check that this question booklet is headed "Ordinary level -0580 code and subject title—Physics-Paper 1".
 - Insert the information required in the spaces above.
 - Without opening the booklet, pull out the answer sheet carefully from inside the front cover of this booklet. Take care that you do not crease or fold the answer sheet or make any marks on it other than those asked for in these instructions.
 - Insert the information required in the spaces provided on the answer sheet using your HB pencil:
- Candidate Name, Centre Number, Candidate Number, Subject Code Number, and Paper number**
- How to answer questions in this examination:**
- Answer ALL the 50 questions in this examination. All questions carry equal marks.
 - Non-programmable calculators are allowed.
 - For each question there are four suggested answers, A, B, C and D. Decide which answer is correct. Find the number of the question on the Answer Sheet and draw a horizontal line across the letter to join the square brackets for the answer you have chosen. For example, if C is your correct answer, mark C as shown below:
- [A] [B] [C] [D]
- Mark only one answer for each question. If you mark more than one answer, you will score zero for that question. If you change your mind about an answer, erase the first mark carefully, and then mark your new answer.
 - Avoid spending much time on any question. If you find a question difficult, move to the next. You can come back to the question later.
 - Do all rough work in this booklet using, where necessary, the blank spaces in the question booklet.
 - You must not take this booklet and answer sheet out of the examination room. All question booklets and answer sheets will be collected at the end of the examination

SECTION 1 (Forty-two Questions)

Direction: Each of the questions or incomplete statements in this section is followed by four suggested answers. Select the best answer for each question.

- Which of the following correctly represents a physical quantity in Physics?
 - 3 s/m
 - 3 m²/N
 - 3 m/s
 - 3.0
- Below are pairs of physical quantities. State which pair are both vector quantities?
 - Mass and weight.
 - Weight and momentum.
 - Power and velocity.
 - Speed and acceleration.
- A bike rider increases the speed of his bike from 30 km/h to 50 km/h. Which of the forces acting on the bike increases?
 - Drag force.
 - Weight.
 - Friction.
 - Normal reaction.
- Upthrust is exerted on a body when the body is immersed in ...
 - liquid only.
 - solid.
 - gas only.
 - liquid or gas.
- Which of the graphs in Figure 1 below shows how the acceleration (y) of a body falling freely 5 m above the ground varies with time (x)?



- A nurse asks a patient to climb on a scale balance. Which physical quantity is she about to measure?
 - Weight.
 - Force.
 - Mass.
 - Size of her feet.
- What is the significance of the slope of displacement versus time graph?
 - Speed.
 - Acceleration.
 - Distance covered.
 - Velocity.
- A ball is thrown upward and it returns to the thrower. Which of the following statements about the ball is correct?
 - Its velocity increases as it moves upward.
 - At the maximum height, its velocity is zero.
 - Its weight increases as it moves upwards.
 - Its mass decreases as it moves upwards.
- Calculate the gravitational potential energy of a 50 kg bag of rice on a table of height 2 m.
 - 1000 J
 - 100 J
 - 25 J
 - 250 J
- Electrical energy is measured in the unit of ...
 - joules.
 - watts.
 - coulombs.
 - megawatts.

11. In the process of doing work, energy is always ...

- created.
 - converted.
 - destroyed.
 - created and converted.
12. Select a non-renewable source of energy.
- Geothermal.
 - Sun.
 - Coal.
 - Wind.
13. Determine the elastic limit in the force (F) versus extension (x) graph in figure 2 below.
-
- 10 N
 - 2.5 N
 - 0.4 N
 - 5 N
14. Cooking the same quantity of a meal takes a longer time at the top of Mount Fako than at the foot of the mountain. This is because at the top of the mountain
- temperature is low.
 - temperature is high.
 - atmospheric pressure is high.
 - atmospheric pressure is less.

15. Select the correct formula to calculate the efficiency (E) of a machine.

- $E = \frac{\text{Work input}}{\text{Work output}}$
- $E = \frac{\text{Power output}}{\text{Power input}}$
- $E = \frac{M.A}{V.R}$
- $E = \frac{V.R}{M.A}$

16. Select quantity below which is correctly paired with its unit.

(A)	Force	$kg\ m\ s^{-1}$
(B)	Work	$kg\ m^2\ s^{-2}$
(C)	Heat	$J\ kg\ K^{-1}$
(D)	Momentum	$kg\ m\ s^{-2}$

17. Which of the following properties makes water to be used in car radiators?

- Water has high specific heat capacity.
 - Water prevents corrosion.
 - Water can easily spread in the radiators.
 - Water does not wet the walls of the radiators.
18. Below is a list of machines used at a construction site. Select the one which can best be used in transporting a bucket of concrete to the third floor of the building.
- Wheelbarrow.
 - Truck.
 - Pulley system.
 - Inclined plane.

19. A current of 3 A flows through a conductor in 2 minutes. Calculate the quantity of charge that passes through the conductor during this time.

- 6 C
- 360 C
- 1.5 C
- 0.67 C

20. Identify the symbol of a battery in figure 3 below.

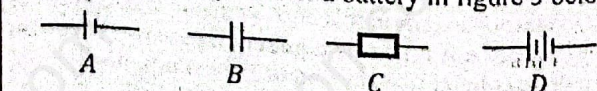


Figure 3

21. Which of the following is a protective device that protects users of electricity from electric shock?
- Fuse connection.
 - Earth connection.
 - Circuit breaker.
 - Neutral wire connection.

22. It does NOT affect the resistance of a conductor.
- Colour of the conductor.
 - Length of the conductor.
 - Temperature.
 - Cross sectional area.

23. Which of the following is an example of a semiconductor?
- Silicon.
 - Boron.
 - Phosphorus.
 - Carbon.

24. The net charge on a p-type semiconductor is?
- Positive.
 - Negative.
 - Neutral.
 - Semipositive.

25. Which of the formulae below is used to calculate refractive index (n) of a material?
- $n = \frac{\text{apparent depth}}{\text{real depth}}$
 - $n = \frac{\text{real depth}}{\text{apparent depth}}$
 - $n = \frac{\sin r}{\sin i}$
 - $n = (\sin i) \times (\sin r)$

26. An object is placed at $2F$ in front of a convex lens. Select the property of the image formed that is different from that of the object.
- Same size as the object.
 - Same distance behind the lens as object in front of the lens.
 - Same height.
 - Inverted.

27. A light ray is incident as shown in Figure 4 below.

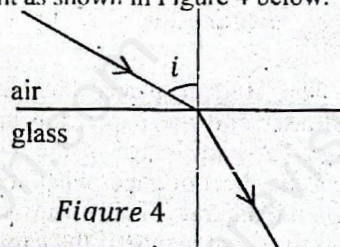


Figure 4

- Which of the following statements is true?
- Total internal reflection cannot occur.
 - If angle i is greater than critical angle, total internal reflection will occur.
 - If angle i is less than critical angle, total internal reflection will occur.
 - If angle i is greater than the critical angle, total internal refraction will occur.

28. A string of length l , subjected to a tension T is plucked at its centre so that it vibrates at a frequency f . Which of the following changes will cause the greatest increase in f ?

	Length (l)	Tension (T)
(A)	increases	increases
(B)	increases	decreases
(C)	decreases	increases
(D)	decreases	decreases

29. In a semiconductor, conduction is done by ...
- protons and neutrons.
 - holes and electrons.
 - electrons and protons.
 - electrons and neutrons.

30. Which of the graphs in Figure 5 below best shows how the frequency (y) of a note produced by a plucked guitar string varies with the length (x) of the guitar string?

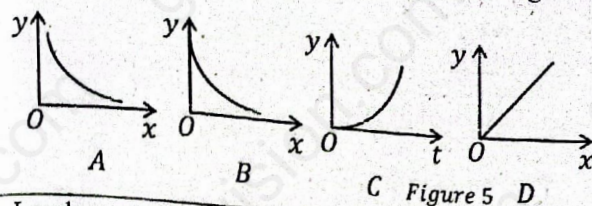


Figure 5 D

31. Loudness and pitch are associated to sound. Each of them respectively depends on ...
- amplitude and period
 - amplitude and temperature.
 - frequency and amplitude
 - frequency and period.

32. A bar AB is brought close to, but not touching the north pole (N) of a bar magnet (NS)

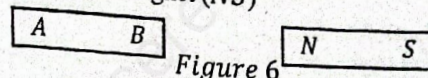


Figure 6

It is observed that the bar is attracted to the magnet. When the end A is brought close to N , attraction is equally observed. This shows that ...

- the bar is a non-magnetic material.
- the bar is a magnet.
- the end B of the bar is a north pole.
- the bar is a magnetic material.

33. Which of the following are both laws of electromagnetism?

- Lenz's law and right-hand grip rule law.
- Faraday's law of electromagnetism and Ohm's law.
- Faraday's law and Newton's law of gravitation.
- Lenz's law and Faraday's law of electromagnetism.

34. A nuclide simultaneously emits an alpha and a beta particle. Its mass number and atomic number respectively decrease by ...

- 4 and 3
- 4 and 1
- 4 and 2
- 2 and 4

35. Which of the following statements clearly states one way by which the efficiency of a transformer can be increased?

- Increasing the thickness of the coil.
- Decreasing the thickness of the coil.
- Making the coil with steel.
- Increasing current through it.

36. The resultant magnetic force of a magnet appears to be

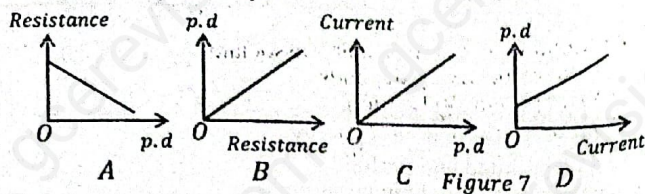
- evenly (equally) concentrated at both poles.
- more concentrated at the north pole than at the south pole.
- more concentrated at the south pole than at the north pole.
- more concentrated in between the poles.

37. Which of the following statements is true about house wiring?

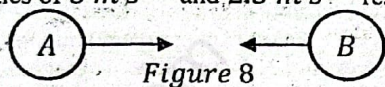
- There should be good earthing to protect the appliances.
- There should be good electrical contact to avoid electric shock.
- There should be good electrical contact to avoid short circuiting.
- The fuse should always be connected on the neutral wire.

38. A plane vibrator generates 3000 waves in 2 minutes. Calculate the frequency of the vibrator.
- (A) 1500 Hz
(B) 600 Hz
(C) 25 Hz
(D) 3600 Hz

39. Which of the graphs in Figure 7 has resistance as the significance of its slope?



40. Which of the following wave phenomena is responsible for the formation of the rainbow?
- (A) Reflection.
(B) Dispersion.
(C) Refraction.
(D) Diffraction.
41. Water is heated until it changes to vapour. Which of the following statements below is correct during this change of state?
- (A) Temperature remains constant.
(B) Temperature increases.
(C) Temperature decreases.
(D) Heat content of water molecules remains constant.
42. Two identical balls A and B each of mass 2.0 g move in opposite directions as shown in Figure 8 below, with velocities of 3 m s^{-1} and 2.5 m s^{-1} respectively.



If they collide and coalesce, calculate their common velocity in m s^{-1} after collision.

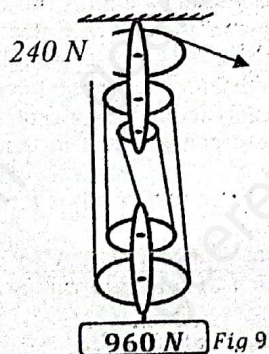
- (A) 5.5
(B) 2.75
(C) 0.25
(D) 0.50

SECTION 2 (Eight Questions)

Directions: These groups of questions deal with practical situations. Each situation is followed by a set of questions. Select the best answer for each question.

Questions 43 - 45

The diagram below shows a simple machine which is used by builders at a construction site to lift heavy material. The minimum pulling force needed to lift a load of 960 N is 240 N.



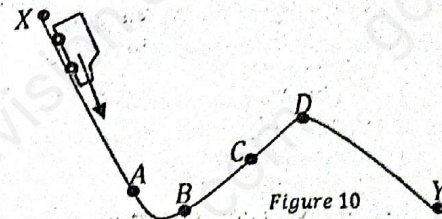
43. The velocity ratio of the machine is ...
- (A) 5
(B) 1/5
(C) 1/4
(D) 4
44. If the pulling force does 1920 J of work, through what height will the stone be lifted?
- (A) 1.6 m
(B) 0.5 m
(C) 0.5 m
(D) 0.6 m

45. What length of rope must be pulled to lift the load through a vertical height of 1.5 m?

- (A) 6 m
(B) 0.3 m
(C) 7.5 m
(D) 0.1 m

Questions 46 - 47

The diagram below shows the runway of a toy of mass 200 g which is released from the point X so that it moves along ABCD to Y.



46. At which of the points A, B, C or D will the speed of the toy be minimum after release from the point X?

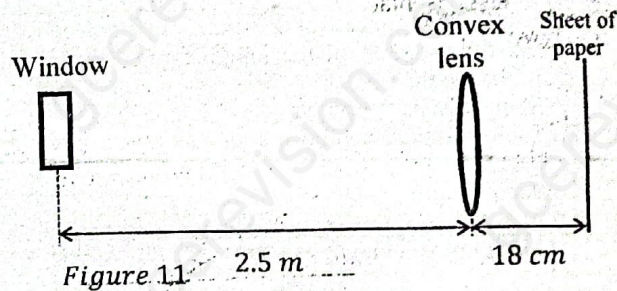
- (A) A
(B) B
(C) C
(D) D

47. Given that X is 80 cm high, at what speed will the toy pass through the point C if it is 20 cm high?

- (A) 3.5 m s^{-1}
(B) 12 m s^{-1}
(C) 1.2 m s^{-1}
(D) 0.4 m s^{-1}

Questions 48 - 50

The set up below was designed by a student to investigate a thin convex lens:



48. The student placed the lens between the window shutter and the paper and moved the lens to and fro until a sharp image of the window shutter was formed on the sheet of paper when the distances were as shown on the diagram. This means that

- (A) the focal length of the lens is 18 cm.
(B) the focal length of the lens is about 18 cm.
(C) the image distance is 2.5 m.
(D) the linear magnification is 0.14.

49. For which of the object distances below will it be impossible to pick an image of the window on the sheet of paper?

- (A) 45 cm
(B) 36 cm
(C) 25 cm
(D) 10 cm

50. When the same lens is placed between a vertical wall and a match stick 5 cm tall and moved until it (the lens) is 50 cm from the match stick, an image of the match stick is formed on the wall. Select a correct property of the image.

- (A) Virtual.
(B) Magnified.
(C) Inverted.
(D) Laterally inverted.

END