

EXAMINATIONS COUNCIL OF ZAMBIA

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

SCIENCE

5124/1

(CHEMISTRY, PHYSICS)

PAPER 1 Multiple Choice

Monday

14 OCTOBER 2013

Additional materials:

Mathematical tables/Electronic calculator (non-programmable)

Multiple Choice Answer Sheet

Soft clean eraser

Soft pencil (types B or HB is recommended)

Time: 1 hour

INSTRUCTIONS TO CANDIDATES

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

Look at the left hand side of your answer sheet. Ensure that your name, the school/centre name and subject paper are **printed**. Also ensure that the subject code, paper number, centre code, your examination number and the year are **printed and shaded**. Do not change the already printed information.

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.

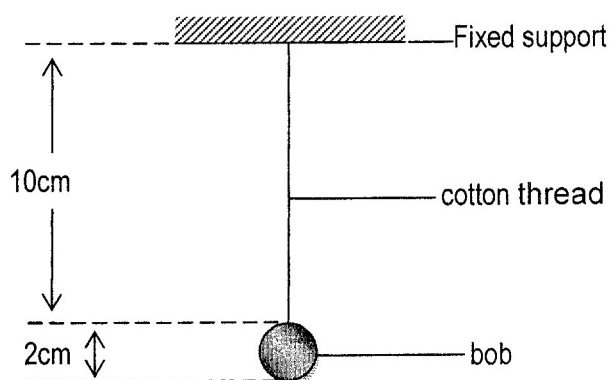
INFORMATION FOR CANDIDATES

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.

The **Periodic Table** is printed on page 13.

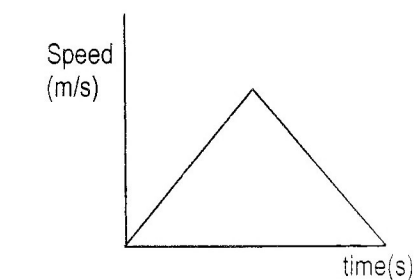
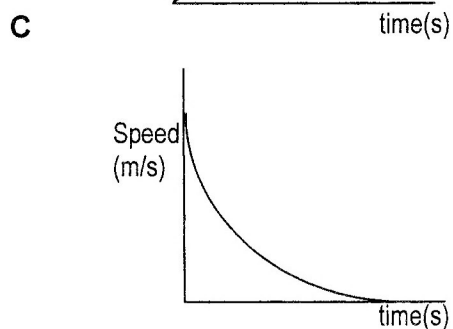
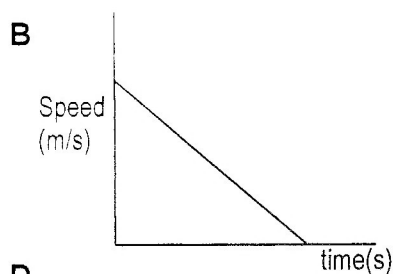
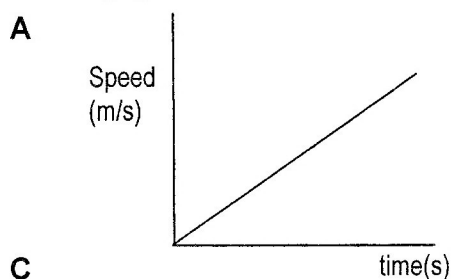
Cell phones are not allowed in the Examination Room-.

1 The diagram below represents a pendulum.



The length of the pendulum is ...

- A 2cm.
 - B 10cm.
 - C 11cm.
 - D 12cm.
- 2 Which of the following numbers has three significant figures?
- A 0.0003
 - B 0.0030
 - C 0.0300
 - D 0.3000
- 3 Which graph represents the motion of a body thrown vertically upwards into the air with negligible air resistance?



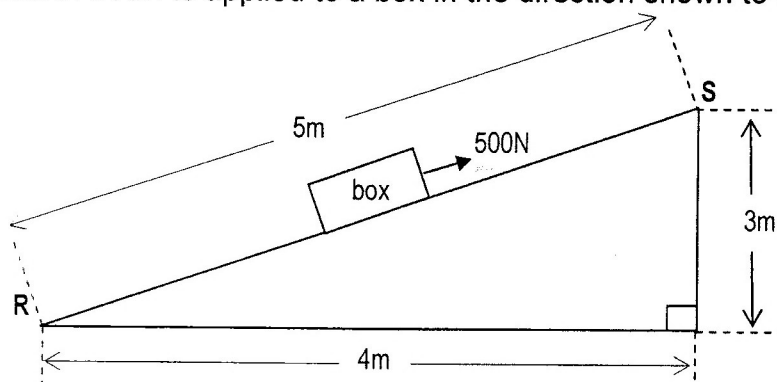
- 4 An Astronaut goes to the moon where the gravitational field strength is 1.6N/kg . What will be the changes, if any, in his mass and weight when he lands on the moon?

	Mass	Weight
A	Same on earth and moon	Less on moon
B	Less on moon	Same on earth and moon
C	Less on earth	Less on moon
D	More on earth	More on moon

- 5 A body has a mass of 2kg . It accelerates from 20m/s to 40m/s in 4 seconds. The resultant force is ...

- A 8N .
 B 10N .
 C 20N .
 D 30N .

- 6 A force of 500N is applied to a box in the direction shown to move it up an incline.



It takes 3 seconds to move this box from R to S. The useful power generated is ...

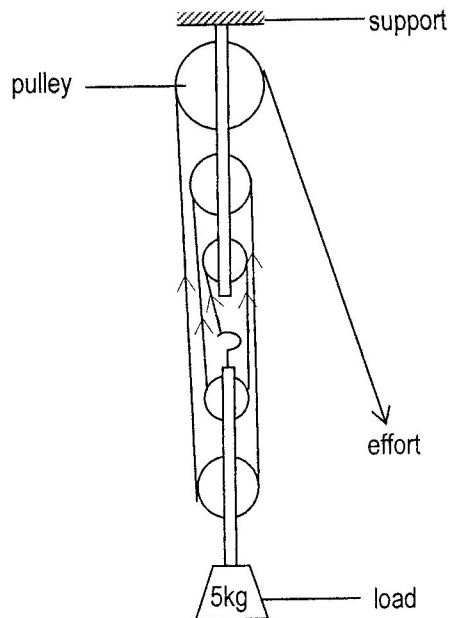
- A 500.0 W
 B 666.7 W
 C 833.3 W
 D 1500.0 W

- 7 Which of the following gives the states of matter in which molecules at a given temperature have the highest speed and the strongest cohesive force?

Highest speed Strongest force between them

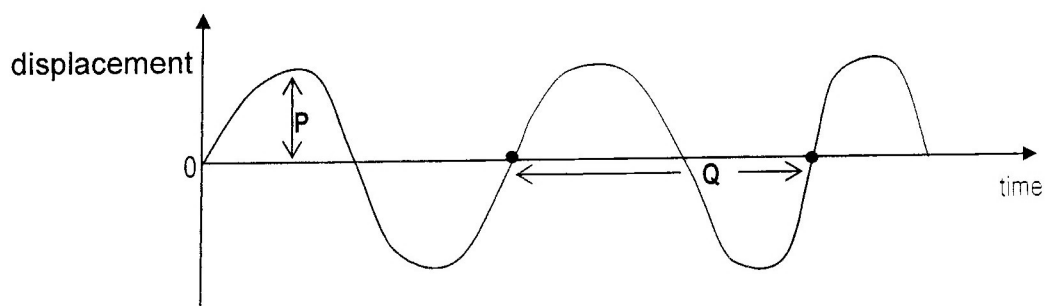
- | | | |
|---|-------|-------|
| A | gas | solid |
| B | gas | gas |
| C | solid | gas |
| D | solid | solid |

- 8 The figure below shows an ideal pulley system.



Assuming $g = 10\text{m/s}^2$, the minimum effort required to raise the load is ...

- A 1N.
 B 5N
 C 9N
 D 10N
- 9 Warm water which is left in a clay pot gradually cools. This is because ...
- A heat no longer reaches the water.
 B of evaporation of water from the pot.
 C there is no condensation.
 D of convection currents in water.
- 10 The figure below shows a graph of wave motion.



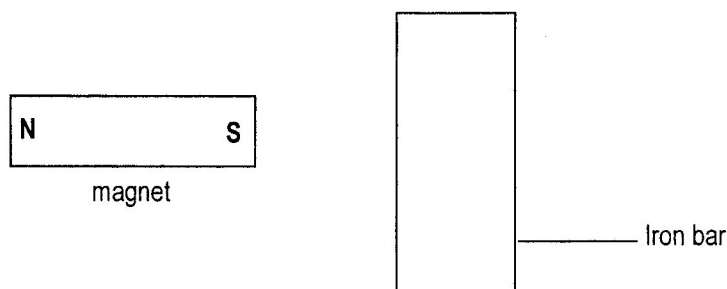
Which quantities are shown by distance **P** and **Q**?

- | | P | Q |
|---|--------------------|------------|
| A | Amplitude | Period |
| B | Half the amplitude | period |
| C | amplitude | wavelength |
| D | half the amplitude | wavelength |

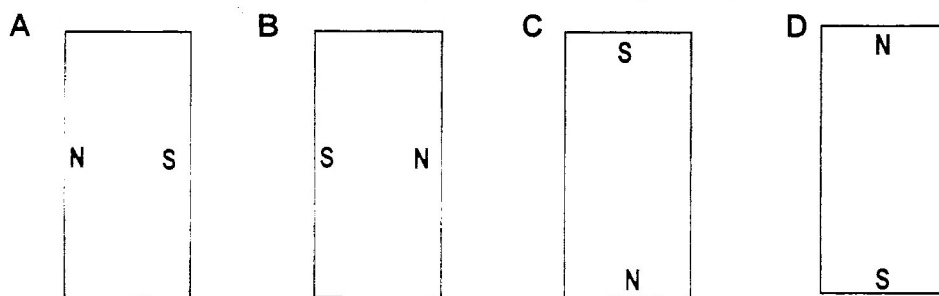
11 All of the following are properties of a radio wave **except** ...

- A it causes particles of a medium to vibrate perpendicular to its direction.
- B it travels with a speed approximately 3×10^8 m/s in air
- C It is undeflected by electric or magnetic fields.
- D It does not travel in a vacuum.

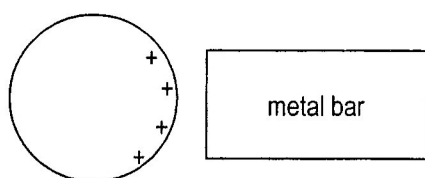
12 The diagram below shows a bar of iron placed near a magnet. Both the iron bar and the magnet remain undisturbed.



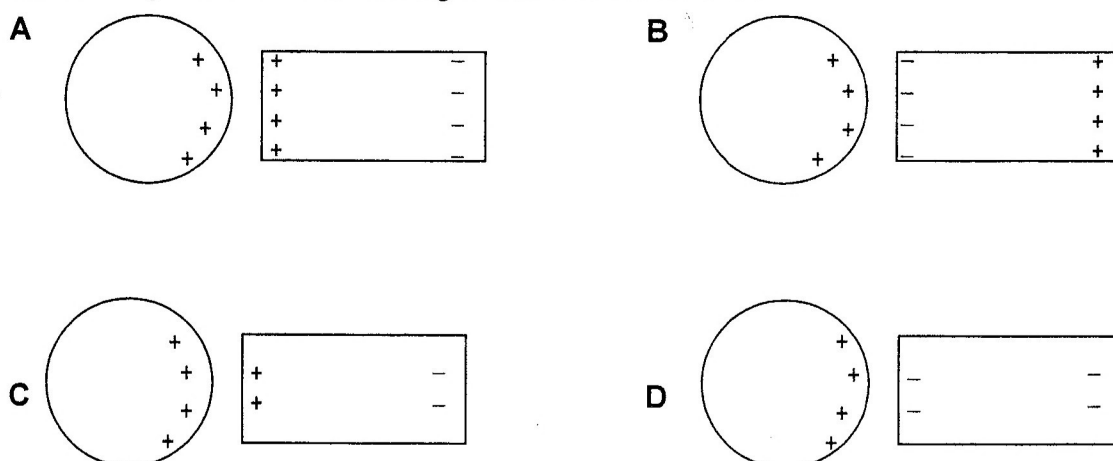
Which of the following correctly shows the magnetic poles on the Iron bar?



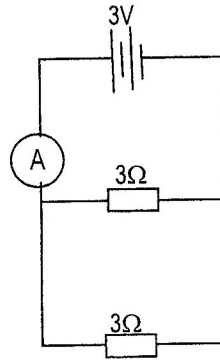
13 A positively charged sphere is moved close to an isolated metal bar.



Which diagram shows the charges induced on the bar?



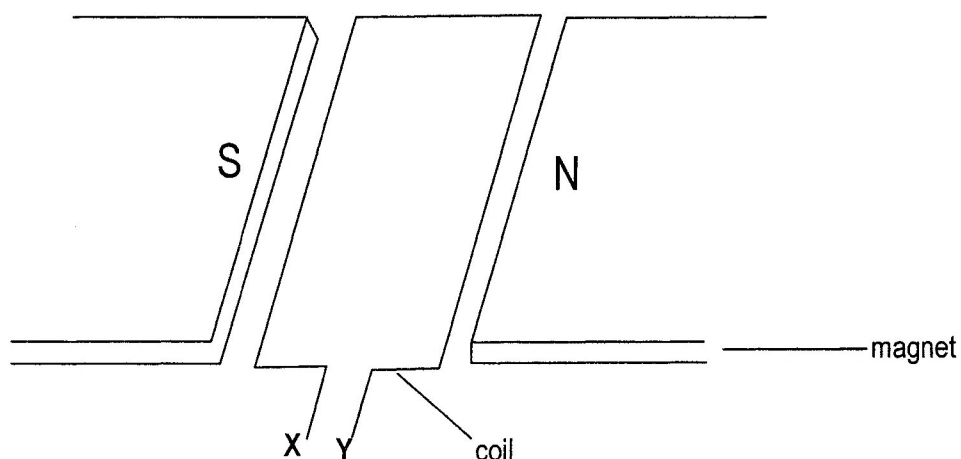
14 The diagram below represents a parallel circuit.



The current through the ammeter, \textcircled{A} , is ...

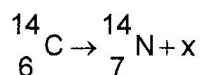
- A 0.5A.
 - B 1.0A.
 - C 2.0A.
 - D 9.0A.
- 15 In wiring a house a switch is always connected to the live wire. This is ...
- A because no current flows through the neutral wire.
 - B to avoid short circuits and overheating of elements.
 - C because the circuit can never be switched off if the switch is on the neutral wire.
 - D to make it easier to isolate any device connected in the circuit thus making it safe.
- 16 An electric appliance is rated 5000W, 250V. A man uses this appliance for 10 hours and pays K25.00 for the electrical energy used. What is the cost of electrical energy per unit?
- A K0.10
 - B K0.50
 - C K0.80
 - D K2.00
- 17 Which of the following is true about cathode rays?
- A They carry a positive charge.
 - B They can produce X-rays.
 - C They are electromagnetic in nature.
 - D They are lighter than electrons.

- 18 The diagram shows a coil in a magnetic field which is part of an a.c generator.



What must be connected directly to X and Y?

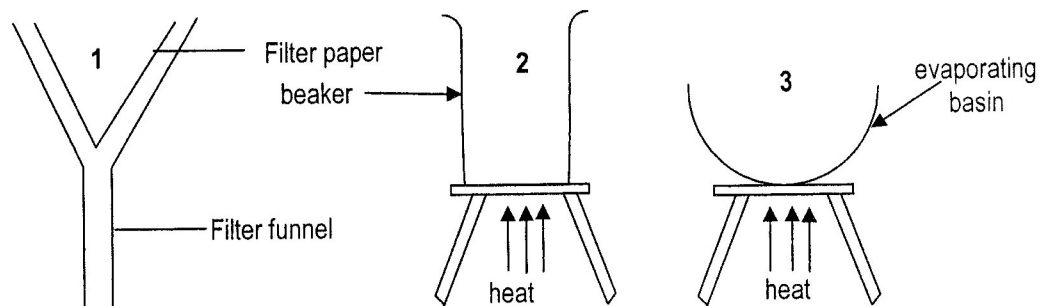
- A split rings
 - B brushes
 - C slip rings
 - D d.c supply
- 19 The radioisotope sodium – 24 , has a half-life of 15 hours. How long would an 8g sample of sodium – 24 take to decay to 1g?
- A 45 hours
 - B 60 hours
 - C 90 hours
 - D 120 hours
- 20 The equation represents the decay of carbon – 14 to nitrogen – 14.



Which of the following is true about radiation X?

- A It can be repelled by a proton.
 - B It can be repelled by an electron.
 - C It is electrically neutral.
 - D It is an electromagnetic wave.
- 21 Which of the following processes shows that matter is composed of tiny particles.
- A Crystallisation
 - B Expansion
 - C Freezing
 - D Melting

22 The diagrams show three sets of apparatus.

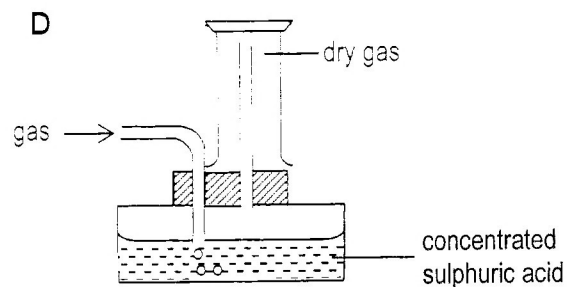
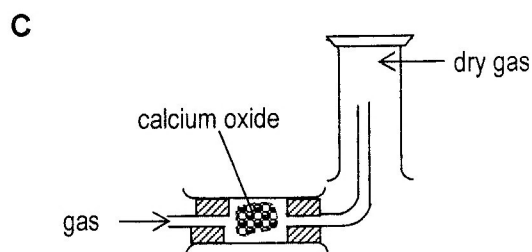
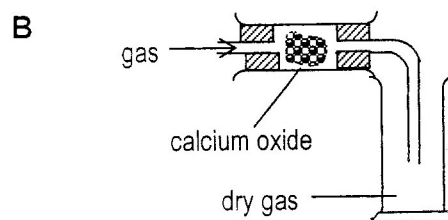
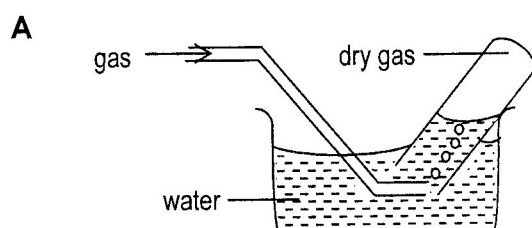


What apparatus would be used to obtain separate samples of sand and salt from a mixture of sand and sea water?

- A 1 only
- B 1 and 3
- C 2 and 3
- D 3 only

23 A gas is less dense than air, very soluble in water and is alkaline.

Which method is used to collect a dry sample of the gas?



- 24 The symbol for an atom of phosphorus is $^{31}_{15}\text{P}$. What does the number 31 represent for an atom of phosphorus?
- A The number of nucleons.
 - B The number of protons.
 - C The position of the atom in the Periodic Table.
 - D The number of electrons, protons and neutrons.
- 25 Which pair of elements form a compound by sharing electrons?
- A Carbon and chlorine.
 - B Lithium and iodine.
 - C Neon and oxygen.
 - D Potassium and bromine.
- 26 How many atoms are present in one molecule of Urea, $\text{CO}(\text{NH}_2)_2$?
- A 4
 - B 6
 - C 7
 - D 8
- 27 Methane burns completely in oxygen according to the equation below:
- $$\text{CH}_4(\text{g}) + 2\text{O}_2(\text{g}) \longrightarrow \text{CO}_2(\text{g}) + 2\text{H}_2\text{O}(\text{g})$$
- If 0.2 mol of methane is burned completely, which volume of carbon dioxide measured at r.t.p is formed?
- A 0.2dm^3
 - B 0.6dm^3
 - C 2.4dm^3
 - D 4.8dm^3
- 28 Potassium is in the same Group of the Periodic Table as lithium.
- Which of the following is a property of lithium?
- A It is a poor conductor of electricity.
 - B It forms an acidic oxide.
 - C It forms an ionic chloride, LiCl_2 .
 - D It reacts with water, liberating hydrogen.
- 29 How many Groups in the Periodic Table contain both metals and non-metals?
- A 2
 - B 4
 - C 6
 - D 8

30 Aluminium cooking utensils are used in many kitchens. What property of aluminium is **not** important for this use?

- A It has a high melting point.
- B It is a good conductor of electricity.
- C It is a good conductor of heat.
- D It is resistant to corrosion.

31 Which row in the table below gives a correct use for the metal stated?

A	aluminium	making water pipes
B	copper	galvanising dustbins
C	mild steel	making car bodies
D	zinc	manufacture of aircrafts

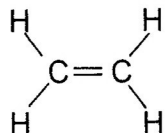
32 What is the identity test of the gas formed when an ammonium salt reacts with an alkali?

- A It relights a glowing splint.
- B It turns damp red litmus paper blue.
- C It burns with a 'pop' sound.
- D It turns limewater milky.

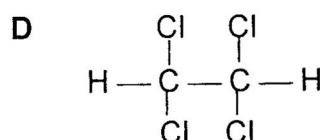
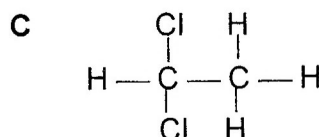
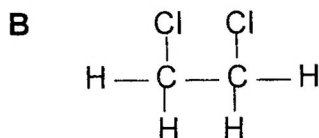
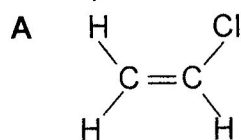
33 Which of the salts below can be prepared by a titration method?

- A Copper (II) sulphate.
- B Aluminium nitrate.
- C Ammonium chloride.
- D Barium sulphate.

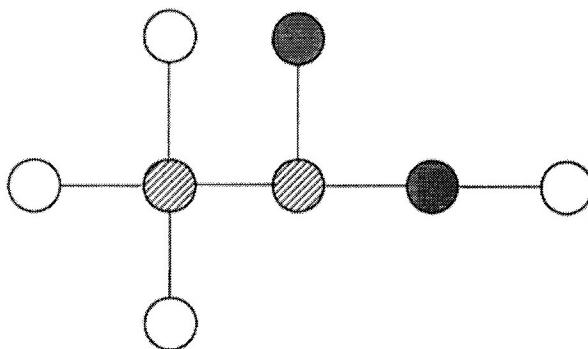
34 Ethene is an unsaturated hydrocarbon. Its structure is shown below.



What product is formed when ethene reacts with chlorine?



- 35 An organic compound containing carbon, hydrogen and oxygen is represented by the diagram below.



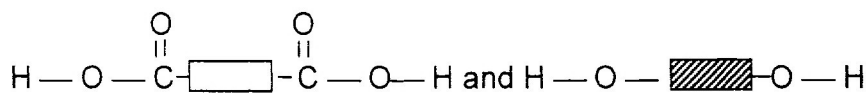
What could the compound be?

- A Ethanol
 B Propane
 C Ethanoic acid
 D Propanol
- 36 Methane, CH_4 , the first member of the alkane homologous series, has the boiling point -161°C .

Which molecular formula and boiling point could be correct for another alkane?

A	C_2H_4	-88
B	C_2H_6	-185
C	C_3H_6	-69
D	C_3H_8	-42

- 37 Terylene (polyester) is made by the condensation polymerisation of the two monomers shown.



What is the simplest repeat unit of the polymer?

- A $-\overset{\text{O}}{\parallel}{\text{C}}-\square-\overset{\text{O}}{\parallel}{\text{C}}-\text{O}-\text{shaded box}-\text{O}-$
- B $-\text{O}-\square-\overset{\text{O}}{\parallel}{\text{C}}-\text{O}-\text{shaded box}-\text{O}-$
- C $-\overset{\text{O}}{\parallel}{\text{C}}-\square-\text{O}-\overset{\text{O}}{\parallel}{\text{C}}-\text{shaded box}-\text{O}-$
- D $-\overset{\text{O}}{\parallel}{\text{C}}-\square-\overset{\text{O}}{\parallel}{\text{C}}-\text{shaded box}-\text{O}-$

38 Which method of rust prevention does not involve coating of the iron or steel object?

- A Galvanising
- B Oiling
- C Painting
- D Sacrificial protection

39 Hydrogen is manufactured by the steam reforming of natural gas according to the equation below:



What catalyst is used in this process?

- A manganese (IV) oxide
- B Iron (III) oxide
- C Nickel
- D Platinum

40 Which of the following is **not** a use of ammonia?

- A manufacture of ammonium nitrate
- B manufacture of nitrogen
- C manufacture of nitric acid
- D manufacture of ammonium chloride.

The Periodic Table of the Elements

Group																			
I	II											III	IV	V	VI	VII	0		
<div>1 H Hydrogen</div>																			
7 Li Lithium 3	9 Be Beryllium 4											11 B Boron 5	12 C Carbon 6	14 N Nitrogen 7	16 O Oxygen 8	19 F Fluorine 9	20 Ne Neon 10	4 He Helium 2	
23 Na Sodium 11	24 Mg Magnesium 12											27 Al Aluminium 13	28 Si Silicon 14	31 P Phosphorus 15	32 S Sulphur 16	35.5 Cl Chlorine 17	40 Ar Argon 18		
39 K Potassium 19	40 Ca Calcium 20	45 Sc Scandium 21	48 Ti Titanium 22	51 V Vanadium 23	52 Cr Chromium 24	55 Mn Manganese 25	56 Fe Iron 26	59 Co Cobalt 27	59 Ni Nickel 28	64 Cu Copper 29	65 Zn Zinc 30	70 Ga Gallium 31	73 Ge Germanium 32	75 As Arsenic 33	79 Se Selenium 34	80 Br Bromine 35	84 Kr Krypton 36		
85 Rb Rubidium 37	88 Sr Strontium 38	89 Y Yttrium 39	91 Zr Zirconium 40	93 Nb Niobium 41	96 Mo Molybdenum 42	Tc Technetium 43	104 Ru Ruthenium 44	103 Rh Rhodium 45	106 Pd Palladium 46	108 Ag Silver 47	112 Cd Cadmium 48	115 In Indium 49	119 Sn Tin 50	122 Sb Antimony 51	128 Te Tellurium 52	127 I Iodine 53	131 Xe Xenon 54		
133 Cs Caesium 55	137 Ba Barium 56	139 La Lanthanum 57	178 Hf Hafnium 72	181 Ta Tantalum 73	184 W Tungsten 74	186 Re Rhenium 75	190 Os Osmium 76	192 Ir Iridium 77	195 Pt Platinum 78	197 Au Gold 79	201 Hg Mercury 80	204 Tl Thallium 81	207 Pb lead 82	209 Bi Bismuth 83	210 Po Polonium 84	210 At Astatine 85	222 Rn Radon 86		
Fr Francium 87	Ra Radium 88	Ac Actinium 89																	

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

a

X

b

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

The volume of one mole of any gas is 24 dm^3 at room temperature and pressure (r.t.p.).