Name………………………………………………. Index No………………………..

School………………………………………………..……

Candidate's sign……………………….

Date……………………………………….

233/2
CHEMISTRY
PAPER 2
JULY / AUGUST 2013
Time: 2 Hours

SUBUKIA DISTRICT JOINT EVALUATION TEST – 2013
Kenya Certificate of Secondary Education (K.C.S.E)

233/2
CHEMISTRY
PAPER 2
JULY / AUGUST 2013
Time: 2 Hours

INSTRUCTIONS TO CANDIDATES

1.   Write your name and index number in the spaces provided
2.   Mathematical tables and electronic calculators may be used
3.   ALL working MUST be shown clearly where necessary.

FOR EXAMINER'S USE ONLY

QUESTION	MAXIMUM SCORE	CANDIDATE'S SCORES
1	13	
2	9	
3	12	
4	10	
5	9	
6	8	
7	10	
8	9	
TOTAL SCORE	**80**	

This paper consists of 12 printed pages. Candidates should check the question paper to ensure that all pages are printed as indicated and no questions are missing

1.(a) The grid below represents part of a periodic table. Study it and answer the questions that follow. The letters do not represent the actual symbols of elements.

S				R	E		X	
								V
Q	Z					M		
							T	

i)   Identify the most reactive non-metal   (1mk)

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ii)   Which of the metals is most reactive. Explain   (1mk)

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iii)   What name is given to the family of elements to which elements X and T belong (1mk)

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iv)   Give reasons for the following

a)   Ionic radius of Q is smaller than that of M   (1mk)

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b)   Atomic radius of Q is greater than that of S   (1mk)

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v)Give an element which does not form compounds under ideal conditions. Explain   (2mks)

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vi)Give the formula of the compound formed between element R and Z. (1mk)

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b)   Study the table below and answer the questions that follow

Substance	A	B	C	D	E	F
Mpt°C	801	119 113	139	-5	-101	1356
Bpt°C	1410	445	457	54	-36	2860
Electrical conductivity(solid)	Poor	Poor	Good	Poor	Poor	Poor
Electrical conductivity(Liquid)	Good	Poor	Good	Poor	Poor	Poor

i)   Identify a substance with

   a)   Giant metallic structure

(1mk)

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   b)   Simple molecular structure   (1mk)

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ii)   Suggest a reason why substance B has two melting points   (1mk)

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iii)Substance A and C conduct electric current in the liquid state. State how the two substances differ as conductors of electric current   (2mks)

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2.The scheme below shows several reactions starting with propane. Study the scheme and answer the questions which follow.
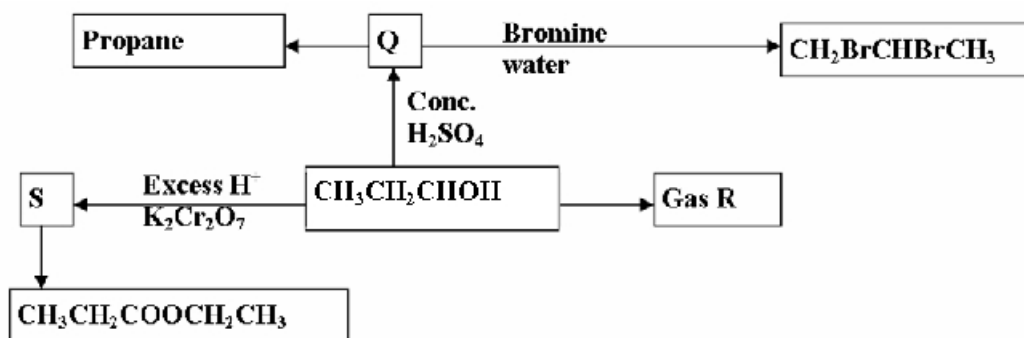
a)   i)Gas R is hydrogen gas. Name a substance that can be reacted with CH_3CH_2CHOH to produce gas R.   (1mk)

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ii)Name and draw the structural formula of compound Q.   (2mks)

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iii)What conditions and reagents are necessary to convert S to $CH_3CH_2COOCH_2CH_3$ as shown in the diagram?

Reagents (1mk)

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Conditions. (1mk)

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iv) Write an equation for the reaction that takes place when equal volumes of chlorine gas react with propane. (1mk)

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b) The table below shows some properties of the organic compounds U,V and W. Use the information to answer the question that follow.

	U	V	W
Reaction with liquid bromine	Decolourise bromine very fast	No reaction	Decolourises bromine liquid slowly.
Combustion	Burns with yellow smoky flame	Burns with a blue flame leaving no residue	Burns with a clear yellow flame
Reaction with Conc. H_2SO_4	No reaction	It is dehydrated to form compound U	No reaction

i) To which Homologous series do the following compounds belong? (3mks)

U……………………………………………………………………………………..

V……………………………………………………………………………………..

W……………………………………………………………………………………..

3. **I.** Study the flow chart for the industrial manufacture of ammonia given below and answer the questions that follow.
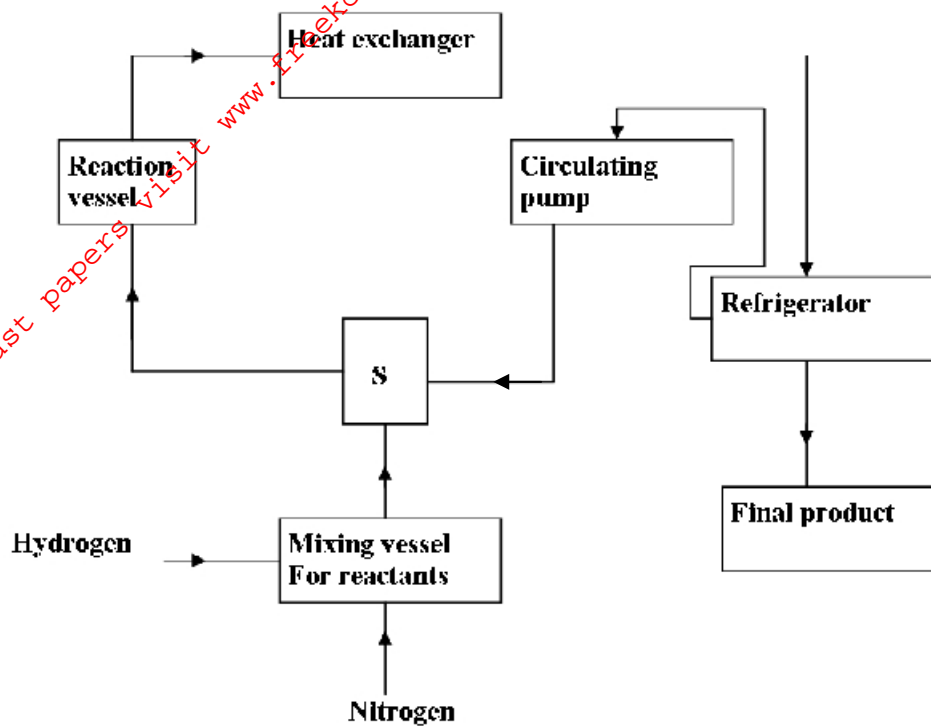
a) State the purpose of the unit labeled S. (1mk)

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....
....

b) What is the function of the circulating pump?. (1mk)

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....
....

c) Suggest the source of the raw materials . (2mks)

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....

d)Name two impurities removed during the purification of hydrogen and nitrogen.
(1mk)

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....

e) In what state is the final product collected. Explain. (2mks)

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II.   Below is a set – up in the preparation of a particular salt. Study it and answer the questions that follow.
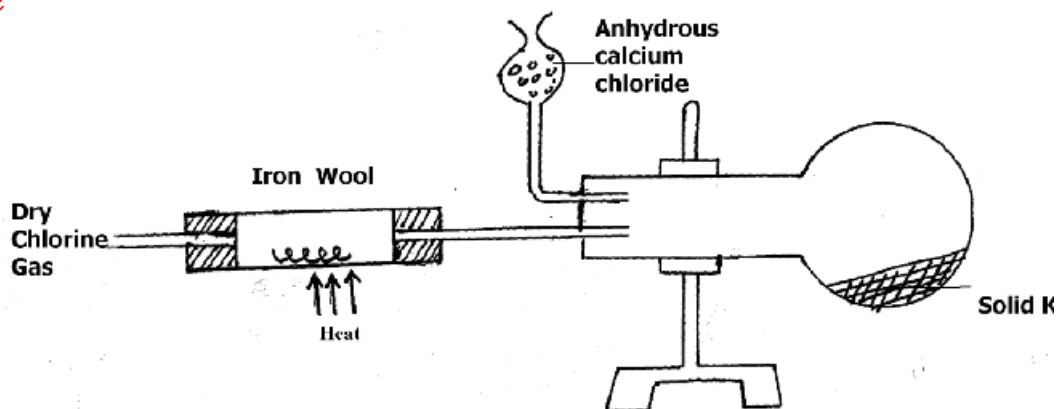
a)   Explain the observation made in the combustion tube when dry hydrogen Chloride gas is passed instead of dry chlorine.   (2mks)

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b)   Identify solid K   (1mk)

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....

c)   What property makes solid K to be collected in the flask as shown below. (1mk)

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....
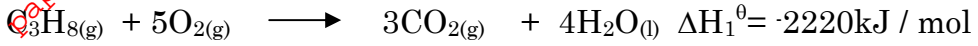
d)   State the purpose of anhydrous calcium Chloride as shown in the set – up above. (1mk)

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4. a) State Hess' law. (1mk)

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…………………………………………………………………………………………………

b) The heat of combustion of propane, carbon and hydrogen are given below.

$$C_3H_{8(g)} + 5O_{2(g)} \longrightarrow 3CO_{2(g)} + 4H_2O_{(l)} \quad \Delta H_1^{\theta} = -2220kJ / mol$$

$$C_{(s)} + \tfrac{1}{2} O_{2(g)} \longrightarrow CO_{2(g)} \quad \Delta H_2^{\theta} = -393kJ/ mol$$

$$H_{2(g)} + \tfrac{1}{2} O_{2(g)} \longrightarrow H_2O_{(l)} \quad \Delta H_3^{\theta} = -285.8kJ/ mol$$

i) Write a thermochemical equation to show the formation of propane from its elements (1mk)

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ii) Using the information above, show the formation of propane using an

energy cycle diagram..(2mk)

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iii) Calculate the enthalpy of formation of propane. (2mks)

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c)i.)Define 'Heating Value' of a fuel. 1mk

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…………………………………………………………………………………………………

ii)State two precautions to be observed when using a fuel.   (1mk)

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5.   The diagram below is the down all for the extraction of sodium metal. Use it to answer the questions that follow.
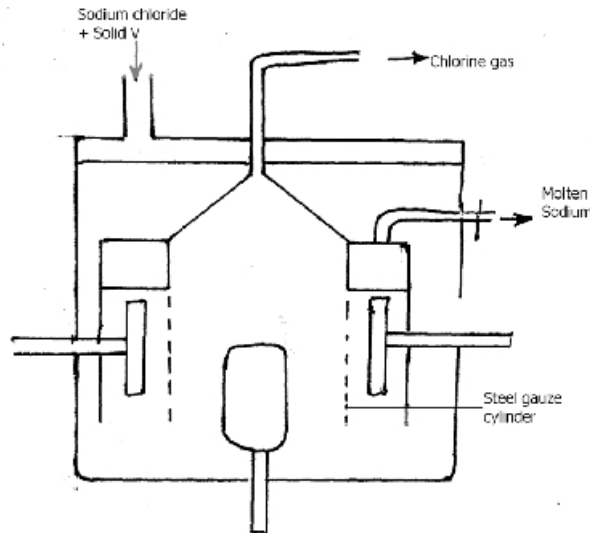
a)   In which state is sodium chloride and how is it maintained in the state. (1mk)

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....

b)   Name solid V and state its use.   (2mks)

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c)   Give a reason why the anode is made of graphite and not steel.   (1mk)

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d)   Write equations for reactions that take place at:
i)**Anode(1mk)**

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ii)**Cathode(1mk)**

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e) State the function of the steel gauze cylinder. (2mks)

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f)State the main impurity in the sodium collected and state how it is removed.(1mk)

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g.) Why is it possible to collect the sodium as shown above?(1mk)

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6. a) The flow chart below is a summary of fractional distillation of air.
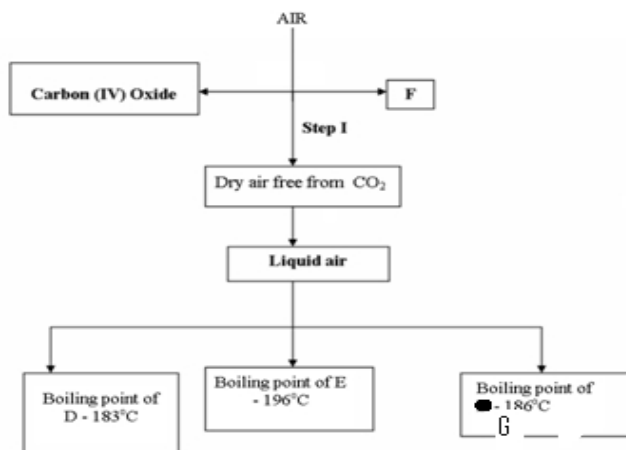
i) Explain how carbon (IV) oxide gas is removed in Step I. (1mk)

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…………………………………………………………………………………………………

ii) State the form in which F is removed. (1mk)

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iii) Identify products D and E   (2mks)

D

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....

E

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b) i)   Explain how dust particles are removed.   (1mk)

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ii)   Describe how you can distinguish a gas jar of carbon (IV) oxide among
others.   (1mk)

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iii) Give two commercial uses of carbon (IV) oxide.   (1mk)

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....

iv) State one used of substance G.   (1mk)

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7.   The table below shows some standard electrode potential for some electrodes.

Half reaction	Reduction potential (V)
$Mg^{2+}_{(aq)} + 2e^- \longrightarrow Mg_{(s)}$	-2.36
$Ag^+ + e^- \longrightarrow Ag_{(s)}$	-0.80
$Zn^{2+}_{(aq)} + 2e^- \longrightarrow Cu_{(s)}$	-0.76
$Cu^{2+}_{(aq)} + 2e^- \longrightarrow Cu_{(s)}$	+0.34
$Cl_{2(g)} + 2e^- \longrightarrow 2Cl^-_{(aq)}$	+1.36
$F_{2(g)} + 2e^- \longrightarrow 2F^-_{(aq)}$	+2.87

(a) Which pair of electrodes when use in a cell would produce the greatest e.m.f ?   (1mk)

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(b) Identify the strongest reducing agent. Explain   (2 mks)

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(c) Given the $Zn_{(s)}$ / $Zn^{2+}_{(aq)}$ // $Ag^{2+}_{(aq)}$ / $Ag_{(s)}$:
(i) What is the emf of the cell above?   (3 mks)

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....

(ii) Write the cell diagram for the cell above.   (2 mks)

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iii) What is the meaning of the two parallel lines in the cell representation. (2mk)

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8. a.)Define the term radioactivity.   1mk

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b.)Below is a radioactivity decay series starting from $^{214}_{83}Bi$ and ending with $^{206}_{82}Pb$.
Study it and answer the questions that follow.

$^{214}_{83}Bi$ $\underline{Step\ I}$→ $^{210}_{81}Ti$ $\underline{Step\ II}$→ $^{210}_{82}Pb$ $\underline{Step\ III}$→ $^{210}_{83}Bi$ $\underline{Step\ IV}$→ $^{210}_{84}Pb$ $\underline{Step\ V}$→ $^{206}_{82}Pb$
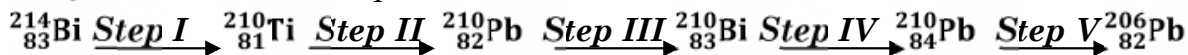
i.)Identify the particles given out in steps;

   I. 1mk

   II. 1mk

ii.)Write the nuclear equation for the reaction that takes place in step V.   1mk

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c.) The decay curve below gives the percentages of radioactive isotope Bismuth remaining against different times. Study it and answer the questions that follow.

Graph of Percentage of radioactive Bismuth remaining against time.
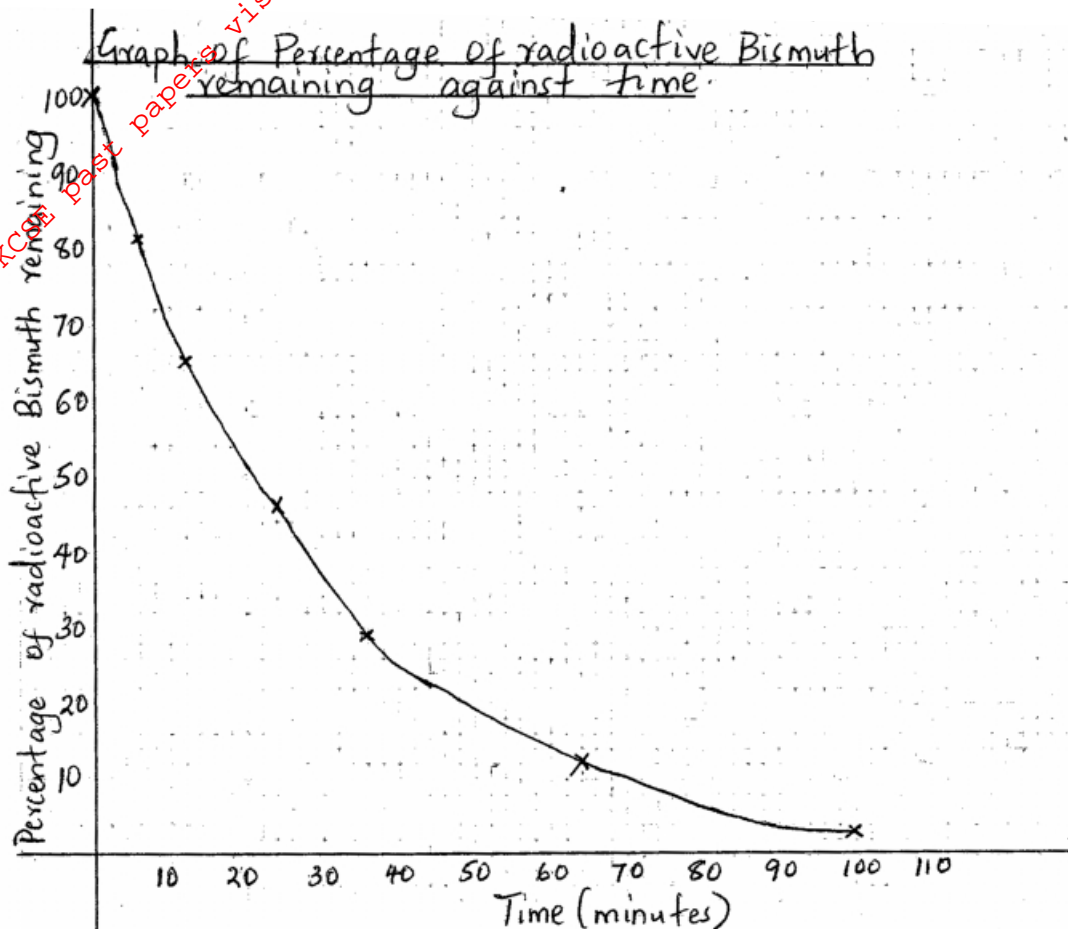
I.) From the graph determine;

i. Half life of Bismuth.   1mk

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ii. Percentage of bismuth that remained after 80 minutes.   1mk

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iii. Original mass of bismuth isotope given that the mass that remained after 80 minutes was 0.16g.   2mk

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d. |)Give one use of radioactive isotopes in medicine.