

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

Max. Marks : 19 Marks

Time : 19 Minutes

Mark Schemes

**Q1.**

(a) wavelength correctly shown 1

(b) (i) increased 1

decreased 1

(ii) 17-18 inclusive 1

evidence of measurement divided by 3 or mean of 3 separate measurements 1

mm  
*accept cm if consistent with answer* 1

(c) (i) red shift 1

(ii) moving away 1

(iii) the furthest galaxies show the biggest red shift 1

(meaning that) the furthest galaxies are moving fastest 1

(so the) Universe is expanding 1

(extrapolating backwards this suggests that) the Universe started from an initial point 1

(iv) cosmic microwave background radiation  
*allow CMBR* 1

[13]

**Q2.**

(a) gravitational attraction (between the satellite and the Earth)

*allow gravity*  
*allow weight of the satellite*

1

(b) any **two** from:

- mass of satellite
- speed / velocity (of satellite)
- radius of orbit / circle

*allow height above the Earth*

*radius / height alone is insufficient*

2

(c) (i) increasing the height (above the Earth's surface) increases the time (for one orbit)

*allow a positive correlation*

*allow as one gets bigger, the other gets bigger, or vice versa*

*ignore they are directly proportional*

1

(ii) there is no relationship / correlation

1

(d) Isaac Newton was a respected scientist who had made new discoveries before

1

**[6]**