

Name of the Student: _____

Max. Marks : 17 Marks

Time : 17 Minutes

Mark Schemes

Q1.

- (a) fusion
*do **not** credit any response which looks like 'fission'*
1
- of hydrogen / H (atoms)
credit only if 1st 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) any **three** from:
- red-shift shows galaxies are moving away (from each other / the Earth)
 - more distant galaxies show bigger red-shift
- or**
- more distant galaxies show a greater increase in wavelength
accept correct reference to frequency in place of wavelength
- (in all directions) more distant galaxies are moving away faster
accept (suggests) universe is expanding
 - suggests single point of origin (of the universe)
- 3

- (b) (i) (radiation produced shortly after) 'Big Bang'
accept beginning of time / beginning of the universe for 'Big Bang' 1
- (ii) any **one** from:
- can only be explained by 'Big Bang'
 - existence predicted by 'Big Bang'
 - provides (further) evidence for 'Big Bang'
ignore proves 'Big Bang' (theory)
ignore reference to red-shift 1
- (iii) increase
accept becomes radio waves 1
- universe continues to accelerate outwards
accept as universe continues to expand
- or**
- greater red-shift 1

[7]

Q3.

- (a) a protostar is at a lower temperature
or
 a protostar does not emit radiation /energy 1
- as (nuclear) fusion reactions have not started
accept heat or light for energy 1
- (b) by (nuclear) fusion
accept nuclei fuse (together)
nuclear fusion and fission negates this mark 1
- of hydrogen to helium 1
- elements heavier than iron are formed in a supernova
accept a specific example e.g. heavier elements such as gold are formed in a supernova
accept heavier elements (up to iron) formed in red giant/red super giant
reference to burning (hydrogen) negates the first 2 marks 1

[5]