

GENERAL CERTIFICATE OF EDUCATION (GCE) BOARD

General Certificate of Education Examination

0580 PHYSICS 1

JUNE 2021

ORDINARY LEVEL

Centre Number	
Centre Name	
Candidate Identification No.	
Candidate Name	

Mobile phones are NOT allowed in the examination room.

MULTIPLE CHOICE QUESTION PAPER

One and a half hours

INSTRUCTIONS TO CANDIDATES

Read the following instructions carefully before you start answering the questions in this paper. Make sure you have a soft HB pencil and an eraser for this examination.

1. USE A SOFT HB PENCIL THROUGHOUT THE EXAMINATION.
2. DO NOT OPEN THIS BOOKLET UNTIL YOU ARE TOLD TO DO SO.

Before the examination begins:

3. Check that this question booklet is headed “0580 Physics 1 – Ordinary Level”
4. Fill in the information required in the spaces above.
5. Fill in the information required in the spaces provided on the answer sheet using your HB pencil:
Candidate Name, Exam Session, Subject Code, Centre Number and Candidate Number.
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.

How to answer the questions in this examination

6. Answer **ALL** the 50 questions in this Examination. All questions carry equal marks.
7. Calculators are allowed.
8. Each question has FOUR suggested answers: A, B, C and D. Decide which answer is appropriate. 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 corresponding answer you have chosen.

For example, if C is your correct answer, mark C as shown below:

[A] [B] ☒ [C] [D]

9. Mark only one answer for each question. If you mark more than one answer, you will score a zero for that question. If you change your mind about an answer, erase the first mark carefully, and then mark your new answer.
10. Avoid spending too much time on any one question. If you find a question difficult, move on to the next question. You can come back to this question later.
11. Do all rough work in this booklet using the blank spaces.
12. **At the end of the examination, the invigilator shall collect the answer sheet first and then the question booklet. DO NOT ATTEMPT TO LEAVE THE EXAMINATION HALL WITH IT.**
You may find the following constants useful
 - acceleration of free fall, $g = 10 \text{ m s}^{-2}$
 - the speed of light in vacuum, $c = 3 \times 10^8 \text{ m s}^{-1}$
 - the charge on an electron, $e = 1.6 \times 10^{-19} \text{ C}$

Turn Over

Section 1 (Forty Two Questions)

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

Questions 1 – 42

1. Which of the following values below represents momentum?

A 20 N
 B 20 Pa
 C 20 N m
 D 20 kg m s^{-1}

2. The base unit of length is the:

A millimetre
 B metre
 C centimetre
 D kilometre

3. Which of the following pairs are all scalar quantities?

A Work and time
 B Momentum and distance
 C Displacement and speed
 D Velocity and force

4. Which of the graphs in figure 1 best represents the relationship between the acceleration of a moving car and its mass, when the force acting on the car is constant?

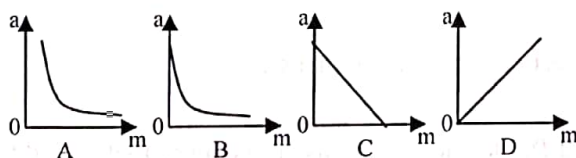


Figure 1

5. Which of these units is equivalent to joule per coulomb (J C^{-1})?

A watt
 B volt
 C ampere
 D ohm

6. For a body to stay in equilibrium:

A the net force must be zero
 B the net force and the sum of the moments must be zero
 C the upward forces must be equal to the sum of the downward forces
 D the net force must be greater than the sum of moments.

7. In a velocity-time graph the area between the graph and the time axis gives:

A total momentum
 B total distance covered
 C total acceleration
 D total work done

8. Seat belts reduce injury on users in the case of accidents by:

A reducing the stopping time and increasing the stopping force
 B increasing the stopping time and increasing the stopping force
 C reducing the stopping time and reducing the stopping force
 D increasing the stopping time and reducing the stopping force

9. Which of these energy resources is non-renewable?

A Petroleum
 B Biomass
 C Tidal energy
 D Solar energy

10. Which of the following pairs of forces are both non-contact forces?

A Weight and upthrust
 B Air resistance force and electrostatic force
 C Electrostatic force and friction force
 D Magnetic force and weight

11. A ball of mass 0.5 kg travelling at 10 m s^{-1} has kinetic energy of:

A 2.5 J
 B 5 J
 C 25 J
 D 50 J

12. What type of energy is stored in a compressed spring?

A Kinetic energy
 B Elastic potential energy
 C Gravitational potential energy
 D Chemical energy

13. The density of a substance is the:
- mass of 1 kg of the substance
 - mass of 1 g of the substance
 - volume of a unit mass of the substance
 - mass of a unit volume of the substance

14. In figure 3 an irregular-shaped object is put into a measuring cylinder containing water.

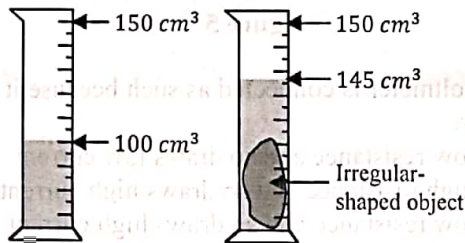


Figure 3

The volume of the object is:

- 45 cm³
 - 100 cm³
 - 145 cm³
 - 150 cm³
15. The hydraulic jack works on the principle that the:
- force applied to a liquid is transmitted equally to every part of the liquid
 - force applied to a liquid is transmitted in proportion to the area of contact
 - pressure applied to a liquid is transmitted equally to every part of the liquid
 - pressure applied to a liquid is transmitted in proportion to the area of contact
16. What is the pressure, in pascals, in a liquid of density 1000 kg m⁻³, at a depth of 10 m?
- 10⁻³
 - 10⁻¹
 - 10⁴
 - 10⁵

17. Which of the graphs in figure 4 shows how the pressure at a given depth varies with the depth of the liquid?

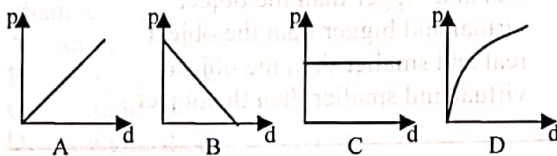


Figure 4

18. When evaporation takes place the temperature of the remaining liquid drops because:
- the slowest molecules are escaping
 - the fastest molecules are escaping
 - the pressure on the liquid is decreasing
 - the pressure on the liquid is increasing

19. Absolute zero (0 K) is the same as a Celsius temperature of:

- 273 °C
- 0 °C
- 32 °C
- 273 °C

20. Water is used in car radiators because it has a:

- high heat capacity
- high boiling point
- high latent heat of vaporisation
- low melting point

21. During the night the temperature of the sea water is higher than that of the sandy sea shore. This is because sea water:

- is a better absorber of heat than sand
- is a poorer radiator of heat than sand
- has a higher heat capacity than sand
- has a lower heat capacity than sand

22. The specific latent heat of fusion of a substance is the amount of heat energy needed to convert:

- 1 kg of the substance from solid to liquid at constant temperature
- 1 kg of the substance from liquid to gas at constant temperature
- a unit mass of the substance from solid to liquid at constant temperature
- a unit mass of the substance from liquid to gas at constant temperature

23. Heat from the Sun reaches the Earth by:

- conduction and convection
- convection and radiation
- radiation only
- convection only

24. When measuring the specific heat capacity of liquids the calorimeter and its contents is lagged so as to:

- ensure even distribution of heat
- ensure good electrical contact
- measure accurate temperature changes
- minimize heat exchange with environment

Turn Over

25. A car is moving with uniform acceleration. Its velocity-time graph is:

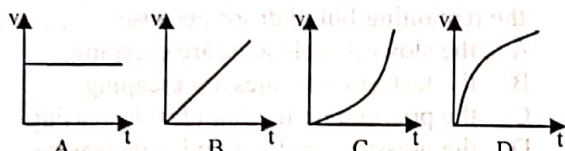


Figure 2

26. Dust particles often stick on television screens because the:

- A television screens become charged and so attract the oppositely charged dust particles
- B dust particles become charged and so attract the uncharged television screens
- C television screens become charged and so attract the uncharged dust particles
- D television screens, whether charged or not, attract dust particles

27. Electrical power is transmitted at high voltage in thick copper cables:

- A so as to discourage people from stealing the cables along the way
- B so as to maintain a high voltage up to the consumer end
- C so as to keep power loss along the cable as low as possible
- D because transformers will step down the voltage to any level at the consumer end

28. The effective voltage of electrical energy supplied to our homes by ENEO is:

- A 110 V
- B 220 V
- C 250 V
- D 340 V

29. When we pay electricity bills, what are we paying for?

- A Power consumption
- B Energy consumption
- C Voltage consumption
- D Electricity consumption

30. A voltmeter is connected in a circuit as shown in figure 5.

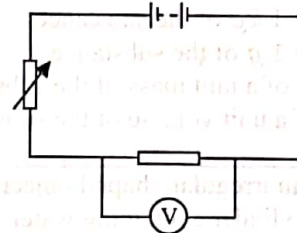


Figure 5

The voltmeter is connected as such because it has a very:

- A low resistance and so draws low current
- B high resistance and so draws high current
- C low resistance and so draws high current
- D high resistance and so draws low current

31. The bar magnet in figure 6 is moved quickly towards the solenoid

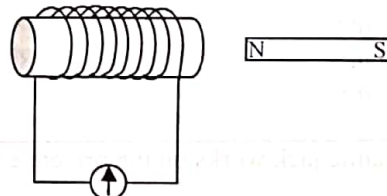


Figure 6

The rule that can be used to determine the magnitude of the induced EMF generated in the solenoid is:

- A Faraday's rule
- B Lenz's rule
- C Fleming's Left Hand rule
- D Right Hand Grip rule

32. In drawing of magnetic field lines, the stronger the field is the:

- A more parallel the field lines are
- B farther apart the field lines are
- C closer together the field lines are
- D more divergent the field lines are

33. An optical pin is placed between the principal focus and the optical centre of a converging lens. The image formed is:

- A real and bigger than the object
- B virtual and bigger than the object
- C real and smaller than the object
- D virtual and smaller than the object

34. Which of the diagrams in figure 7 best shows total internal reflection?

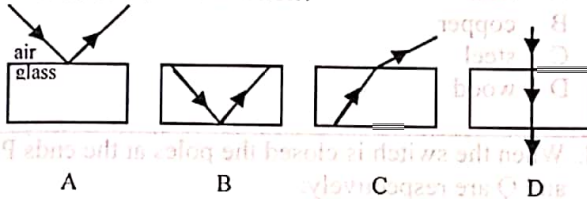


Figure 7

35. Soft iron is used as the core of electromagnet because it is:

- A difficult to magnetise but easy to demagnetise
- B difficult to magnetise and difficult to demagnetise
- C easy to magnetise but difficult to demagnetise
- D easy to magnetise and easy to demagnetise

36. Which of the following is best suited for making the core of a transformer?

- A Copper
- B Aluminium
- C Iron
- D Steel

37. A bar magnet with known poles is used to study the properties of a bar AB. If the south pole of the bar magnet attracts end A and also attracts end B of the bar, then the:

- A bar AB is a magnet
- B north pole of the magnet will repel both ends of the bar AB
- C bar AB is a magnetic material
- D bar AB is a non-magnetic material

38. The core of transformers are usually laminated in order to minimize heat loss due to:

- A magnetic reversals
- B resistance of copper
- C flux leakage
- D eddy currents

39. The tracks produced by alpha particles in a cloud chamber are:

- A straight, long and thin
- B wavy, long and thick
- C straight, short and thin
- D straight, short and thick

40. Which symbol represents an alpha particle?

- A ${}^4_2\alpha^{2+}$
- B ${}^4_2\alpha$
- C ${}^4_2\text{He}$
- D ${}^4_2\text{He}^{2-}$

41. Alpha (α), beta (β), and gamma (γ) radiations emitted from a source are deflected by a magnetic field pointing out of the page. The correct diagram of the outcome is:

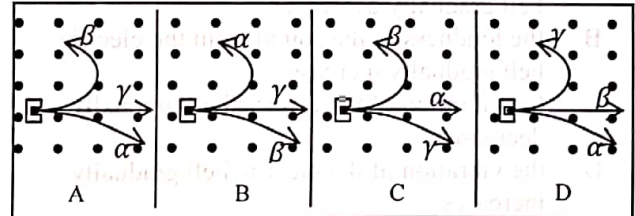


Figure 8

42. When trivalent atoms are added to a semiconductor, its conductivity increases. This process is called:

- A transmutation
- B doping
- C rectification
- D transformation

Section 2 (Eight Questions)

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

Questions 43 - 46

Figure 9 is part of a setup used to study the behaviour of waves in air.

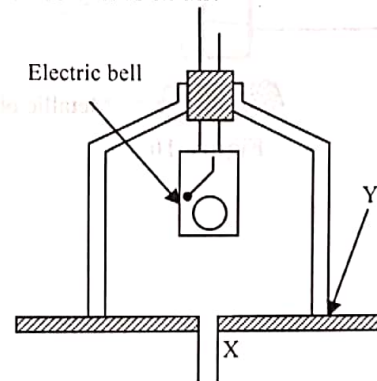


Figure 9

43. The end X of the tube from the jar is connected to a:
- A barometer
 - B U-tube manometer
 - C vacuum pump
 - D Bourdon gauge

Turn Over

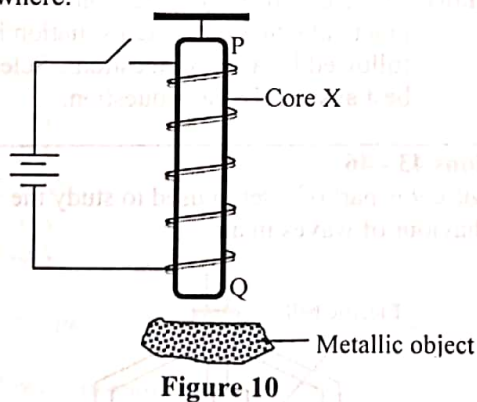
44. The substance applied at Y helps to:
- reduce static friction at the base
 - increase pressure of air at the base
 - increase static friction at the base
 - reduce the passage of air at the base

45. When the instrument connected at point X is operating:
- the loudness of the sound from the electric bell gradually decreases
 - the loudness of the sound from the electric bell gradually increases
 - the vibration of the electric bell gradually decreases
 - the vibration of the electric bell gradually increases

46. This experiment shows that:
- Light can travel in air but not in a vacuum
 - Light can travel in a vacuum but not in air
 - Sound can travel in air but not in a vacuum
 - Sound can travel in a vacuum but not in air

Questions 47 – 50

Figure 10 shows an electromagnet designed to pick up some metallic objects and released elsewhere.



47. A suitable material for the core X is:

- iron
- copper
- steel
- wood

48. When the switch is closed the poles at the ends P and Q are respectively:

- N – N
- S – S
- N – S
- S – N

49. One material that cannot be picked up by the electromagnet can be made of:

- silver
- iron
- steel
- cobalt

50. Which of the following modifications will cause the electromagnet to pick up heavier objects?

- Increasing the length of the core X
- Increasing the length of the coil
- Increasing the number of cells of the battery
- Changing the dc source to ac

STOP
GO BACK AND CHECK YOUR WORK