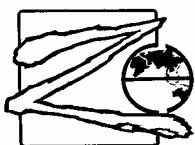


Candidate Name _____

Index Number

Class

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ZHENGHUA SECONDARY SCHOOL
Secondary 4 Express / 5 Normal (Academic)
Science (Physics/Chemistry)
Preliminary Examinations 2007

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Science(Physics/Chemistry)**5152/01**

Paper 1 : Multiple Choice Questions

Additional Materials: Multiple Choice Answer Sheet

1 hour

Soft clean eraser

Soft pencil (type B or HB is recommended)

READ THESE INSTRUCTIONS FIRST

Write in soft pencil.

Do not use staples, paper clips, highlighters, glue or correction fluid.

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

There are **forty** questions on 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 the instructions on the Answer Sheet very carefully.**

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.

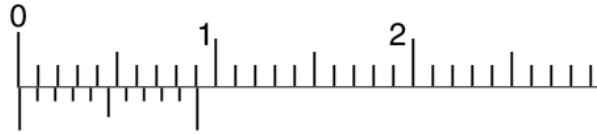
For Examiner's use	
Science (Physics)	/20
Science (Chemistry)	/20
Total	/40

 This paper consists of **14** printed pages including this cover page and the Periodic Table

[Turn over

Answer all the questions in the OMR provided.

- 1 A vernier caliper shows a reading below when its jaws are clamped together.

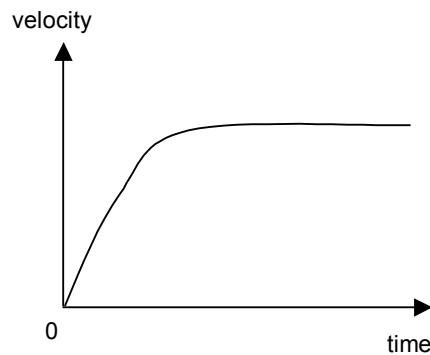


John used the same vernier caliper to measure the diameter of a metal ball and the reading is as shown below.



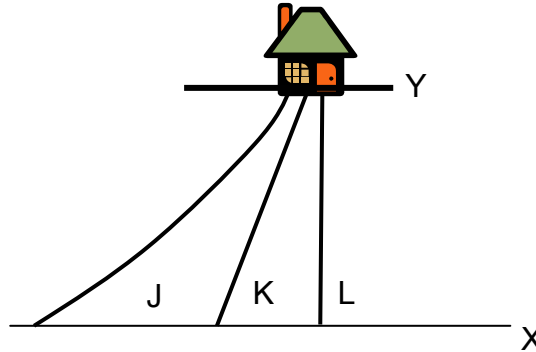
What is the corrected reading of the metal ball?

- A 0.82 cm
 - B 0.83 cm
 - C 0.84 cm
 - D 0.85 cm
- 2 The graph shows how the velocity of a ball-bearing changes with time after it has been dropped into a column of viscous oil. Which of the following can be deduced from the graph?



- A The ball-bearing decelerates until it stops.
- B The ball-bearing accelerates at a constant rate.
- C The ball-bearing first decelerates and then moves with a steady velocity
- D The ball-bearing first accelerates and then moves with a steady velocity

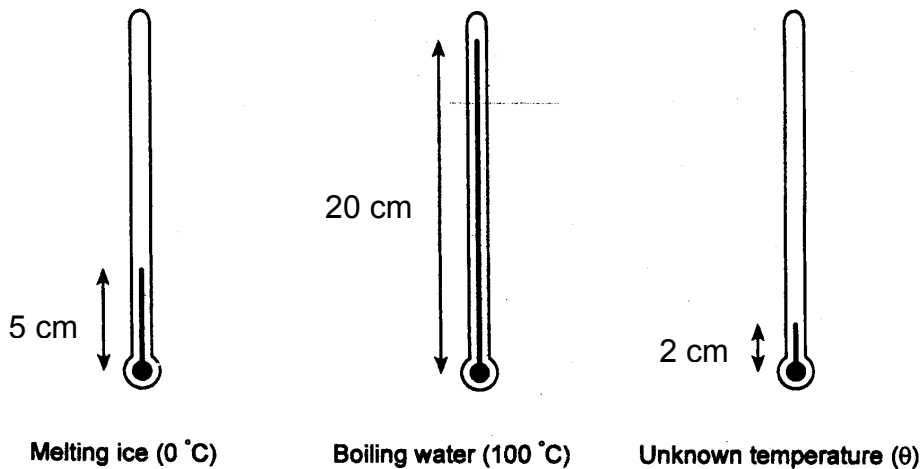
- 7 A man lives at a mountain top. He can walk from mountain foot X to his house Y along three paths labelled J, K and L. Which path requires the most amount of work?



- A Path J
B Path K
C Path L
D An equal amount of work is done along each path.
- 8 How is a laboratory thermometer made more sensitive?

	Capillary tube	Volume of mercury
A	Narrower	Smaller
B	Narrower	Larger
C	Wider	Smaller
D	Wider	Larger

- 9 An uncalibrated mercury-in-glass thermometer is placed in melting ice, boiling water and a liquid of unknown temperature θ consecutively. The length of the mercury column at each instance is indicated below.



What is the unknown temperature θ ?

- A -13.3 °C
B -20.0 °C
C 16.7 °C
D 20.0 °C

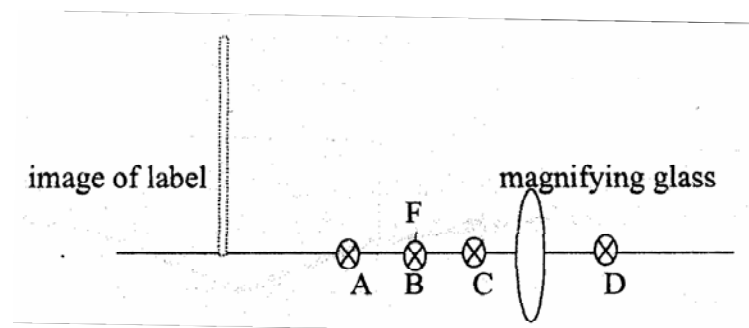
10 When you stand bare feet with one foot on a stone floor and the other on a carpet, the stone floor feels colder than the carpet. What is the likely explanation?

- A Air is unable to circulate through the carpet fibres.
- B More energy flows from the carpet to your foot than from the stone floor to your foot.
- C More energy flows from your foot to the stone floor than from your foot to the carpet.
- D The stone floor is at a lower temperature than the carpet.

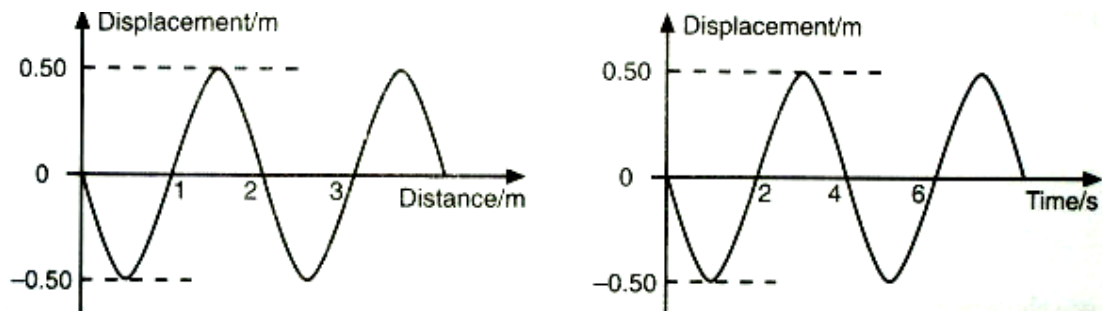
11 The table gives the melting points and boiling points of four elements. Which element is a liquid at 1200 °C?

	Element	Melting point / °C	Boiling point / °C
A	iron	1540	2750
B	chlorine	-101	-35
C	aluminium	660	2470
D	mercury	-39	357

12 An old man is using a magnifying glass to see the ingredients on a pizza label. F is the focal point of the lens. Where should the pizza label be placed?

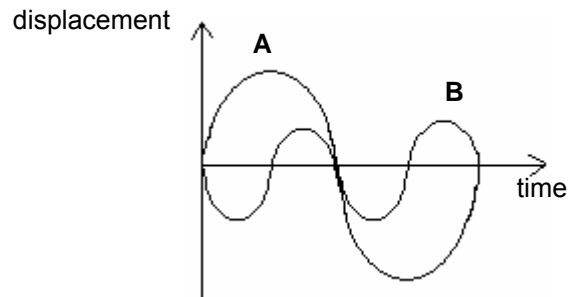


13 The two graphs below refer to the same wave. What is the speed of the wave?

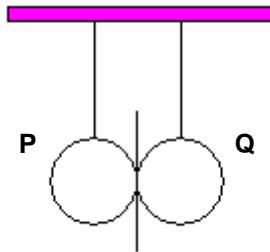


- A 0.125 m s^{-1}
- B 0.25 m s^{-1}
- C 0.5 m s^{-1}
- D 2.0 m s^{-1}

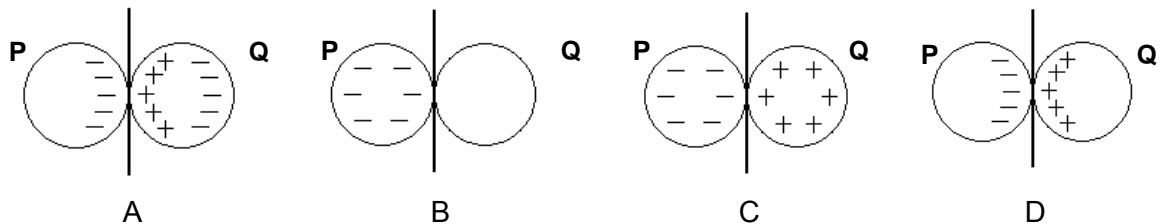
- 14 An electronic synthesizer produces two pure notes **A** and **B** as shown. Which of the following statement about **A** and **B** is wrong?



- A A is louder than B.
 B Frequency of B is higher than A.
 C B travels faster than A.
 D Both A and B have the same speed.
- 15 Two neutral conducting spheres, **P** and **Q**, are suspended by insulating threads from the ceiling as shown below. They are separated by a sheet of insulating material.



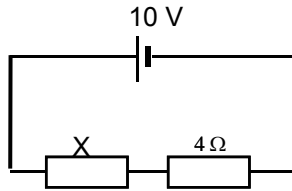
If P is touched by a negatively charged conducting rod, which diagrams shows the distribution of charges in the two spheres?



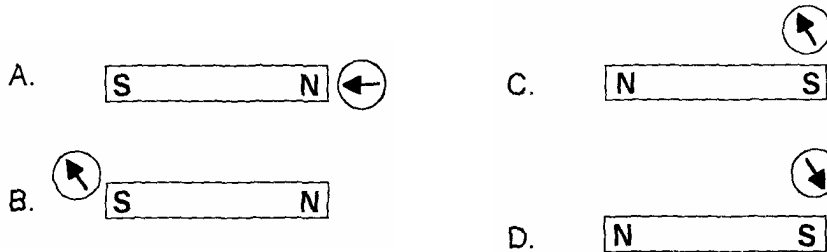
- 16 A dry cell of e.m.f 3.0 V has a wire connected to its terminals. If 12 C of charge passes through the circuit, what amount of chemical energy is transformed into electrical energy?

- A 0.25 J C 4.0 J
 B 3.6 J D 36.0 J

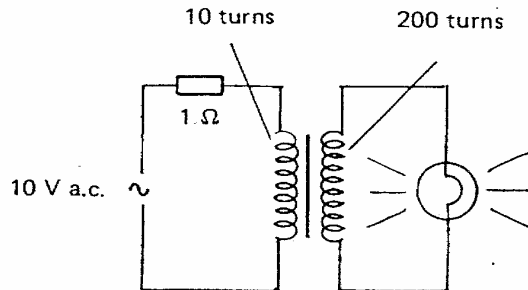
- 17 The current in the circuit below is 2 A. What is the value of the potential difference across the resistor X?



- A 1 V C 6 V
B 2 V D 9.75 V
- 18 Which diagram shows the correct position of the compass needle?



- 19 The diagram below shows an ideal transformer. What is the potential difference across the lamp in the secondary circuit?



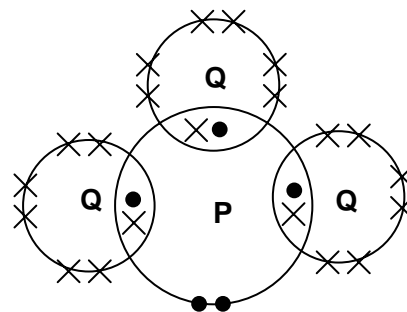
- A 0.40 V C 160 V
B 0.50 V D 200 V
- 20 The half-life of isotope X is four days and its initial mass is 32 mg. What mass of the isotope X has **decayed** after twelve days?
- A 4 mg C 12 mg
B 8 mg D 28 mg

- 21 How many protons, neutrons and electrons are there in ${}^{88}_{38}\text{Sr}^{2+}$?

	Protons	Electrons	Neutrons
A	38	38	50
B	38	36	88
C	36	38	88
D	38	36	50

- 22 The diagram shows the electron arrangement of the atoms in a molecule of PQ_3 . Which of these two elements might **P** and **Q** be?

	P	Q
A	phosphorus	fluorine
B	boron	fluorine
C	aluminium	chlorine
D	nitrogen	hydrogen



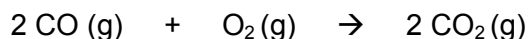
- 23 Element **D**, **E** and **G** have atoms with atomic numbers of 3, 8 and 17 respectively. The formulae of their hydrides formed are

	D	E	G
A	DH ₃	H ₆ E	H ₇ G
B	DH	HE ₂	HG ₇
C	DH	H ₂ E	HG
D	DH ₂	HE ₂	HG

- 24 3.725 g of potassium chloride was dissolved in 250 cm³ of water. Calculate the concentration in mol/dm³ of the potassium chloride solution.

- A 0.2 mol/dm³
 B 0.5 mol/dm³
 C 0.02 mol/dm³
 D 0.05 mol/dm³

- 25 A sample of 50 cm³ of carbon monoxide was burned in 50 cm³ of oxygen. What was the composition of the gas remaining after the reaction? (All measurements were made at the same temperature and pressure.)



- A 50 cm³ of carbon dioxide only
 B 50 cm³ of carbon dioxide and 25 cm³ of excess carbon monoxide
 C 50 cm³ of carbon dioxide and 25 cm³ of excess oxygen
 D 75 cm³ of carbon dioxide and 25 cm³ of excess oxygen

26 A gaseous hydrocarbon, C_2H_2 , was burnt in excess air. What is the ratio of the volume of products to the volume of reactants?

- A 1 : 2
- B 2 : 1
- C 7 : 6
- D 6 : 7

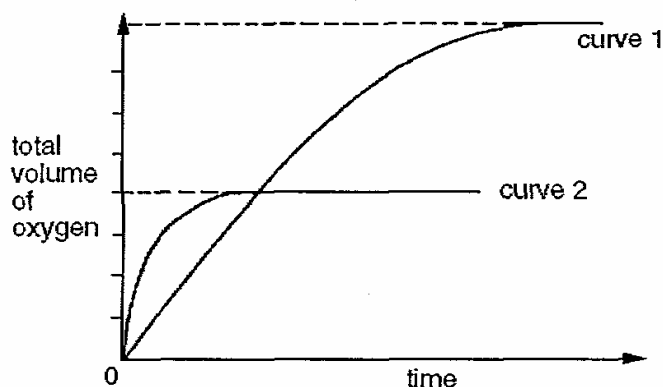
27 Hydrogen reacts with chlorine.



What can we deduce from the above information?

- A Heat is absorbed in the reaction.
- B More bonds are made than broken in the reaction.
- C More energy was absorbed in breaking the bonds than given out in making the bonds.
- D The temperature of the surrounding rises because heat is given off.

28 Manganese (IV) oxide catalyses the decomposition of aqueous hydrogen peroxide into water and oxygen. In order to follow the rates of this reaction for two different solutions of hydrogen peroxide, the total volumes of oxygen evolved were recorded at regular time intervals and the results were plotted. In each experiment, the same mass of catalyst was used and the temperature was the same.



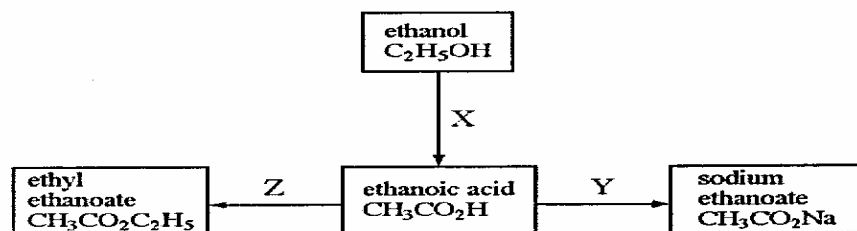
If **curve 1** corresponds to 20 cm^3 of a 4.0 mol/dm^3 solution, **curve 2** corresponds to _____

- A 5 cm^3 of a 8.0 mol/dm^3 solution.
- B 10 cm^3 of a 8.0 mol/dm^3 solution.
- C 10 cm^3 of a 4.0 mol/dm^3 solution.
- D 20 cm^3 of a 8.0 mol/dm^3 solution.

29 Zinc carbonate reacts with hydrochloric acid to form zinc chloride. Which of the following conditions gives the fastest rate of reaction?

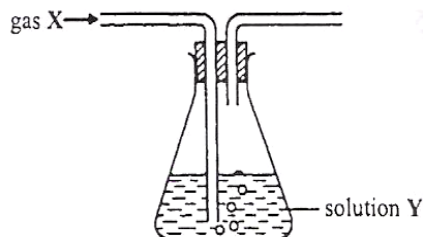
- A 0.1 mol of hydrochloric acid and lumps of zinc carbonate
- B 0.1 mol of hydrochloric acid and powdered zinc carbonate
- C 0.2 mol of hydrochloric acid and lumps of zinc carbonate
- D 0.2 mol of hydrochloric acid and powdered zinc carbonate

30 Which reactions below are oxidation reactions?



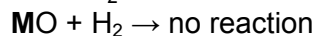
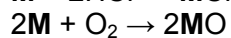
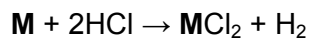
- A X only
- B X and Y
- C Y only
- D Y and Z

31 Gas X was bubbled through an aqueous solution Y. A change in colour was observed in solution Y. What could X and Y have been?



- | | Gas X | Solution Y |
|---|-------------------|---------------------------------------------|
| A | Ammonia | Hydrochloric acid |
| B | Ethane | Aqueous bromine |
| C | Hydrogen chloride | Red litmus solution |
| D | Sulphur dioxide | Acidified aqueous potassium dichromate (VI) |

37 Element **M** reacts in the following ways:



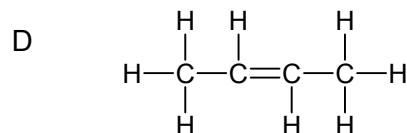
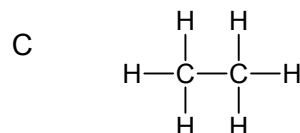
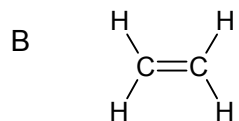
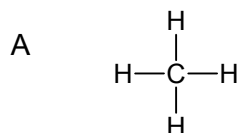
What could element **M** be?

- A Aluminium
- B Calcium
- C Copper
- D Potassium

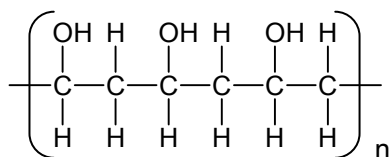
38 Which statement about the processes combustion and rusting is correct?

- A The processes increase the carbon dioxide content of the atmosphere.
- B The processes cause a decrease in the oxygen content of the atmosphere.
- C Nitrogen must be present for the processes to occur.
- D The mass of reactants is greater than that of the products.

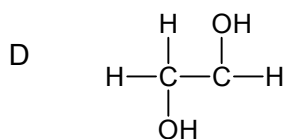
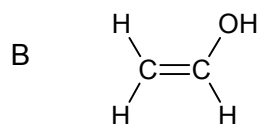
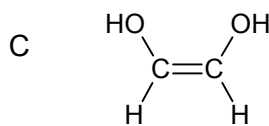
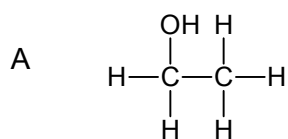
39 A hydrocarbon **X** (relative molecular $M_r = 56$) was found to decolourise aqueous bromine. Which one of the following full structural formulae could be **X**?



- 40 Polyethenol is a new plastic which is water soluble. This plastic is useful in hospitals for keeping soiled laundry in and thereby preventing infection. The dirty laundry is placed in the washing machine and the bag dissolves, letting the washing out. The structure of polyethenol is



What is the monomer unit for this addition polymer?



-- THE END --

DATA SHEET
The Periodic Table of the Elements

		Group																						
I	II	III	IV	V	VI	VII	0																	
1 H Hydrogen																								
3 Li Lithium	4 Be Beryllium							5 B Boron	6 C Carbon	7 N Nitrogen	8 O Oxygen	9 F Fluorine	10 Ne Neon											
11 Na Sodium	12 Mg Magnesium							13 Al Aluminium	14 Si Silicon	15 P Phosphorus	16 S Sulphur	17 Cl Chlorine	18 Ar Argon											
19 K Potassium	20 Ca Calcium							21 Sc Scandium	22 Ti Titanium	23 V Vanadium	24 Cr Chromium	25 Mn Manganese	26 Fe Iron	27 Co Cobalt	28 Ni Nickel	29 Cu Copper	30 Zn Zinc	31 Ga Gallium	32 Ge Germanium	33 As Arsenic	34 Se Selenium	35 Br Bromine	36 Kr Krypton	
37 Rb Rubidium	38 Sr Strontium							39 Y Yttrium	40 Zr Zirconium	41 Nb Niobium	42 Mo Molybdenum	43 Tc Technetium	44 Ru Ruthenium	45 Rh Rhodium	46 Pd Palladium	47 Ag Silver	48 Cd Cadmium	49 In Indium	50 Sn Tin	51 Sb Antimony	52 Te Tellurium	53 I Iodine	54 Xe Xenon	
55 Cs Caesium	56 Ba Barium							57 La Lanthanum	58 Ce Cerium	59 Pr Praseodymium	60 Nd Neodymium	61 Pm Promethium	62 Sm Samarium	63 Eu Europium	64 Gd Gadolinium	65 Tb Terbium	66 Dy Dysprosium	67 Ho Holmium	68 Er Erbium	69 Tm Thulium	70 Yb Ytterbium	71 Lu Lutetium		
87 Fr Francium	88 Ra Radium							89 Ac Actinium	90 Th Thorium	91 Pa Protactinium	92 U Uranium	93 Np Neptunium	94 Pu Plutonium	95 Am Americium	96 Cm Curium	97 Bk Berkelium	98 Cf Californium	99 Es Einsteinium	100 Fm Fermium	101 Md Mendelevium	102 No Nobelium	103 Lr Lawrencium		
									104 Rf Rutherfordium	105 Db Dubnium	106 Sg Seaborgium	107 Bh Bohrium	108 Hs Hassium	109 Mt Meitnerium	110 Ds Darmstadtium	111 Rg Roentgenium	112 Cn Copernicium	113 Nh Nihonium	114 Fl Flerovium	115 Mc Moscovium	116 Lv Livermorium	117 Ts Tennessine	118 Og Oganesson	

The volume of one mole of any gas is 24 dm³ at room temperature and pressure (r.t.p.).

*58-71 Lanthanoid series
†90-103 Actinoid series

Key

a	X
b	

a = relative atomic mass
X = atomic symbol
b = proton (atomic) number