

QUESTION 1: Multiple choice

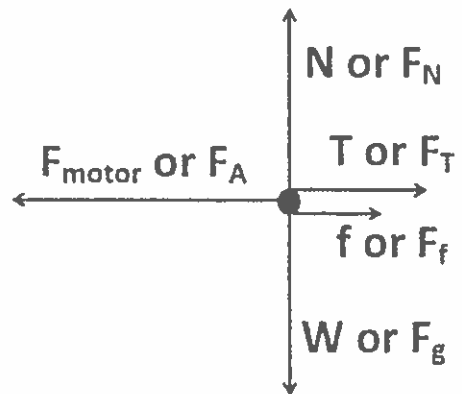
- | | | | |
|-----|------|------|------|
| 1.1 | D ✓✓ | 1.6 | A ✓✓ |
| 1.2 | C ✓✓ | 1.7 | B ✓✓ |
| 1.3 | C ✓✓ | 1.8 | A ✓✓ |
| 1.4 | D ✓✓ | 1.9 | C ✓✓ |
| 1.5 | B ✓✓ | 1.10 | D ✓✓ |

[20]

QUESTION 2:

2.1 When object A exerts a force on object B, object B SIMULTANEOUSLY exerts an oppositely directed force of equal magnitude on object A. ✓✓ (2)

2.2 (one tick for each force ✓✓✓✓✓) (5)



2.3

2.3.1. For the bakkie (500 kg):

$$F_{net} = ma$$

$$F_A - T - f = ma$$

$$1646 - T - 150 = 500a \checkmark$$

$$1496 - T = 500a \dots (\text{eqn. 1}) \checkmark$$

either ←

For the crate (20 kg):

$$F_{net} = ma$$

$$T - W = ma$$

$$T - (20)(9,8) = 20a$$

$$T - 196 = 20a \checkmark$$

$$T = 20a + 196 \dots (\text{eqn. 2})$$

either ←

Substitute eqn. 2 into eqn. 1:

$$1496 - (20a + 196) = 500a \checkmark$$

$$520a = 1300$$

$$a = 2,5 \text{ m.s}^{-2} \checkmark \quad (5)$$

2.3.2. [Positive marking from 2.3.1]

$T = 20a + 196$	OR	$T = 1496 - 500a$
$T = 20(2,5) + 196 \checkmark$		$T = 1496 - 500(2,5) \checkmark$
$T = 246 \text{ N} \checkmark$		$T = 246 \text{ N} \checkmark$

(2)

2.4 Decreases ✓ (1)

[15]

QUESTION 3:

3.1 The force of attraction between two objects is directly proportional to the product of the masses ✓ and inversely proportional to the square of the distance between their centres ✓. (2)

3.2 (ANY ONE PAIR) ✓ ✓
 - Force of earth on space shuttle/rocket and force of space shuttle/rocket on earth.
 - Force of fuel on rocket and force of rocket on fuel.
 - Force of space shuttle on rocket and force of rocket on space shuttle. (2)

3.3 $r = R_E + R_{orbit} = (6,38 \times 10^6) + (6000 \times 10^3) = 1,24 \times 10^7 \text{ m}$

$F = \frac{Gm_1m_2}{r^2}$ ✓

$F = \frac{(6,67 \times 10^{-11})(2000)(5,98 \times 10^{24})}{(1,24 \times 10^7)^2}$ ✓

$F = 5,20 \times 10^3 \text{ N}$ or $5\ 204,94 \text{ N}$ ✓

3.4 Decrease ✓ (4)
(1)

3.5 [Positive marking from 3.3] $F = 5,20 \times 10^3 \text{ N}$ or $5\ 204,94 \text{ N}$ (1)

[10]

QUESTION 4:

4.1 A covalent bond is a bond formed by the overlapping of half-filled orbitals ✓ in non-metals resulting in the sharing of electrons ✓. (2)



4.3 Triple bond / 3 bonds ✓ (1)



4.5

4.7.1.

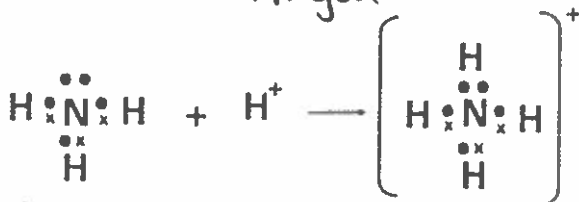
Trigonal pyramidal ✓
 Angular ✓

4.7.3. Octahedral ✓

4.7.2.

4.7.4. Linear ✓

4.6



(3)

4.7

4.7.1. Trigonal planar ✓

4.7.2. Tetrahedral ✓

(2)

[15]