Name of the Student:_____
Max. Marks : 19 Marks **Time : 19 Minutes**

Mark Schemes

Q1.

(a) (a) supernova (explosion)

1

(b) solar system contains heavy elements / elements heavier than hydrogen and helium (1)

these (heavy) elements are / were formed by (nuclear) fusion (1)

accept minor misspellings for 'fusion'
*but **not** anything which could also be 'fission'*

(at the very high temperature(s)) in a super nova / when stars explode (1)

3

[4]

Q2.

(a) stars / galaxies / sources emit all / different types of electromagnetic waves / radiation

accept two or more named electromagnetic waves
accept answers in terms of frequencies / wavelengths

1

(b) (i) wavelength (of light) increases

accept frequency decreases

or

light moves to red end of spectrum

*accept redder but do **not** accept red alone*

1

(ii) it is the star (detected) furthest from the Earth

accept galaxy for stars

or

it is moving away the fastest

ignore reference to universe expanding

1

(c) (i) all matter compressed to / starts at / comes from a single point

*do **not** accept increasing gravitational pull*
accept everything / the universe for all matter

1

(massive) explosion sends matter outwards

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accept explosion causes universe to expand

*ignore explosion creates the universe **or** further reference to star / Earth formation*

1

(ii) check validity / reliability of the evidence
or
change the theory to match the new evidence

accept comparison of new and old evidence

1

[6]

Q3.

(a) any **two** from:

- nuclei / atoms of light elements fuse

  accept hydrogen or helium for light elements
  accept join for fuse
  *accept for **1** mark, by nuclear fusion*
  answers about fission negates a mark

- each (fusion) reaction releases energy / heat / light

- lots of reactions occur

2

(b) presence of nuclei of the heaviest / heavy / heavier elements

accept atom for nuclei

1

(c) (i) (matter / mass) with such a high density / strong gravitational (field)

1

electromagnetic radiation / light is pulled in

accept nothing can escape
*do **not** accept answers in terms of an empty void*

1

(ii) X-rays

accept e-m radiation / e-m waves

1

[6]

Q4.

(a) longer wavelength waves **or** light moved towards red end of spectrum

1

(galaxy) moving away from the Earth **or** space is expanding **or** the galaxy and Earth are moving apart

accept us for Earth
*do **not** accept galaxies expanding*

1

(b) big bang

1

[3]

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