Name of the Student:_____
Max. Marks : 18 Marks **Time : 18 Minutes**

Mark Schemes

Q1.

(a) (i) (enough) dust and gas (from space) is pulled together
accept nebula for dust and gas
accept hydrogen for gas
accept gas on its own
dust on its own is insufficient
mention of air negates this mark
1

by:
gravitational attraction
or
gravitational forces
or
gravitaty
ignore any (correct) stages beyond this
1

(ii) joining of two (atomic) nuclei (to form a larger one)
do not accept atoms for nuclei
1

(iii) more sensitive astronomical instruments / telescopes
or
infrared telescopes developed
accept better technology
more knowledge is insufficient
1

(b) (i) (other) planets / solar systems
do not accept galaxy
moons is insufficient
1

(ii) provided evidence to support theory
accept proves the theory
1

(c) elements heavier than iron are formed only when a (massive) star explodes
accept materials for elements
accept supernova for star explodes
accept stars can only fuse elements up to (and including) iron
1

[7]

Q2.

(a) (same) number of protons

same atomic number is insufficient

1

(b) (i) nuclei split

*do **not** accept atom for nuclei / nucleus*

1

(ii) (nuclear) reactor

1

(c) beta

1

any **one** from:

- atomic / proton number increases (by 1)

  accept atomic / proton number changes by 1
- number of neutrons decreases / changes by 1
- mass number does not change

  (total) number of protons and neutrons does not change
- a neutron becomes a proton

1

(d) (average) time taken for number of nuclei to halve
or
(average) time taken for count-rate / activity to halve

1

(e) (i) 6.2 (days)

Accept 6.2 to 6.3 inclusive
*allow **1** mark for correctly calculating number remaining as 20 000*
or
*allow **1** mark for number of*
80 000 plus correct use of the graph (gives an answer of 0.8 days)

2

(ii) radiation causes ionisation

allow radiation can be ionising

1

that may then harm / kill healthy cells

accept specific examples of harm, eg alter DNA / cause cancer

1

(iii) benefit (of diagnosis / treatment) greater than risk (of radiation)

accept may be the only procedure available

1

[11]