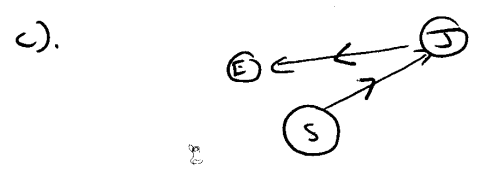


① E	④ D	⑦ E
② B	⑤ E	⑧ A
③ E	⑥ C	⑨ B

10a) a four year 2000.
 t = a years.

- b)
- planet
 - galaxy
 - star



d). sun sirius edge of galaxy.

e.i). Prism.

ii) what elements are it has.

11 a i). Europa

a ii). Jupiter

a iii). Sun.

b). i) eyepiece → magnify
 objective → collect light.

12 a). Prism

b). Helium + Hydrogen.

13 a). Earth
 Solar System
 Milky Way

b). i) Jupiter

b ii) Sun

b iii). Sirius

b iv). Eyepiece Objective

14 a) same speed.

b) i) Prism

b ii) X: RED

b iii) BLUE.

- 15 a). Sun or Moon
 b). Venus
 c). Mercury + Mars.

- 16 a) Objective
 aii) To magnify
 b) i. Venus
 bii). Neptune.
 biii). Jupiter.
 c). Kinetic \rightarrow Heat
 d). A group of a large number of stars.

17 Curved; acceleration; force of; Neither gravity

18 Downwards; Air; Air; Upwards.

- 19 a). Object that orbits a star.
 b). $a = \frac{F_m}{m} = \frac{900}{75} = \underline{\underline{12 \text{ m/s}^2}}$
 c). No gravity + no friction (from air).
 Rocket moves at constant speed because forces on it are balanced.
 d). Different from its weight on Earth.

20c). Solar cell

b). $F_m = m \cdot a$

$$F_m = 420 \times 0.2 \times 10^{-3}$$

$$F_m = \underline{\underline{0.084 \text{ N}}}$$

$$a = 0.2 \text{ mm/s}^2$$

$$a = 0.2 \times 10^{-3} \text{ m/s}^2$$

$$m = 420$$

c). The expelled gas pushes the spacecraft forward.

21 a). cylinder

b)i $a = \frac{F_m}{m} = \frac{24}{120} = \underline{\underline{0.2 \text{ ms}^{-2}}}$

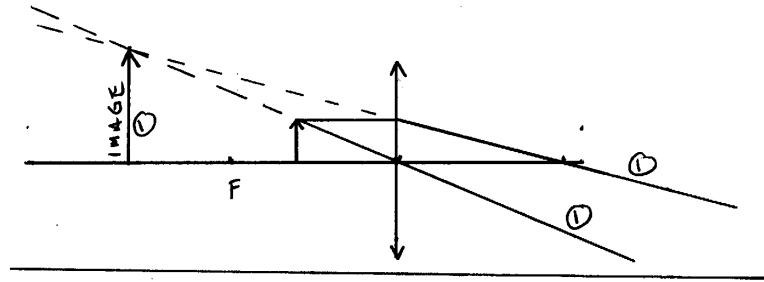
bii). Moves at constant speed because forces are balanced, in this case there are no forces.

22a) To collect as much light as possible.

b.i) $P = \frac{1}{FL} = \frac{1}{20 \times 10^{-3}} = \underline{50.0}$ FL MUST be in metres.

b.ii) Q (has shortest FL).

c).



23a) X-rays are absorbed by Earth's atmosphere.

b). Gamma X-Rays Visible TV + RADIO

c). Different signals need different detectors.

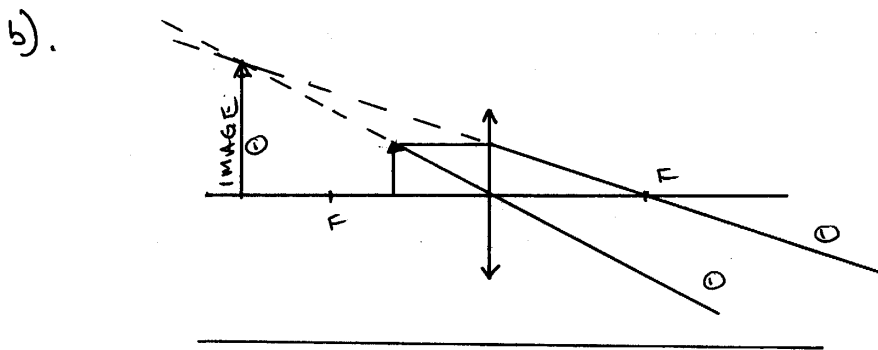
d). Q is used to accelerate forward.

P is used to decelerate and observe + stop it.

24a) Visible light

- b). Different signals need different detectors
 c). at Focus.
 d). Puento Rico - it has one the largest
 curved reflector

25a). Eyepiece Q objective S



26a) Object that orbits a planet.

aii) Force per unit (1) mass

b)i

$$W = mg$$

$$W = 318 \times 1.35$$

$$W = \underline{\underline{429.3 \text{ N}}}$$

bii) To ↑ air friction (drag) to slow probe down.

biii). Nitrogen + Hydrogen.

11/01/10

27a). P - X RAYS
 Q - VISIBLE LIGHT
 R - MICROWAVES.

a). Gamma.

b). IR - Thermopile ; CCD chip
UV - Fluorescent dye.

28 a). INERTIA

b). 8.7 N/kg (HARD TO READ!)

bii). $w = mg$
 $w = 20 \times 10^3 \times 8.7$
 $w = \underline{174,000 \text{ N}}$

biii). weight: decreases mass: constant

c). ISS has fast tangential speed (vertical)
 balanced by acceleration towards Earth
 due to gravity so remains in constant
orbit.

29 a). $d = v \cdot t$
 $2.16 = 12.0 \cdot t$
 $t = \frac{2.16}{12}$
 $t = \underline{0.18 \text{ s}}$

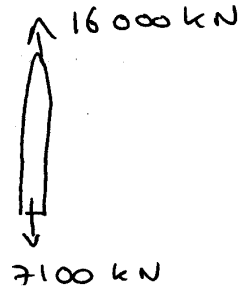
b) Dart has both constant horizontal speed plus
 increasing vertical speed (due to gravity)

c). $d = \bar{v} \cdot t$
 $d = 0.9 \times 0.18$
 $d = \underline{0.162 \text{ m}} \quad (16.2 \text{ cm}).$

31 a i).

$$F_{\text{net}} = 16,000 - 7100$$

$$F_{\text{net}} = \underline{\underline{8,900 \text{ N}}}$$



a ii).

$$W = m \cdot g$$

$$7100 = m \cdot 10$$

$$m = \underline{\underline{710 \text{ kg}}}$$

32 a i).

$$3.6$$

a ii).

$$W = m \cdot g$$

$$W = 530 \times 3.6$$

$$W = \underline{\underline{1908 \text{ N}}}$$

b i).

$$d = v \cdot t$$

$$d = 30 \times 6$$

$$d = \underline{\underline{180 \text{ m}}}$$

b ii).

$$v = u + at$$

$$v = 0 + (3.6 \times 6)$$

$$v = \underline{\underline{21.6 \text{ m/s}}}$$

