GENERAL CERTIFICATE OF EDUCATION BOARD

General Certificate of Education Examination

0580 PHYSICS 1

JUNE 2023 **ORDINARY LEVEL**

Centre Number	
Centre Name	
Candidate Identification Number	
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 and Candidate Identification 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. Non-programmable 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 answer you have selected.

   For example, if **C** is your correct answer, draw a line across C as shown below:

   [A] [B] [C] [D]

9. Select only one answer for each question. If you select more than one answer, you will score a zero for that question. If you change your mind about an answer, erase the first line carefully, then select 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 your rough work in this booklet using the blank spaces in the question booklet.
12. **At the end of the examination, the invigilator shall collect the answer sheet first and then the question booklet. DO NOT LEAVE THE EXAMINATION HALL WITH THEM.**

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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.

1. Which of the following is a pair of scalar quantities?
   A Power, force
   B Force, momentum
   C Energy, pressure
   D Work done, velocity

2. Which of the following is not a contact force?
   A Friction
   B Weight
   C Tension
   D Upthrust

3. The gradient of velocity-time graph represents:
   A the total distance covered
   B the average velocity
   C the acceleration
   D the average distance covered

4. The variation of acceleration due to gravity (g) with time (t) can best be represented by which of the graphs in figure 1?

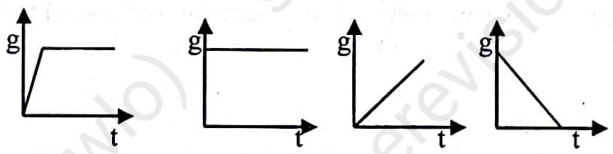


Figure 1

5. A trolley with a ticker tape attached to it, is caused to run down a runway. A section of the tape produced by a ticker timer of known frequency is displayed in figure 2.

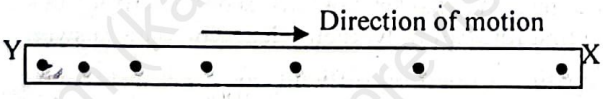


Figure 2

The object is:
   A moving with constant velocity
   B accelerating
   C decelerating
   D moving with constant acceleration

6. The form of energy stored in a car battery is:
   A chemical energy
   B heat energy
   C light energy
   D nuclear energy

7. A builder raises a bag of cement of mass 50 kg onto a platform which is 3 m high. The work done by the builder in joules is:
   A 1500
   B 500
   C 250
   D 150

8. Which of the following energy sources are all renewable energy sources?
   A Geothermal energy , oil
   B Sun, oil
   C Sun, wind
   D Coal, Biomass

9. What are the constituents of the nucleus?
   A Protons and electrons
   B Protons and neutrons
   C Protons, neutrons and electrons
   D Neutrons and electrons

10. The half-life of a sample of a radioactive substance is the time taken for the:
   A activity of the sample to reduce by half
   B density of the sample to reduce by half
   C mass of the sample to reduce by half
   D size of the sample to reduce by half

11. An object is placed 20 cm from a diverging lens of focal length 10 cm. The image formed is;
   A real, inverted and magnified
   B virtual, erect and magnified
   C real, inverted and diminished
   D virtual, erect and diminished.

12. In a vacuum, all electromagnetic waves have the same:
   A amplitude
   B frequency
   C speed
   D wavelength

13. A pond 8 m deep appears to be only 6 m deep when viewed vertically from above. The refractive index of the water is:
A 48
B 14
C 2
D 1.3

14. Which of the following is true about a p-type semiconductor?
A It has a net positive charge
B It has more conduction electrons than holes
C It has more holes than conduction electrons
D It has an equal number of holes and conduction electrons

15. The electrical resistance of a metallic conductor is inversely proportional to its:
A cross-sectional area
B length
C resistivity
D temperature

16. Alternating current is preferred to direct current for transmission of electrical power because:
A it can easily be stepped up and stepped down
B it is easily generated
C thinner conducting wires can be used
D it can easily be changed to direct current

17. Which of the following elements can be used to dope silicon to produce a p-type semiconductor?
A Phosphorus
B Germanium
C Iron
D Boron

18. Which of the graphs in figure 3 best shows how the potential difference (V) across a metal conductor varies with the current (I) flowing through it?

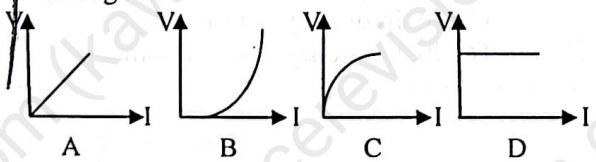


Figure 3

19. The kWh is the unit of:
A energy
B potential
C power
D resistance

20. Figure 4 shows a connection of three resistors of resistances 3Ω, 6Ω and 5Ω.

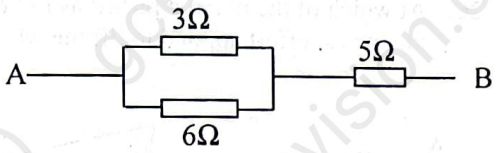


Figure 4

The resultant resistance across AB is:
A 3 Ω
B 4 Ω
C 7 Ω
D 14 Ω

21. Which of the following is NOT released by a decaying radioactive nucleus?
A Alpha particles
B Beta particles
C Gamma rays
D X-rays

22. A car of mass 600 kg moving with a constant velocity of 20 m s^{-1} along a straight road is brought to rest in 40 s by applying the brakes. The average retarding force acting on the car during this time is:
A 1.3 N
B 10 N
C 300 N
D 1200 N

23. Which of the following statements is an advantage of using a pressure pot to cook food?
A It cooks at a lower temperature
B It cooks at a higher temperature
C It cooks at a lower pressure
D It preserves all the food nutrients

24. When matter moves in a bulk and transfers heat from one point to another, the process is called:
A transmission
B radiation
C conduction
D convection

25. The advantage of the double wheels of a heavy truck is to:
A increase the stability of the truck
B reduce the pressure exerted on the ground
C reduce the friction between the wheels and the road
D facilitate braking when the brakes are applied

26. At which of the marked positions in figure 5 is the lowest effort applied to lift the wheel barrow?

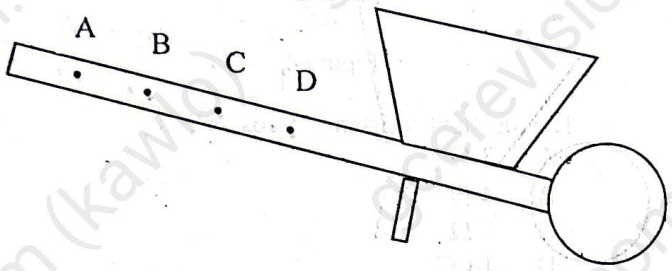


Figure 5

A Position A
B Position B
C Position C
D Position D

27. A tennis ball is thrown at a wall with a velocity of 6 m s^{-1}, and rebounds with a velocity of 4 m s^{-1}. What is the change in velocity in m s^{-1}?
A 24.0
B 10.0
C 2.0
D 1.5

28. The lower fixed point of a mercury-in-glass thermometer in kelvin scale is:
A 373 K
B 277 K
C 273 K
D 0 K

29. Water is used as a cooling liquid because:
A it has a melting point of 0 °C
B it has a high specific heat capacity
C it is cheap
D it easily evaporates

30. The heat supplied to a substance during change of state goes to increase:
A the temperature of the substance
B the kinetic energy of the substance
C the mass of the substance
D the potential energy of the substance

31 An object is charged by bringing a charged object close to it but not touching it. This process can be described as:
A charging by friction
B charging by rubbing
C charging by induction
D charging by transfer

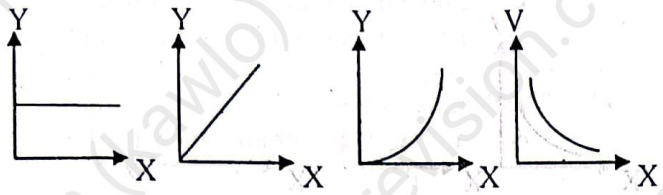
32. Which of the following electrical devices operates effectively using a soft magnetic material?
A loud speaker
B TV set
C radio set
D electric bell

33. Repulsion is the surest test to confirm a magnet using another magnet because;
A repulsion can only exist between unlike poles of magnets
B repulsion can only exist between like poles of magnets
C attraction can only occur between like poles of magnets
D attraction can occur between unlike poles of magnets

34. Which property of waves affects the loudness of sound?
A Frequency
B Pitch
C Amplitude
D Wavelength

35. When a vibrating object reaches resonance;
A its amplitude is minimum
B its amplitude is maximum
C its frequency is minimum
D its frequency is maximum

36. Which of the graphs in figure 6 is correct for $sin\ i$ (Y) plotted against $sin\ r$ (X) for light moving from air into a rectangular glass block ?



A. B. C. D.

Figure 6

37. Two forces of magnitudes 3N and 4N are acting on a body. The maximum resultant force that can be obtained is:
A 1 N
B 5 N
C 7 N
D 12 N

38. The phenomenon of a wave which leads to the production of echo is called:
A refraction
B diffraction
C reflection
D polarization

39 A transformer which has a laminated soft iron core is more efficient because:
A less energy is wasted reversing the magnetic domains
B less heat is produced in the core
C more heat is produced in the core
D fewer magnetic field lines link the primary and secondary coils

40. The region round a magnet where an object experiences a force is known as:
A magnetic field
B magnetic flux
C magnetic axes
D magnetic meridian

41. Heat from the sun reaches the earth through the process of:
A Conduction
B Convection
C Evaporation
D Radiation

42. Figure 7 is the velocity-time graph of a moving body. The distance covered during the first 10 s is

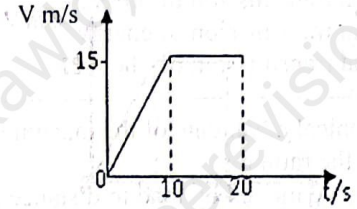


Figure 7

A 75 m
B 150 m
C 300 m
D 375 m

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 – 46
Figure 8 shows a hydraulic jack system which may be used to lift a car.

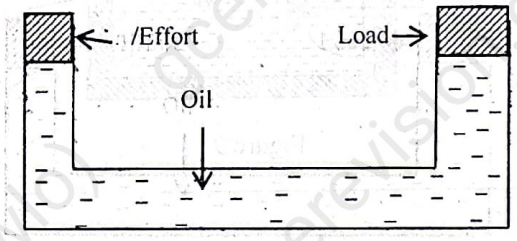


Figure 8

43. The hydraulic jack system is:
A an energy multiplier
B a force multiplier
C a pressure multiplier
D a volume multiplier

44. Why is oil preferred to water in the jack system?
A water is a transparent liquid
B oil evaporates less than water
C water is easily compressible
D oil has less bubbles of air than water

45. The principle on which the above system functions is based on:
A equal transmission of force
B equal transmission of pressure
C equal transmission of energy
D equal transmission of the oil

46. The mechanical advantage of the machine is defined as the ratio of:
A distance moved by load to distance moved by effort
B distance moved by effort to distance moved by load
C load to effort
D effort to load

Questions 47 – 50
The setup in figure 9 is an apparatus used to measure the specific heat capacity of a liquid

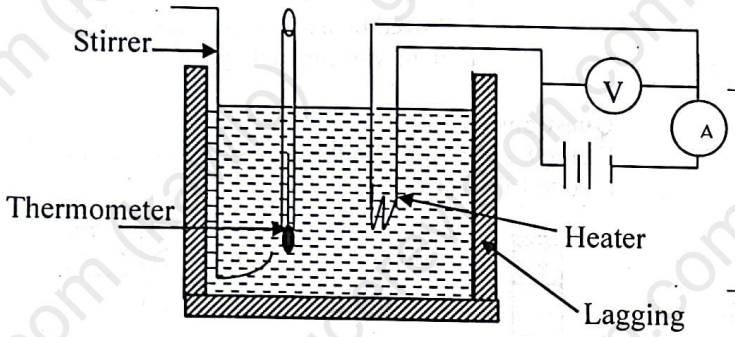


Figure 9

47. The calorimeter is lagged in order to:
A ensure good electrical conduction
B ensure even distribution of heat
C prevent heat loss to the surroundings
D prevent evaporation of the liquid

48 The thermometer is used to:
A measure temperature of liquid before heating
B measure temperature of liquid before and after heating
C ensure even distribution of heat in the liquid
D maintain a constant temperature

49 The specific heat capacity of the liquid can be calculated using the formula:
A $c = IVt/m\Delta\theta$
B $c = IVt - m\Delta\theta$
C $c = IVt + m\Delta\theta$
D $c = m\Delta\theta/ IVt$

50. The stirrer is used to ensure that:
A the cold liquid from the bottom rises
B the liquid cools faster
C the liquid evaporates evenly
D the heat is evenly distributed

STOP
GO BACK AND CHECK YOUR WORK