

01. 0625_s23_ms_41 Q: 10

| Question | Answer | Marks |
|----------|--|-------|
| (a)(i) | (speed) decreases (from X to Y) and then increases (from Y to X) | B1 |

| Question | Answer | Marks |
|----------|--|-------|
| (a)(ii) | any three from: <ul style="list-style-type: none"> gravitational (potential) energy (GPE) transfers to kinetic energy (KE) or vice versa KE transfers to GPE from X to Y AND GPE transfers to KE from Y to X speed decreases as KE decreases / OR A most GPE at Y OR least GPE at X total (of GPE + KE) energy is constant | B3 |
| (b)(i) | -230 (°C) | B1 |
| (b)(ii) | (white surface) is a poor absorber / good reflector / poor emitter of IR / radiation OR black / other surface is a good absorber / poor reflector / good emitter of IR / radiation | B1 |
| | any one from: <ul style="list-style-type: none"> (the white surface) increases in temperature less when facing the Sun (the white surface) decreases in temperature less when facing away (from Sun) the black / other surfaces increases in temperature more when facing the Sun the black / other surface decreases in temperature more when facing away (from Sun) less variation in temperature on white surface (during one whole rotation) | B1 |

02. 0625_s23_ms_43 Q: 9

| Question | Answer | Marks |
|----------|--|-------|
| (a) | both positions correctly marked S ₁ and J ₁ on the diagram | A3 |
| | Saturn moved $360 \times 5 / 30 (= 60^\circ)$ OR S ₁ in correct position | C1 |
| | Jupiter moved $360 \times 5 / 12 (= 150^\circ)$ OR J ₁ in correct position | C1 |
| (b)(i) | S ₂ at 240° AND J ₂ at (600° - 360° =) 240° | B1 |
| (b)(ii) | (Saturn and Jupiter) are aligned / Jupiter exactly in front of Saturn / there is a conjunction owtte | B1 |
| (c)(i) | (Jupiter) gaseous AND large AND (Earth) rocky AND small | B1 |
| (c)(ii) | any three from: (density) • Jupiter has a low density because it is composed of gas / Earth has a high density because it is a solid (gravitational field strength) • Jupiter (has a large GFS so it) has a large mass / Earth (has a small GFS so it) has a small mass • Jupiter's mass is larger than the Earth's mass because the volume of Jupiter is larger even though the density of Jupiter is smaller | B3 |
| (d) | (mass =) 1.8×10^{27} kg | A3 |
| | $\rho = m / V$ OR $(m =) \rho V$ OR $(m =) 1300 \times 1.4 \times 10^{15} \times 10^9$ | C1 |
| | $(m =) 1300 \times 1.4 \times 10^{15} \times 10^9$ (kg) OR $1.8(2) \times 10^N$ | C1 |

03. 0625_w23_ms_42 Q: 9

| Question | Answer | Marks |
|----------|---|-------|
| (a) | Venus | B1 |
| (b) | The larger the mass (of the planet), the larger the gravitational field strength (at the surface) | B1 |
| (c) | orbit of planets is elliptical / is not circular owtte | B1 |
| (d) | correct conversion of T into seconds i.e. $365.2 \times (24 \times 60 \times 60)$ OR 3.2×10^7 | B1 |
| | $(v =) \{2\pi r\} / T$ | B1 |
| | $2\pi \times 149.6 \times 10^6 / 365.2 \times 24 \times 60 \times 60$ | B1 |