ZIMBABWE SCHOOL EXAMINATIONS COUNCIL

General Certificate of Education Advanced Level

PHYSICS 9188/1

PAPER 1 Multiple Choice

JUNE 2011 SESSION 1 hour

Additional materials:
Electronic calculator and/or Mathematical tables
Multiple Choice answer sheet
Soft clean eraser
Soft pencil (Type B or HB is recommended)

TIME 1 hour

INSTRUCTIONS TO CANDIDATES

Do not open this booklet 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** 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 separate answer sheet.

Read very carefully the instructions on the answer sheet.

INFORMATION FOR CANDIDATES

Each correct answer will score one mark. A mark will not be deducted for a wrong answer. Any rough working should be done in this booklet.

This question paper consists of 14 printed pages and 2 blank pages.

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1 What is a farad in base units?

A $A^2s^4kg^{-1}m^{-2}$
B $A^{-2}s^{-4}kgm^2$
C $A^{-2}s^4kgm^{-2}$
D $A^2s^{-4}kg^{-1}m^2$

2 The percentage error introduced by taking 1 year to be $\pi \times 10^7$s is

A 0.29.
B 0.38.
C 0.45.
D 0.60.

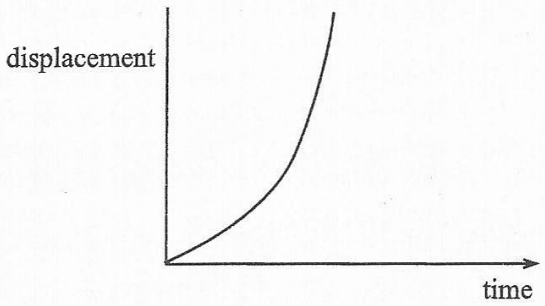
3 Which experimental results are precise but **not** accurate for the determination of the acceleration of free fall in ms^{-2}?

A 8.10; 8.02; 8.07
B 8.90; 8.99; 9.81
C 9.45; 9.81; 9.79
D 9.80; 9.79; 9.81

4 The magnitude of the velocity of a moving body is equal to the

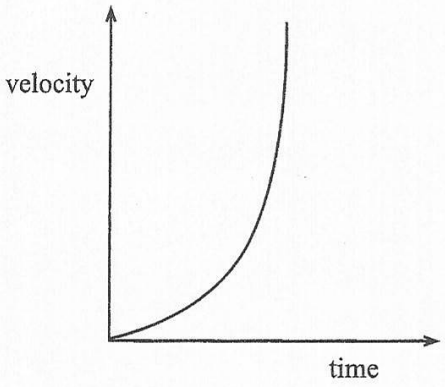
A gradient of a displacement-time graph.
B gradient of a speed-time graph.
C area under a displacement-time graph.
D area under a speed-time graph.

5 The diagram shows the displacement-time graph for a moving body.

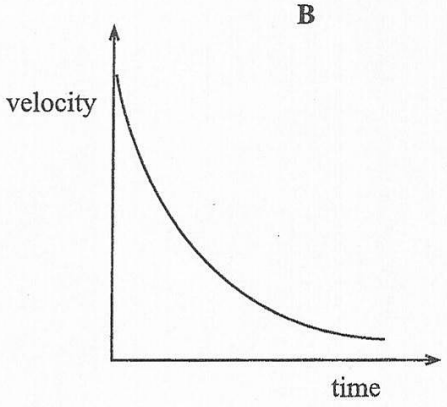


Which diagram could represent the velocity-time graph of the body?

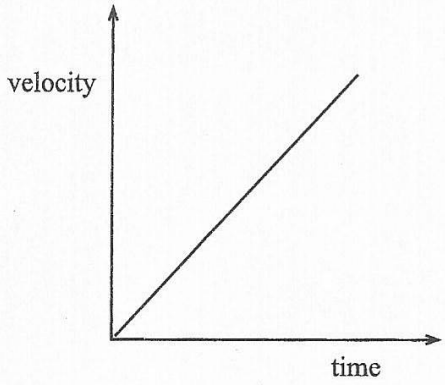
A



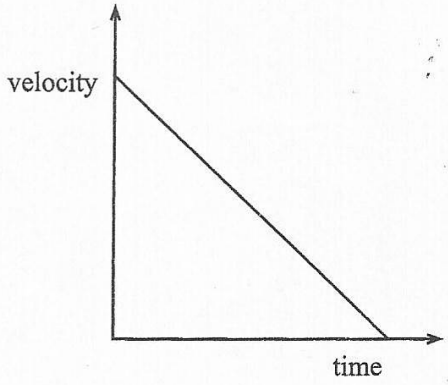
B



C



D



6 Two bodies were involved in an inelastic collision.

Which quantity is **not** conserved?

A kinetic energy
B mass
C momentum
D total energy

7 Why does an object immersed in a liquid experience an upthrust?

A The density of the object differs from that of the liquid.
B The density of the liquid increases with depth.
C The pressure in the liquid increases with depth.
D The value of g in the liquid increases with depth.

8 The resultant of two forces $2F$ and $3F$ can be

A less than $1F$.
B more than $5F$.
C perpendicular to $2F$.
D perpendicular to $3F$.

9 The speed of a car is increased by a factor of 4. What factor does its kinetic energy increase by?

A 2
B 4
C 8
D 16

10 A car has tyres of diameter 0.6 m. What is the angular speed of a point on the tyre tread when the car is travelling at 20 ms^{-1}?

A 66.7 $rads^{-1}$
B 33.3 $rads^{-1}$
C 12.0 $rads^{-1}$
D 20.0 $rads^{-1}$

11 A satellite weighs 100 N on the Earth's surface. Given that the radius of the Earth is R, at what distance from the Earth's surface would the weight of the satellite be 25 N?

A $\frac{R}{2}$
B R
C $2R$
D $4R$

12 Which fact is **not** true for geostationary satellites?

A They are used for surveillance in times of war.
B Their periods of oscillation around the Earth is 8.64×10^4s.
C Their angular frequency is always 7.28×10^{-4} rads^{-1}.
D They always rotate in a direction East to West like the Earth.

13 A 0.05 kg mass executing simple harmonic motion with an amplitude of 12 mm experiences a maximum force of 20 N.

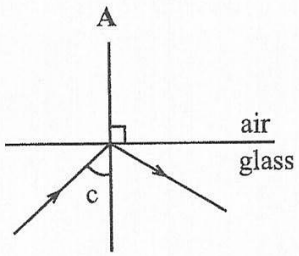
What is its period?

A 1.2 s
B 1.1 s
C 3.4×10^{-2} s
D 1.2×10^{-2} s

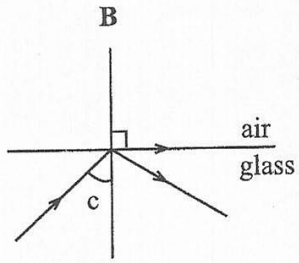
14 A ray of sunlight is incident on a glass-air boundary with a critical angle c.

Which ray diagram is correct?

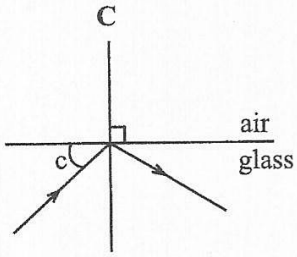
A



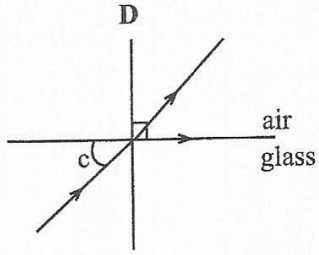
B



C



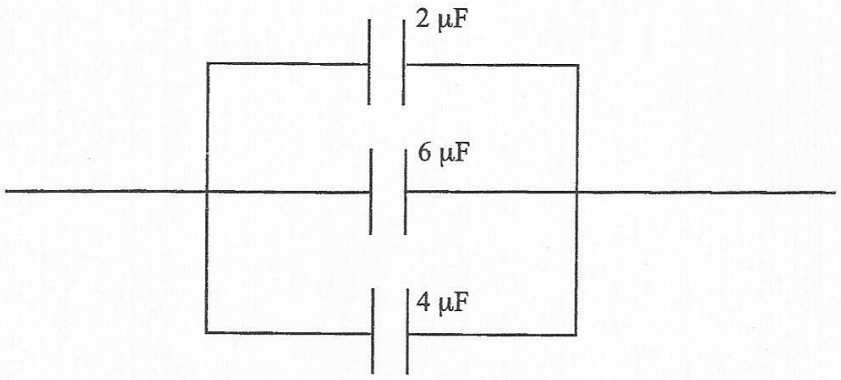
D



15 Waves are plane polarised if they are

A ultrasonic waves from a dipole aerial.
B electromagnetic waves from a dipole aerial.
C compression waves caused by an earthquake.
D infra-red radiation from a hot electric iron.

22 The diagram shows an arrangement of capacitors.

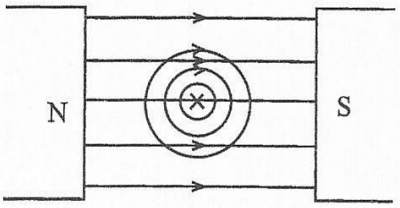


The effective capacitance is

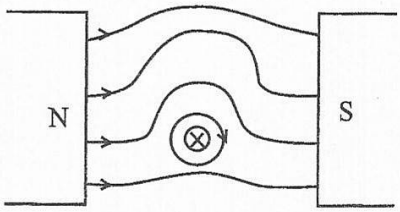
A 0.1 μF.
B 0.9 μF.
C 1.1 μF.
D 12.0 μF.

23 Which diagram correctly shows the field pattern for a vertical conductor carrying a current into the plane of the paper when it is placed between the poles of a magnet?

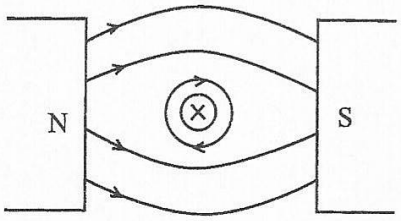
A



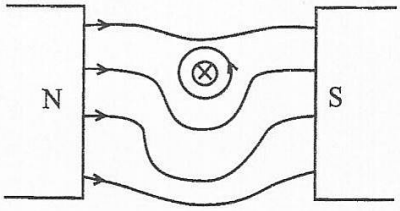
B



C



D

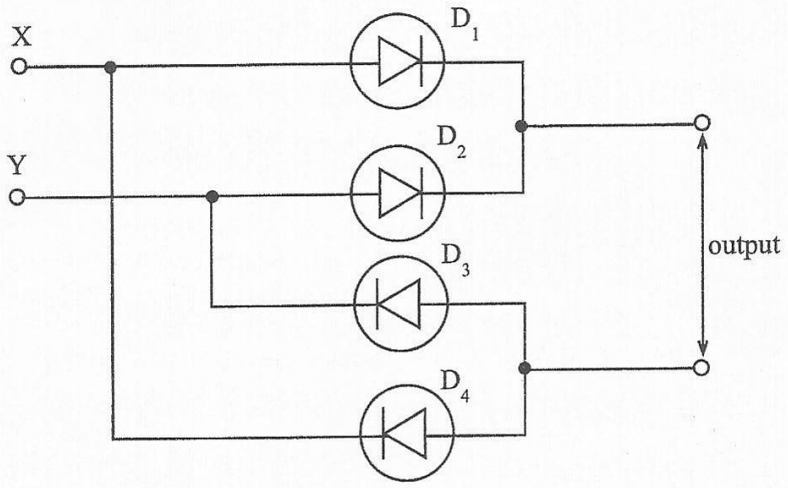


24 An alternating current, I, is represented by the equation, $I = 2.5 \sin(100\pi t)$ where t is the time in seconds.

What is the r.m.s. value of the current when $t = 3$ s?

A 1.2 A
B 1.8 A
C 2.5 A
D 3.5 A

25 In the circuit below four diodes D_1, D_2, D_3 and D_4 are connected to form a rectifier bridge.



Which diodes do not conduct when input terminal X is positive with respect to input terminal Y?

A D_1 and D_3
B D_2 and D_4
C D_1 and D_4
D D_2 and D_3

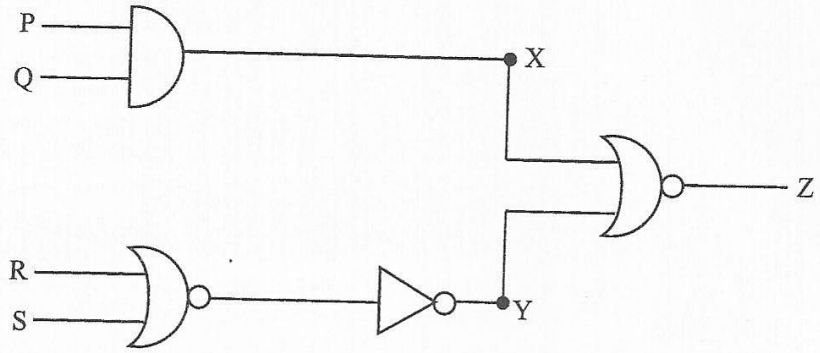
26 Which component is the odd one out?

A LED
B LDR
C thermistor
D strain gauge

27 Which statement, about a voltage follower, is false?

A There is 100% feedback.
B It has a gain of 1 always.
C It can be used as a buffer between high and low currents.
D It has very low output impedence.

28 The diagram shows a combination of logic gates.



What are the conditions of X, Y and Z if P and Q are low, R and S are high?

	X	Y	Z
A	1	0	0
B	1	1	1
C	0	1	0
D	0	0	1

29 In a Brownian motion experiment, dust particles suspended in water were seen to be moving randomly.

This random motion is due to

A random convectional currents in water.
B evaporation of water near dust particles.
C gravitational forces acting on the dust particles.
D water molecules hitting the dust particles randomly.

30 Which of the following materials is polymeric?

A copper
B glass
C rubber
D wood

31 Which values are exact by definition on the Celcius scale?

A the melting point (0°C) and triple point (273.16 K) of water
B the boiling point (100°C) of water and the absolute zero
C the absolute zero and triple point (273.16 K) of water
D the melting point (0°C) and boiling point (100°C) of water

32 A piece of metal of mass x kg, specific heat capacity, c at 333 K is placed on a large mass of y kg of ice at 273 K. If l is the specific latent heat of fusion, then the mass of ice melted by the metal is

A $\frac{cx}{60l}$.

B $\frac{60xc}{l}$.

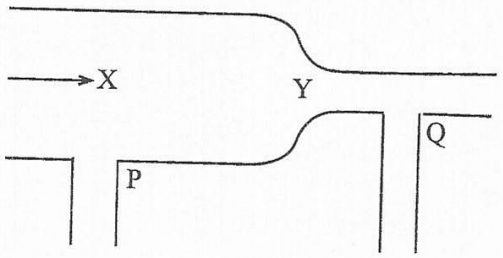
C $\frac{yl}{60cx}$.

D $\frac{60cx}{y}$.

33 The specific latent heat of fusion is the quantity of energy required to change

A unit mass of a substance from solid to liquid state.
B a substance from gas to liquid state.
C the temperature of unit mass by 1 K.
D the temperature of an object by 1 K.

34 A steady flow of oil passes along a horizontal tube from a wide section X to a narrower section Y (see diagram). Manometers are placed at P and Q.



Which statement is most correct?

A Oil velocity at X is greater than at Y.
B Kinetic energy per m^3 of oil at X equals that at Y.
C Volume flow rate at X is greater than that at Y.
D Manometer at P shows greater pressure than that at Q.

35 A photon of infra red radiation has the order

A 10^{-24} J.
B 10^{-23} J.
C 10^{-20} J.
D 10^{-6} J.

36 The eye can detect light when it absorbs energy at a rate of 10^{-17} W.

How many photons were absorbed per second, when the eye detected U-V light of wavelength 6×10^{-8} m?

A 1.3×10^{-32}
B 3.3×10^{-1}
C 3.0×10^{0}
D 7.6×10^{31}

37 A U-V light source can cause emission of photoelectrons from a zinc plate.

What is the effect of increasing the intensity of the source?

	Maximum energy/electron	**No of electrons/second**
A	the same	more
B	the same	the same
C	more	more
D	more	the same

38 A nuclide ${}^{A}_{Z}\mathrm{M}$ decays as follows:

$$ {}^{A}_{Z}\mathrm{M} \xrightarrow{\alpha} \mathrm{N} \xrightarrow{\beta} \mathrm{O} \xrightarrow{\gamma} \mathrm{P} $$

What is the atomic number of P?

A $A-1$
B $A-2$
C $Z-1$
D $Z-2$

39 A piece of a radioactive element has initially 8×10^{24} atoms. The half-life is 48 hours. After 16 days the number of atoms in the specimen is approximately

A 3.1×10^{22}.
B 1.0×10^{22}.
C 2.0×10^{24}.
D 6.3×10^{24}.

40 How many α and β decays are there in the reaction ${}^{238}_{92}\mathrm{U} \rightarrow {}^{206}_{82}\mathrm{Pb}$?

	α	**β**
A	4	6
B	8	3
C	8	6
D	4	3