

Paper 1 (20 Marks)

1.	A
2.	C
3.	C
4.	D
5.	D
6.	B
7.	D
8.	A
9.	C
10.	C
11.	D
12.	D
13.	B
14.	A
15.	A
16.	C
17.	D
18.	B
19.	D
20.	C

Paper 2 Section A (45 Marks)

- 1** (a) $t = 0 \text{ s}$ to $t = 4 \text{ s}$. [1]
- (b) gradient at $t = 6 \text{ s} = 5 \text{ m/s}^2$ [1]
 $F = m a = 1500 \times 5 = 7500 \text{ N}$ [1]
- (c) The truck is traveling up the slope from $t = 8.0 \text{ s}$. [1]
 Part of the weight is acting against the motion thus deceleration will occur. [1]
- (d) Distance travelled = area under graph from $t = 8 \text{ s}$ to 16 s [1]
 $= \frac{1}{2} \times (16 - 8) (30) = 120 \text{ m}$ [1]
- 2** (a) Pressure is force per unit area. [1]
 SI unit is Pa (or N/m^2) [1]
- (b) area = $1 \text{ cm}^2 = 0.0001 \text{ m}^2$ [1]
 $P = F / A$
 $= 480 / 0.0001 = 480\,000 \text{ Pa}$ [1]
- 3** (a) Uniform metre. CG in the middle (ie at the 50 cm mark), [1]
 weight of rule through CG, no turning effect (moment) [1]
 due to the weight of the rule. Thus the rule balances.
- (b) sum of clockwise moments = sum of anticlockwise moments [1]
 $0.050 \times (10) \times 40 = m_2 \times (10) \times 25$ [1]
 0.080 kg [1]
- (c) $\rho = m / V$
 $0.08 / 1.6 \times 10^{-4}$ [1]
 $= 500 \text{ kg/m}^3$ [1]

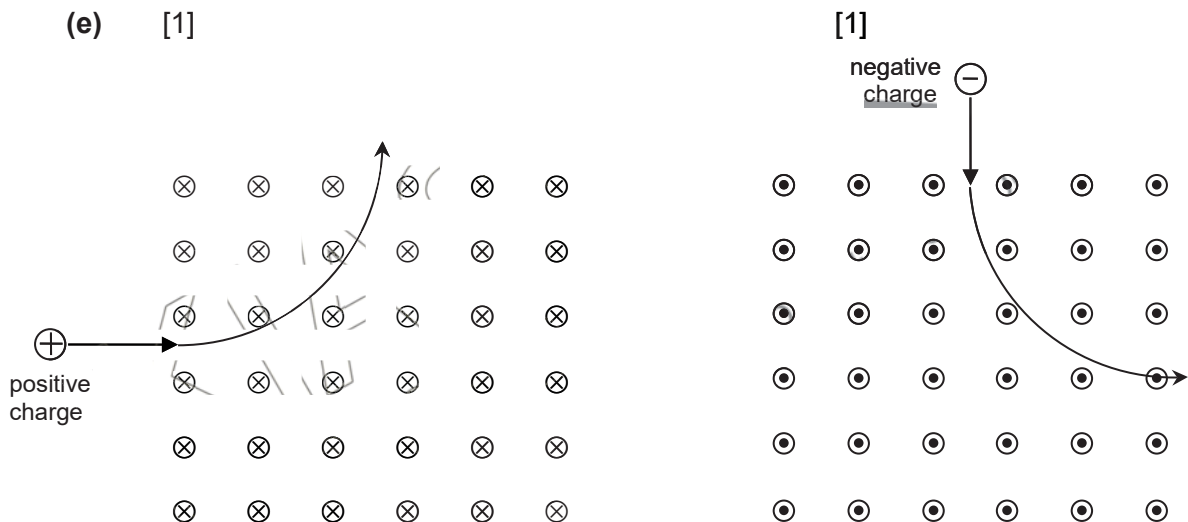
- 4 (a) Steel is a good conductor of heat. [1]
It conducts heat quickly from the oven to the inside of the potatoes, [1]
reducing cooking time.
- (b) Aluminium is a shiny metal. [1]
thus it is a poor emitter of heat [1]
able to reduce the body heat from being lost. [1]
- 5 (a) The **melting point** of X is **0°C** and the **boiling point** of X is **100°C**. [2]
- (b) During the period between Q and R, the **heat energy is absorbed to weaken the intermolecular forces**. [1]
- (c) Since **thermal energy is supplied at a higher rate**, [1]
the length of **QR will be shorter** as the time taken for melting [1]
to complete will be lesser.
The slope of **RS will be steeper as the liquid will reach the boiling point faster**. [1]
- 6 (a) (i) Transverse waves are waves that **travel in a direction perpendicular to the direction of vibration**. [1]
- (ii) $v = 15 / 12$
 $= 1.25 \text{ m/s}$ [1]
 $\lambda = v / f = 1.25 / 0.25$
 $= 5.00 \text{ m}$ [1]
- (iii) Since ~~the~~ **depth/medium of the pool remains unchanged**, the speed of the waves will not change. [1]
- (b) Amplitude increased. [1]
Period halved. (showing 3 waves) [1]
- 7 (a) Electrons are transferred from the carpet to Dylan due to charging by friction. [1]
Since carpet has more positive charges than negative charges, [1]
carpet becomes positively charged.
- (b) Dylan accumulates negative charges
and induces positive charges on the surface of the door knob/
door knob is positively charged. [1]

Since unlike charges attract,
negative charges from his body flows from his body to the metal door [1]
causing him to feel an electric shock.
- 8 (a) $1/R_t = 1/6 + 1/6 = 1/3$ [1]
 $R_t = 3\Omega$ [1]
- (b) $R = (6-3) / 1$ [1]
 $= 3 \Omega$ [1]
- (c) Remaining bulb is brighter. [1]
More current flows through this bulb now. [1]

Paper 2 Section B (20 Marks)

- 9**
- (a) The frequency remained unchanged. [1]
The wavelength decreases. [1]
- (b) $n = c / v$
 $v = 3.0 \times 10^8 \text{ m/s} / 1.5$ [1]
 $= 2.0 \times 10^8 \text{ m/s}$ [1]
- (c) (i) $n = 1 / \sin c$
 $c = \sin^{-1} 1 / 1.5$ [1]
 $= 42^\circ (41.8^\circ)$ [1]
- (ii) The blue ray will be totally internally reflected. [1]
This is because the angle of incidence at Q is greater than the critical angle. [1]
- (d) Diamond will have a smaller critical angle [1]
and therefore a higher chance of undergoing total internal reflection. [1]
- 10**
- (a) Correct labelled diagram [3]
- (b) $\text{Cost} = 2.4 \times (15 / 60) \times 20$ [1]
 $= 12 \text{ cents}$ [1]
- (c) (i) power = voltage x current [1]
reject answer if students did not state what the letters denote
- (ii) 10 A [1]
- (iii) 13 A [1]
- (d) When the metal casing becomes 'live' due to a fault, [1]
the excessive current will flow to the ground via the earth wire [1]
thus preventing anyone getting an electric shock by touching [1]
the 'live' metal casing [1]

- 11 (a) Roll to the **right** (towards the d.c. power supply) [1]
- (b) When the power supply is switched on, **current** flows through wire *P* in a direction that is **into** the plane of the **page** which is **perpendicular** to the **magnetic field** direction (upward). [1]
By Fleming's Left-Hand-Rule, a **force to the right** acts on wire *P*. [1]
- (c) (i) *P* rolls to the **left**. [1]
(ii) *P* rolls **more slowly**. [1]
(iii) *P* rolls to the **left**. [1]
- (d) *P* will **oscillate left and right repeatedly** as long as the a.c. is supplied. [1]
The **periodic change in direction of the current** in wire *P* will **cause** the **force** on the wire to **switch from left to right to left repeatedly**. [1]



End of Paper

