EXAMINATIONS COUNCIL OF ZAMBIA

Joint Examination for the School Certificate
and General Certificate of Education Ordinary Level

PHYSICS   5054/1

PAPER 1 Multiple Choice

Wednesday   15 OCTOBER 2014

Additional materials:
- Multiple choice Answer card
- Soft clean eraser
- Soft pencil (type B or HB is recommended)
- Electronic calculators (non programmable) or mathematical tables

Time: 1 hour

INSTRUCTIONS TO CANDIDATES

Do not open this question paper until you are told to do so.

Write your **name**, **centre number** and **candidate number** on the answer sheet in the spaces provided unless this has already been done for you.

There are **forty (40)** questions in 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 Answer Card provided.

INFORMATION FOR CANDIDATES

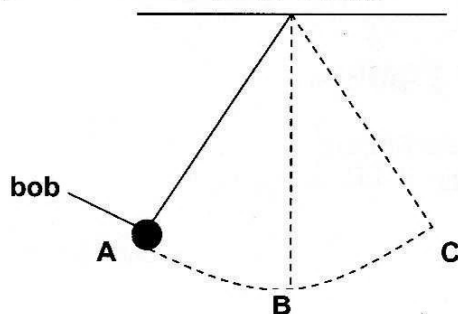Each correct answer will score one mark. A mark will not be deducted for a wrong answer.

Any rough work should be done in this question paper.

Cell phones are not allowed in the examination room.

This question paper consists of 12 printed pages.

1   The diagram shows a simple pendulum.

Given that the period of the pendulum is 1.6s, find the time the bob takes to move from point **A** to **B**.

A   1.6s
B   1.2s
C   0.8s
D   0.4s

2   What is the volume of 900g of a substance whose density is $15g/cm^3$?

A $1.5cm^3$
B $6.0cm^3$
C $60cm^3$
D $13\ 500cm^3$

3   A person of weight 600N at the bottom of a mountain climbs to the top. The gravitational field strength changes from 10.0N/kg at the bottom to 9.97N/kg at the top. His mass is unchanged a he climbs. What are his mass and weight at the top of the mountain?

	Mass at the top of the mountain Kg	Weight at the top of the mountain N
A	60.0	598
B	60.0	600
C	60.1	598
D	60.1	600

4   A list of physical quantities is given below.
Weight, energy, force, mass, acceleration.
Which of these are vector quantities and which of them are scalar quantities?

|	Vector quantities	Scalar quantities
A	Mass, weight, energy	acceleration, force
B	Weight, force, acceleration	mass, energy
C	Energy, force, acceleration	mass, weight
D	Force, mass, acceleration	energy, weight

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5   A jet plane increases its speed from 20m/s to 40m/s at the rate of 5m/s^2. What distance does it cover as it accelerates?

    A   2m

    B   12m

    C   20m

    D   120m

6   By applying a force, **F**, a boy does some work, **W**, on a trolley. The trolley moves a distance 'd'. After sometime he applies a force **2F** on the same trolley and does the same amount of work as before. What distance (in terms of 'd') does the trolley cover this time?

    A   0.5d

    B   d

    C   2d

    D   4d

7   A force **F** imparts an acceleration of 2m/s^2 to a mass of 10kg. What is the magnitude of the force?

    A   2N

    B   5N

    C   8N

    D   20N

8   A man carries a uniform bar **AB** 4.00m long on his shoulder, as shown below. The weight of the bar is 20N.
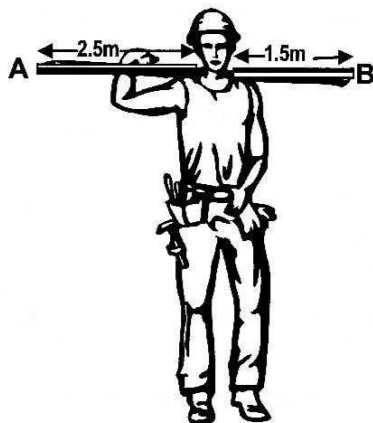
If the bar rests at a point 2.5m from end **A,** how far is this point from the centre of gravity of the bar?

    A   0.5m

    B   1.0m

    C   1.5m

    D   2.0m

[Turn over

**9** The diagram below shows a lorry of mass 4000kg as it moves up the hill with uniform speed.
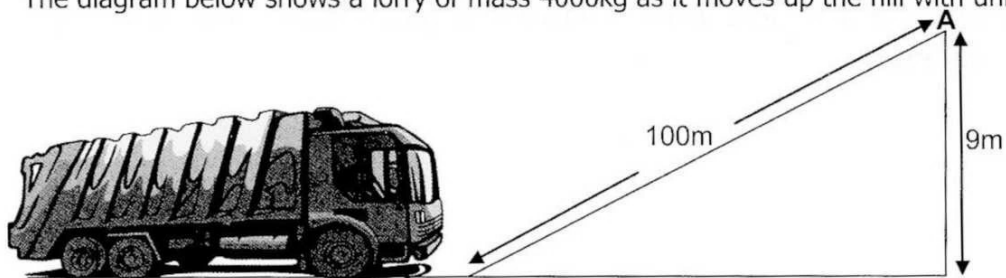
Ignoring friction and taking g = 10N/kg, how much work is done in moving the lorry up the hill at point **A**?

A 1.8×10^4 J

B 3.6×10^5 J

C 7.2×10^5 J

D 9.0×10^6 J

10 The diagram below shows a toy car of mass 1.5kg sliding from rest through a distance of 40m down a frictionless slope.
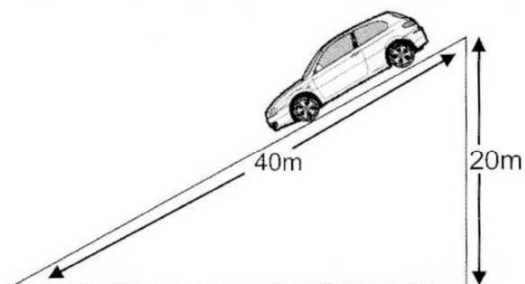
What is the kinetic energy of the toy car at the bottom of the slope?

A   50J

B   100J

C   200J

D   300J

11 The diagram below shows a pulley system.
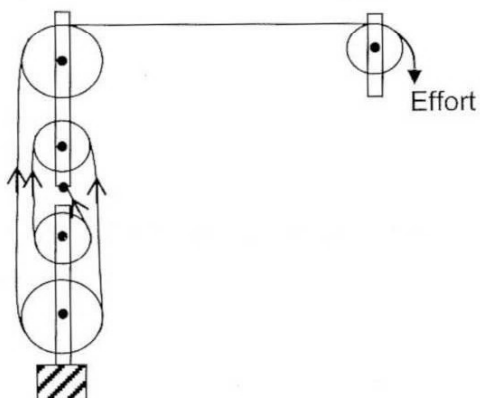
What is the velocity ratio of the pulley system?

A   9

B   5

C   4

D   1

12 Which of the instruments below is used to measure air pressure?

   A   Barometer

   B   Hydrometer

   C   Manometer

   D   Thermometer

13 In Brownian motion • • •

   A   air particles appear as bright points of light.

   B   smoke particles are seen moving in one direction.

   C   bright points of light move in any direction.

   **D**   molecules of smoke particles are seen moving randomly.

14 Which of the following thermometers has the largest operational temperature range?

   A   Thermocouple

   B   Thermistor

   C   Laboratory

   D   Clinical

15 It is difficult to fish during the months of June and July in Zambia because during this season, the surface of rivers are • • •

   A   cool and fish swims on the surface.

   B   cool and fish swims beneath the surface.

   C   warm and fish swims on the surface.

   D   warm and fish swims beneath the surface.

16 The diagram below shows a small cork fixed with wax to a metal plate. An electric heater is placed close to the plate. After some time, the wax melts and the cork drops off.
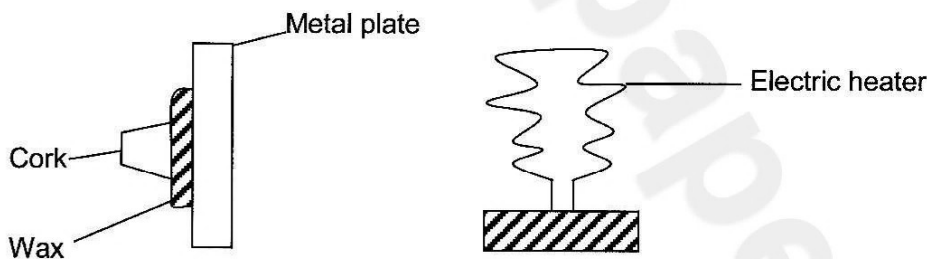
The heat from the heater reaches the wax by • • •

   A   conduction and evaporation.

   B   conduction and convection.

   C   radiation and conduction.

   D   radiation and convection.

**17** When 6g of ice changes to water • • •

   A   latent heat is absorbed by the ice.

   B   latent heat is lost by the ice.

   C   the mass of water formed is less than 6g.

   D   the mass of water formed is more than 6g.

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[Turn over

18 Since the refractive index of water is $\frac{4}{3}$, a pool of water appears shallower by • • •

A $\frac{1}{4}$ of its apparent depth.

B $\frac{1}{4}$ of its real depth.

C $\frac{4}{3}$ of its apparent depth.

D $\frac{4}{3}$ of its real depth.

19 The diagram below shows a side view of plane water waves travelling in a glass-walled tank. The waves are produced by a horizontal metal strip vibrating on the left of **A**.
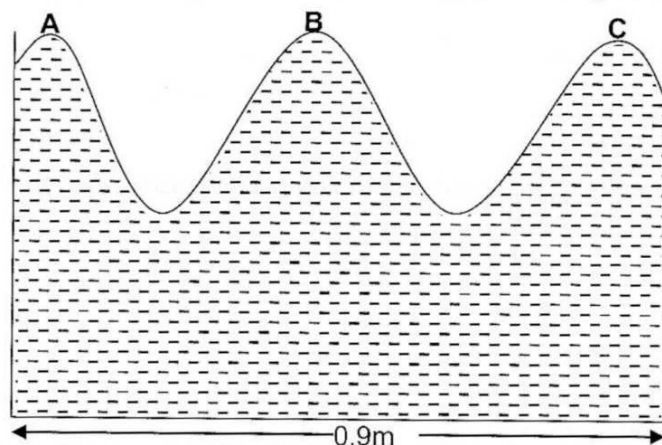
If the crest at **A** takes 1.5 seconds to reach **C**, what is the frequency of the waves?

A   0.3Hz
B   1.3Hz
C   2.7Hz
D   6.0Hz

20 White light is made to pass through a triangular glass prism as shown below.
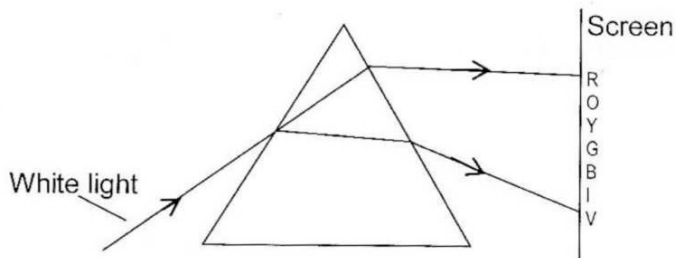
Which of the following has the greatest wavelength?

A   Violet
B   Orange
C   Red
D   Blue

21 The diagram below shows a series of compressions and rarefactions that form a sound wave.
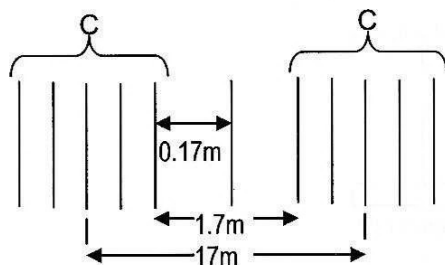
If the speed of the sound wave is 340m/s, the frequency is • • •

A   0.34Hz

B   3.4Hz

C   20Hz

D   340Hz

22 Which of the following determines the quality of sound?

A   Fundamental frequency

B   Harmonics

C   Pitch

D   Intensity

23 A bar magnet that is free to move is placed in a magnetic field as shown in the diagram below.
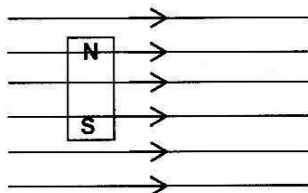

How will the magnet behave? It will • • •

A   move to the left.

B   move to the right.

C   turn clockwise.

D   not move.

24 Which of the following does **not** increase the strength of an electromagnet?

A   More current

B   More turns

C   Iron core

D   Shorter coil

25 A plastic pen when rubbed in the hair on your head, is found to attract small pieces of paper. The conclusion that can be made is that the • • •

A   pen is a magnet.

B   pen is electrically charged.

C   paper pieces are magnetised.

D   paper is a good conductor of electricity.

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[Turn over

26 A negatively charged polythene rod is brought near a positively charged Perspex rod as shown below.
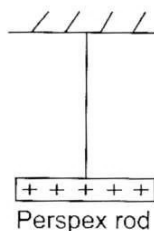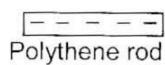

What will happen to the Perspex rod? It will • • •

A remain stationary.

B move up and down.

C be attracted by the polythene rod.

D be repelled by the polythene rod.

27 A 12V battery is connected to three resistors as shown below.
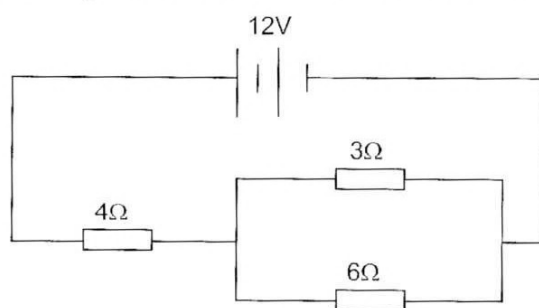
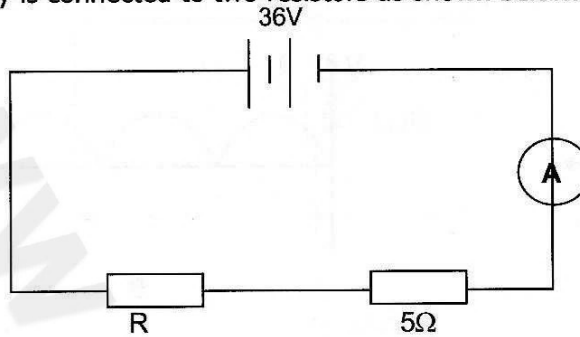What is the charge passing through the battery in three seconds?

A 6C

B 9C

C 12C

D 18C

28 A 48V battery is connected to three resistors **X**, **Y** and **Z** as shown in the diagram below.
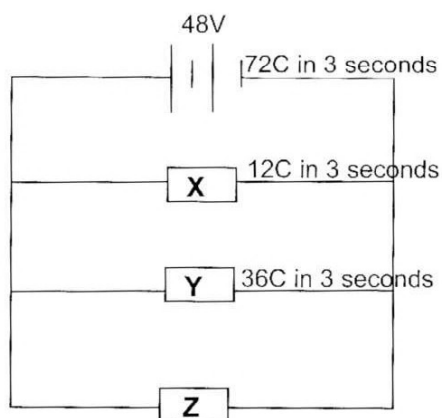
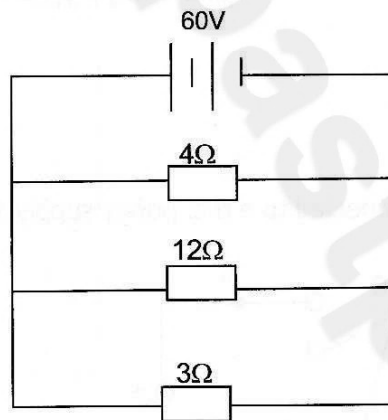The charge passing through **Z** in 3 seconds is • • •

A 18C.

B 24C.

C 30C.

D 48C.

29 A 36V battery is connected to two resistors as shown below.

The ammeter reads 6A. What is the value of resistance **R**?

A 0.5Ω

B 1Ω

C 2Ω

D 3Ω

30 Three resistors connected in parallel are connected to a 60V battery as shown below.

If the current passing through the battery is 40A, what is the effective resistance of the 4Ω, 12Ω and 3Ω resistors in parallel?

A 1.0Ω

B 1.2Ω

C 1.5Ω

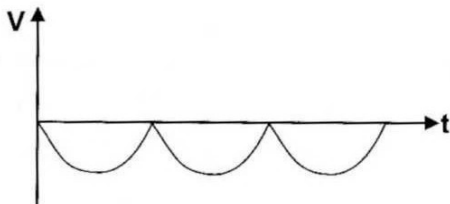D 2.0Ω

[Turn over

31 Which graph represents the variation of the current induced in an a.c. generator?
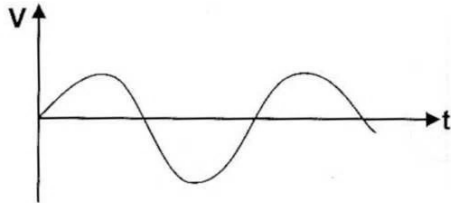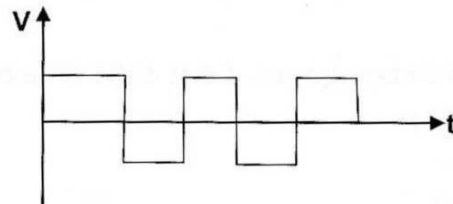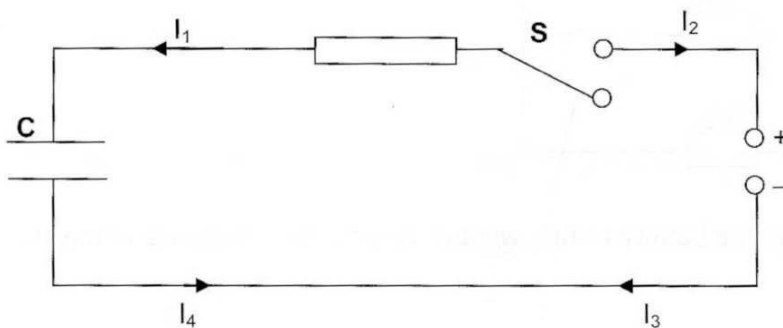

A
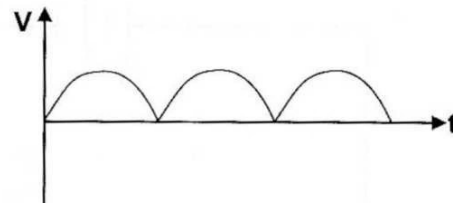
B

C

D

32 The output voltage of a step down transformer is 12V. The input voltage and current are 240V and 2A respectively. The secondary coil has 60 turns. How many turns are in the primary coil?

A 20
B 24
C 120
D 1200

33 A capacitor **C** starts to charge when it is connected to a d.c. power supply as shown below.

Which current flows to charge the capacitor when the switch **S** is closed?

A I_1 and I_3
B I_1 and I_4
C I_2 and I_4
D I_2 and I_3

34 In a cathode ray oscilloscope (CRO), what does the deflection system consist of?

A Y-plates only
B X-plates only
C X-plates and Y-plates
D Cathode, grid and anodes

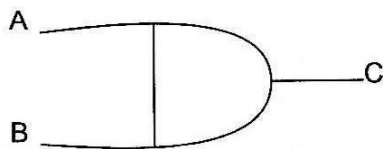35 A potential divider consists of an LDR and a resistor connected to a 6V battery.
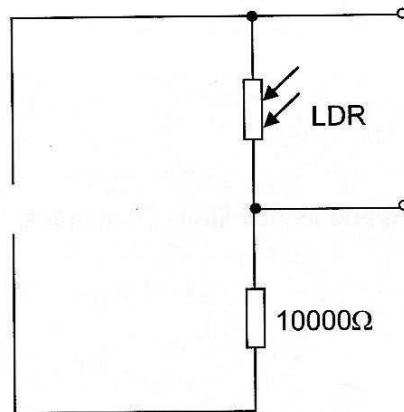
What should be the resistance of the LDR for the output to be 3V?

A   0Ω

B   Between 0 and 10 000Ω

C   10 000Ω

D   More than 10 000Ω

36 The table below shows a truth table.

A	B	C
0	0	0
0	1	0
1	0	0
1	1	1

Which of the following gates would produce such a truth table?

A

B

C

D

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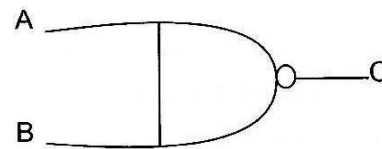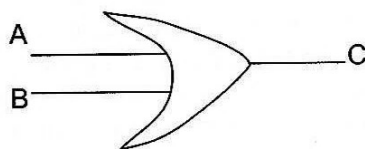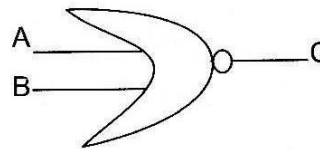
37 Which component below is NOT a main component of a computer?

    A   Central Processing Unit

    B   Keyboard

    C   Monitor

    D   Mouse

38 A radioactive substance has a mass of 4.8kg and its half life is 20 minutes. What mass remains undecayed after one hour?

    A   1200g

    B   800g

    C   600g

    D   300g

39 The result of the α-particle scattering experiment gave evidence for which of the following • • •

    A   nuclear fusion.

    B   radioactive decay.

    C   the existence of isotopes.

    D   the nuclear atom.

40 A nucleus is represented by $^{230}_{91}Z$. It emits one alpha-particle and then one beta-particle. What is the resulting nucleus X?

    A $^{230}_{88}X$

    B $^{226}_{89}X$

    C $^{226}_{90}X$

    D $^{230}_{89}X$

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