

Name of the Student: _____

Max. Marks : 18 Marks

Time : 18 Minutes

Mark Schemes

Q1.

- | | | |
|-----|---|------------|
| (a) | red-shift | 1 |
| (b) | the further away from the Earth, the faster a galaxy is moving | 1 |
| (c) | strength
as the balloon expands the dots get further apart, representing the galaxies moving apart | 1 |
| | weakness
dots are only on the surface of the balloon, galaxies are throughout the universe
or
there is a limit to how far the balloon can expand | 1 |
| (d) | both theories suggest that the Universe is expanding | 1 |
| (e) | new evidence / observations that cannot be explained by Theory 1
<i>accept specific example of new evidence ie CMBR</i> | 1 |
| | | [6] |

Q2.

- | | | |
|-----|--|------------|
| (a) | hydrogen | 1 |
| (b) | supernova | 1 |
| (c) | red super giant | 1 |
| (d) | any four from:
<ul style="list-style-type: none"> • fusion takes place within stars • hydrogen formed into helium • fusion continued and formed larger elements • elements heavier than iron were formed in supernova • (heavy) elements were scattered by the supernova explosion. <i>accept light elements formed</i> | 4 |
| | | [7] |

Q3.

(a) (i) C

1

(ii) The speed of star **B** is less than the speed of star **D**.

1

(b) 300 000 000

allow 1 mark for correct substitution ie $200\,000 \times 1500$ provided no subsequent step shown

2

m / s

allow unit correctly indicated in list if not written in answer space

1

[5]