Q1:

(1-1): By $F = ma$, the acceleration of the object is $\frac{5.0}{2.0} = 2.5\ m/s^2$.

Therefore, the speed of the object after 3.0 s is $3 \cdot 2.5 = \boxed{7.5}\ m/s$.

(1-2): By $v^2 - u^2 = 2as$, we have $v = \sqrt{2 \cdot 2.5 \cdot 5} = \boxed{5}\ m/s$.

(2): The force exerted on the ground$=mg - F\sin\theta$.

Therefore, the reaction pair, the normal reaction$=mg - F\sin\theta$.

Then $f_{max} = \mu N = \boxed{\mu'(mg - F\sin\theta)}$.

---

Q2:

(1): Set the GPE as 0 on the ground. Then, by the conservation of energy: KE+GPE=KE+GPE, we have

$$0 + mgh_1 = \frac{1}{2}mv^2 + 0$$

$$v = \boxed{\sqrt{2gh_1}}$$

(2): As the vertical displacement from A to C is $h_1 - h_2$, we have $W = Fs = \boxed{mg(h_1 - h_2)}$.

(3): By $s = vt + \frac{1}{2}at^2$, as the initial vertical speed is 0, we have $h_2 = \frac{1}{2}gt^2$, i.e. $t = \boxed{\frac{2h_2}{g}}$.

Q3:

(1): By the conservation of energy, $\frac{1}{2}mv^2 = mgh$, i.e. $v = \sqrt{2gh}$, we have $v \propto \sqrt{h}$.

Therefore, $e = \frac{v'}{v} = \sqrt{\frac{h'}{h}} = \sqrt{0.64} = \boxed{0.8}$.

(2): After rebounded, the speed of the ball when it reaches 0.10 m is $0.8 \cdot 2.8 = 2.24\ m/s$.

Therefore, by the conservation of energy, $\frac{1}{2}m(2.24)^2 = mg(h - 0.10)$, i.e. $h \approx \boxed{0.32}\ m$.

---

Q4:

(1): By the provided information, $V_{relative} = \frac{8.0}{2.0} = 4\ m/s$.

As $V_{relative} = V + V_{ship}$, we have $V = \boxed{1}\ m/s$.

(2): $\lambda = V_{relative} \cdot T = \boxed{2}\ m$

(3): By $v = f\lambda$, $f = \frac{v}{\lambda} = \boxed{0.5}\ Hz$.

---

Q5:

(1):

$$\frac{p_1V_1}{T_1} = \frac{P_2V_2}{T_2}$$

$$\frac{0.5\times 10^5\cdot 1.0\times 10^{-3}}{75} = \frac{1.1\times 10^5\cdot 1.0\times 10^{-3}}{T_2}$$

$$T_2 = \boxed{165}\ K$$

(2): The work done on the gas is equal to the area under the graph, we have $W = 0.50\times 10^5\cdot(2.2-1.0)\times 10^{-3} = \boxed{60}\ J$.

(3): By $U = \frac{3}{2}pV$, we have $\Delta U = \frac{3}{2}(p_AV_A - p_CV_C) = \boxed{-90}\ J$.

---

Q6:

(1): The electric fields due to $q_B$ and $q_D$ cancelled each other and that due to $q_C$ added to that due to $q_A$.

Therefore, the direction of the resultant electric field is $\boxed{\vec{OC}}$.

(2): As from the deduction in (1), $E = \frac{kq_A}{\sqrt{0.2^2+0.15^2}^2} - \frac{kq_C}{\sqrt{0.2^2+0.15^2}^2} \approx \boxed{1.4\times 10^4}\ N/C$.

(3): The electric potential due to each charge is $\frac{kq}{\sqrt{0.2^2+0.15^2}} = 3.6\times 10^{10}q\ V$.

Therefore, the resultant electric potential is

$3.6\times 10^{10}(q_A+q_B+q_C+q_D) = \boxed{5040}\ V$.

---

Q7:

(1): By Ohm's law, $V = IR$, $I_1 = I = \frac{24}{R_1+R_3} = \boxed{0.8}\ A$.

(2): $P = IV = 0.8 \times 24 = \boxed{19.2}\ W$.

(3): We have:

$$\begin{cases} I_1 = I_2 + I_3 \\ I_1 R_1 + I_3 R_3 = 24 \\ -I_3 R_3 + I_2 R_2 = 6 \end{cases}$$

Solving, we have $I_3 = \boxed{0.4}\ A$.