

Name of the Student: \_\_\_\_\_

Max. Marks : 20 Marks

Time : 20 Minutes

Mark Schemes

**Q1.**

- (a) fusion  
*do **not** credit any response which looks like 'fission'*  
1
- of hydrogen / H (atoms)  
*credit only if 1<sup>st</sup> mark point scores*  
1
- (b) fusion of other / lighter atoms / elements  
*reference to big bang nullifies both marks*  
1
- during supernova / explosion of star(s)  
1
- (c) the (available) evidence: supports this idea  
**or**  
does not contradict this idea  
**or**  
can be extrapolated to this idea  
**or**  
(electromagnetic) spectrum from other stars is similar to sun  
1
- [5]

**Q2.**

- (a) *answers must be in terms of nuclear fuels*
- concentrated source of energy  
*idea of a small mass of fuel able to generate a lot of electricity*  
1
- that is able to generate continuously  
*accept it is reliable*  
**or** *can control / increase / decrease electricity generation*  
*idea of available all of the time / not dependent on the weather*  
*ignore reference to pollutant gases*  
1
- the energy from (nuclear) fission  
1
- is used to heat water to steam to turn turbine linked to a generator

(b) carbon dioxide is not released (into the atmosphere)

1

1

but is (caught and) stored (in huge natural containers)

1

[6]

**Q3.**

(a) **B E G**

*all 3 required and no other  
any order*

1

same number of / 88 protons (and different numbers of neutrons)

*same number of electrons is insufficient*

1

(b) (i) 222

1

86

1

(ii) 4800

*allow 1 mark for obtaining 3 half-lives*

2

(c) ethical

1

deceived / lied to (about safety of working conditions)

*accept (women) not warned of the dangers*

*given no protection is insufficient*

**or**

value own / scientists' lives more than women

**or**

did not treat women humanely

1

(d) accept any sensible suggestion

eg

too many interests in continued use of radium

evidence may cause public unrest

*do **not** accept not enough evidence*

doctors not want to be blamed for illnesses (caused by radium)

*accept doctors not wanting to be sued (for harm caused by using  
radium)*

doctors thought (possible) benefits outweighed (possible) risks

*do **not** accept did not know radium could be harmful*

*believe radium could treat illnesses is insufficient*

1

[9]