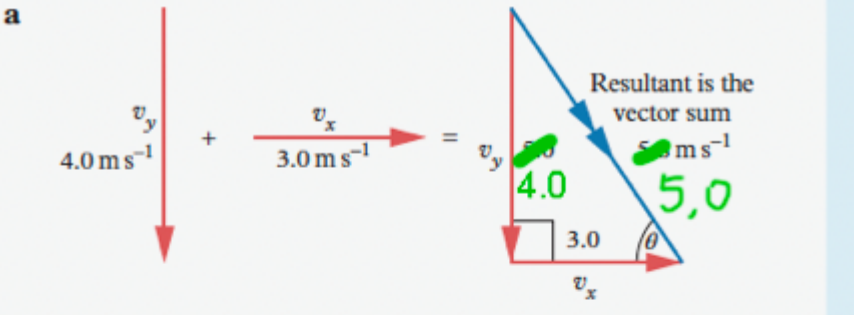
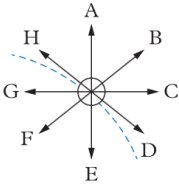
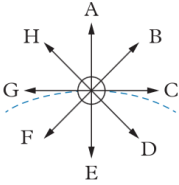
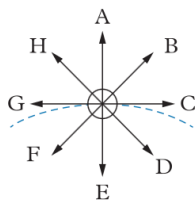


ERRATA U 3& 4

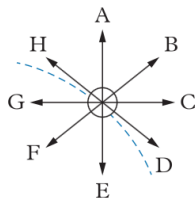
OXFORD PHYSICS FOR QUEENSLAND U3&4 (2025)

Module	Correction being made	Digital updated
2.1 WE2.1D page 58	<p>Step 2: v_y should be 4.0 not 5.0, and other values as shown:</p> <div style="text-align: center;">  <p>Resultant is the vector sum</p> </div> <p>(1 mark)</p> <p>b Resultant impact velocity = $\sqrt{3^2 + 4^2}$ $= \sqrt{25}$ $= 5.0 \text{ m s}^{-1}$ (1 mark)</p> <p>$\tan \theta = \frac{\text{opposite}}{\text{adjacent}}$ $= \frac{4}{3}$ $\theta = \tan^{-1}\left(\frac{4}{3}\right)$ $53 = 59^\circ$ to the horizontal (1 mark)</p> <p>$v = 5.8 \text{ m s}^{-1}$ at 59° to the horizontal (1 mark)</p>	No 6.3.26
2.5A Review Q6	<p>Swap diagrams for (b) and (c)</p> <p>b. at its highest point</p> <div style="text-align: center;">  </div> <p>c. shortly before it hits the ground.</p> <div style="text-align: center;">  </div> <p>SHOULD BE:</p>	No 6.3.26

b. at its highest point



c. shortly before it hits the ground.



3.2 WE3.2D
(b) and (e)
page 108

Change b and e as shown below:

$$F_H = F_A \cos \theta$$

$$= \overset{416}{\cancel{400}} \cos 30^\circ \text{ (1 mark)}$$

b. $= \overset{416}{\cancel{400}} \times 0.866$

$$= \overset{360}{\cancel{346}} \text{ N (1 mark) to the right (1 mark) (3 s.f.)}$$

e. Frictional force $F_f = \overset{360}{\cancel{346}} \text{ N}$ (because $F_f = -F_H$ when speed is constant) (1 mark)

No 6.3.26

3.5 Review
Questions

U3& 4. Module 3.5 Review Questions (Q25b)

25. A bag of cement is sliding down a 30° incline at constant speed. **Propose**, with reference to the relationships is true or false. **Justify** your responses.

a. $F_g \sin 30^\circ > F_f$ (2 marks)

b. $F_A = F_g \sin 30^\circ$ (2 marks)

c. $F_N = mg \cos 30^\circ$ (2 marks)

d. $F_g = mg$ (2 marks)

The book view and the digital answers have the correct symbols for Q25b. The symbol on the right above for (b) should be F_f NOT F_A as shown correctly below:

Knowledge utilisation

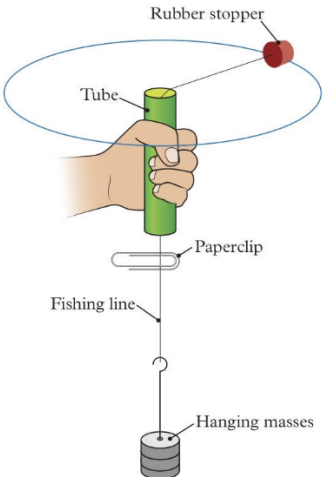
25 A bag of cement is sliding down a 30° incline at constant speed. **Propose**, with reference to the scenario, whether each of the following relationships is true or false. **Justify** your responses.

a $F_g \sin 30^\circ > F_f$ (2 marks)

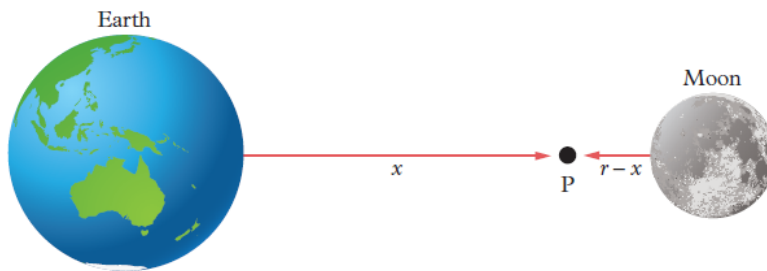
b $F_f = F_g \sin 30^\circ$ (2 marks)

c $F_N = mg \cos 30^\circ$ (2 marks)

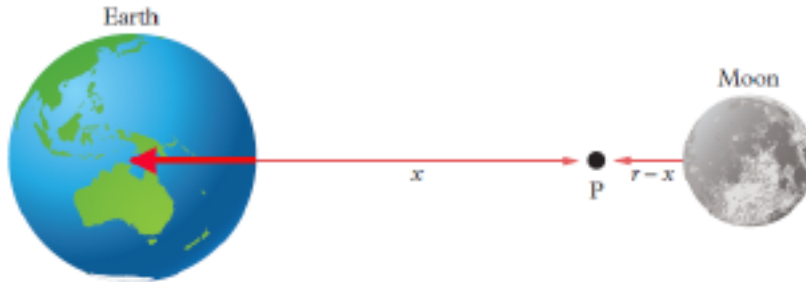
d $F_g = mg$ (2 marks)

4.3 page 159	The normal force can be resolved into two components: one vertical, $F_N \cos \theta$, and one horizontal, $F_N \sin \theta$. There is no acceleration in the vertical direction so	No 6.3.26
4.3 WE4.3E (a) Step 2 page 155	<p>a $v = \frac{2\pi r}{T}$</p> <p>$= \frac{2\pi \times 0.25}{1.00}$ (1 mark)</p> <p>$= 1.571 \text{ ms}^{-1}$ (1.571)</p> <p>$= 1.6 \text{ ms}^{-1}$ (2 s.f.) (1 mark)</p>	No 6.3.26
4.5 ReviewQ 4.5A Q4 page 164	<p>4 A student is investigating centripetal motion by whirling a rubber stopper above his head in a horizontal circle at constant speed.</p>  <p>They increase the mass, m, of the hanging slotted masses but want to keep the radius, r, constant. To do this, they must</p> <p>A increase m or v.</p> <p>B increase m or decrease v.</p> <p>C decrease m or increase v.</p> <p>D decrease m or v.</p>	No 6.3.26
5.2 Page 179 (above Skill drill)	Change 2.92 to 1.46	No 6.3.26
5.2 Skill Drill page 179	<p>Physics U3&4 Module 5.2 page 179</p> <p>Skill drill</p> <p>Identifying relationships</p> <p>Science inquiry skills: Processing and analysing data (Lesson 1.7)</p> <p>In most experiments we manipulate the independent</p> <p>This shows the relationship is linear with a constant $m = 2$. The equation is $y = 2x$.</p> <p>For DV2, doubling the IV quadruples the DV, so</p>	no 6.3.26
5.3 WE5.3A page 185	<p>Worked example 5.3A</p> <p>Gravitational field strength using weight</p> <p>A 650g mass is allowed to hang freely off a spring balance on the Moon. The scale is in newtons (N) and the weight reading on the scale is 1.06N.</p> <p>a Calculate the gravitational field strength on the Moon in N kg^{-1}. Give your answer to an appropriate number of significant figures. (2 marks)</p> <p>b Express the gravitational field strength on the Moon as acceleration due to gravity on the Moon in ms^{-2}. Give your answer to an appropriate number of significant figures. (1 mark)</p>	no 10.1.26
5.3 WE5.3A. Your turn, page 185	<p>Your turn</p> <p>The gravitational field strength on Mars is 3.7 N kg^{-1}. Calculate the gravitational force acting on a 2.5kg object on Mars. Give your answer to an appropriate number of significant figures. (2 marks)</p>	no 10.1.26

5.3
Fig 5 page
188



Red line should extend to centre of Earth and have an arrow head



no 6.3.26

5.3 CYL5.3
Q 5 page
195

5 Calculate the gravitational field strength at a point 100,000km above Earth's centre. The mass of the Earth $m_{\text{Earth}} = 5.97 \times 10^{27} \text{ kg}$, mean radius of Earth $r_{\text{Earth}} = 6.37 \times 10^6 \text{ m}$ (3 s.f.). (3 marks)

10^{24}

no 6.3.26

5.3 WE5.3E
Step 6, page
193

Change 0.4117 to 0.4103

Step 6: Calculate the gravitational field strength at P due to black hole B (g_{PB}). (1 mark for "Calculates the field at P due to B")

$$g_{PB} = \frac{GM_B}{r_{PB}^2}$$

$$= \frac{6.67 \times 10^{-11} \times 100 \times 2 \times 10^6}{(1.803 \times 10^{10})^2}$$

$$= 0.4117 \times 10^{-9} \text{ m s}^{-2} \text{ (1 mark)}$$

Step 7: Add the two vectors g_{PA} and g_{PB} by joining the arrows head to tail. Draw in the resultant vector, g_P . (1 mark for "Draws correct vector diagram")

(1 mark)

0.4103

No 6.3.26

5.3 WE5.3E
page 194

No 6.326

Think	Do
Step 8: Resolve the two vectors g_{PA} and g_{PB} into components along the x- and y-axes. (1 mark for "Calculates the components of the field on P due to B")	$g_{PB(x)} = g_{PB} \sin \theta$ $= 0.4117 \times 10^{-3} \sin 56.31^\circ$ $= 3.426 \times 10^{-7} \text{ m s}^{-2}$ $g_{PB(y)} = g_{PB} \cos \theta$ $= 0.4117 \times 10^{-3} \cos 56.31^\circ$ $= 2.281 \times 10^{-7} \text{ m s}^{-2}$ (1 mark)
Step 9: Add the x-components of the two vectors and add the y-components of the two vectors. (1 mark for "Calculates the sum of fields in both directions")	x-component: $g_{PB(x)} = 0$ $g_{PA(x)} = 3.426 \times 10^{-7}$ $g_x = g_{PB(x)} + g_{PA(x)}$ $= 3.426 \times 10^{-7} \text{ m s}^{-2}$ y-component: $g_{PB(y)} = 13.34 \times 10^{-7}$ $g_{PA(y)} = 2.281 \times 10^{-7}$ $g_y = g_{PB(y)} + g_{PA(y)}$ $= 13.34 \times 10^{-7} + 2.281 \times 10^{-7}$ $= 15.621 \times 10^{-7} \text{ m s}^{-2}$ (1 mark)
Step 10: Add the two vectors g_x and g_y by joining the arrows head to tail. Draw in the resultant vector, g_P . Solve for the resultant, g_P . Calculate the angle, ϕ . (1 mark for "Provides correct mathematical reasoning")	<p> $g_{PB(x)} = 3.426 \times 10^{-7} \text{ m s}^{-2}$ $g_{PB(y)} = 15.621 \times 10^{-7} \text{ m s}^{-2}$ $g_P = 16.00 \times 10^{-7} \text{ m s}^{-2}$ $\phi = \tan^{-1} \left(\frac{3.426 \times 10^{-7}}{15.621 \times 10^{-7}} \right)$ $= 12.3^\circ$ (1 mark) </p>
Step 11: Give your answer to an appropriate number of significant figures, in this case 3 s.f. Use the correct units. Make sure you include the direction. (1 mark for "Provides correct answer")	The gravitational field at P is 16.0 $16.0 \times 10^{-7} \text{ m s}^{-2}$ (3 s.f.) at an angle of 12.3 12.3° towards B from the line joining A and P. (1 mark)

Note also: The first line in Step 11 should read "The gravitational field at P is $16.0 \times 10^{-7} \text{ ms}^{-1}$ (3 s. f.)

5.4 p 198,
print copy
only

152,098,200km, a difference of 5 million km. The difference in radius between the two is about 1.5 per cent, which means the orbit is almost circular. For example, consider an ellipse

Remove space between "about" and "1.5 per cent"

5.4 Real
World P207

Most pass the

Medium Earth orbit (MEO), altitude 1,200–35,790 km, period 2–24 h
Uses: Global positioning satellites (GPS) at 20,000 km, microgravity experiments
Features: ~~Passes~~ same spot twice a day; has short round-trip for signals; more solar radiation so it has a shorter life than LEOs

No 6.3.26

5.4 WE
5.4B Step 2,
Page 203

$T_s = 1.0 \text{ day}, T_M = 28 \text{ days}, r_M = 3.8 \times 10^8 \text{ m}$
 $r_s = ?$
 $\frac{T_a^2}{r_a^3} = \frac{T_b^2}{r_b^3} = \text{constant}$

Change 28 days to 27.3 days

no
10.1.26

5.4 WE5.4B
page 203

Artificial satellites orbiting Earth
 A satellite is launched into orbit around Earth. Knowing that the natural satellite of Earth (the Moon) has period of ~~28~~ days and an orbiting radius of $3.8 \times 10^8 \text{ m}$, **calculate** the desired orbital radius for the artificial satellite so that it has a period of 1 day. Give your answer to an appropriate number of significant figures. (4 marks) **27.3**

...change 28 days (line 3) to 27.3 days

no
10.1.26

6.1 page 232

What experiments are done using Coulomb's law?

no 10.1.26

A great experiment to determine the charge on two spheres involves the use of two ping pong balls coated in conductive paint or wrapped in aluminium foil. The balls, each of mass m , are suspended from a common point by cotton threads of length L . When the balls are given equal ~~negative~~ **positive** charge, they move apart and finally settle in a rest position a distance r apart. This makes an angle θ to the vertical (Figure 13). Using vector diagrams and Coulomb's law calculations, we can work out the charge on the balls and compare

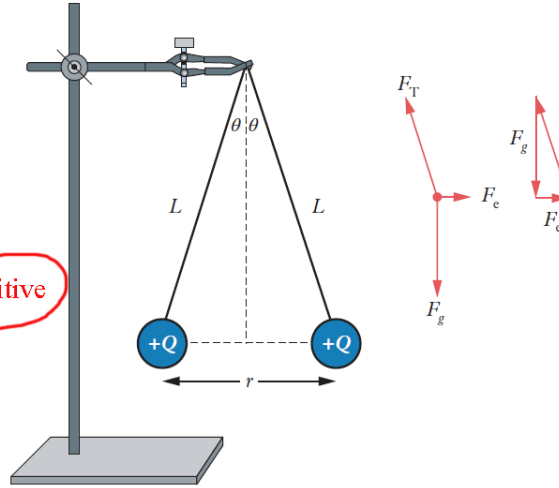


FIGURE 13 Diagram of the ping pong ball setup, along with a free-body diagram and a vector diagram of the forces

6.2 WE6.2D

Step 4: Calculate the field strength at C due to A using $E = \frac{kq}{r^2}$. Convert nm to m. (1 mark for "Calculates field strength at C by A")

Step 5: Calculate the field strength at C due to ~~A~~ ^B using $E = \frac{kq}{r^2}$. Convert nm to m. (1 mark for "Calculates field strength at C by ~~A~~ ^B")

$$E_{CA} = \frac{9 \times 10^9 \times 3 \times 10^{-9}}{(0.30)^2} = 300 \text{ N C}^{-1} \text{ (1 mark)}$$

$$E_{CB} = \frac{9 \times 10^9 \times 34 \times 10^{-9}}{(0.87)^2} = 401 \text{ N C}^{-1} \text{ (1 mark)}$$

no 6.3.26

6.5 Data Drill page 270

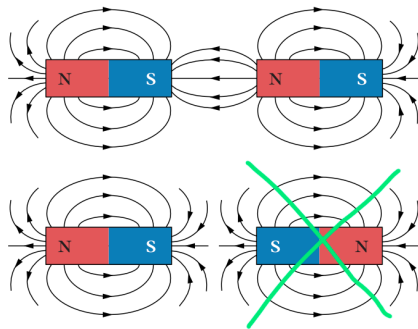
Data drill

Effect of separation distance on force

A pair of lightweight conductive ping pong balls were suspended from a common point by cotton thread (Figure 1). The balls were given an equal ~~negative~~ **positive** charge and allowed to come to rest. The distance apart was varied and the force between the balls was measured.

no 10.1.26

7.1 Fig 3



Change the diagram in the bottom right (above) to look like this (below). Note that the arrow heads have been corrected.

No 6.3.26

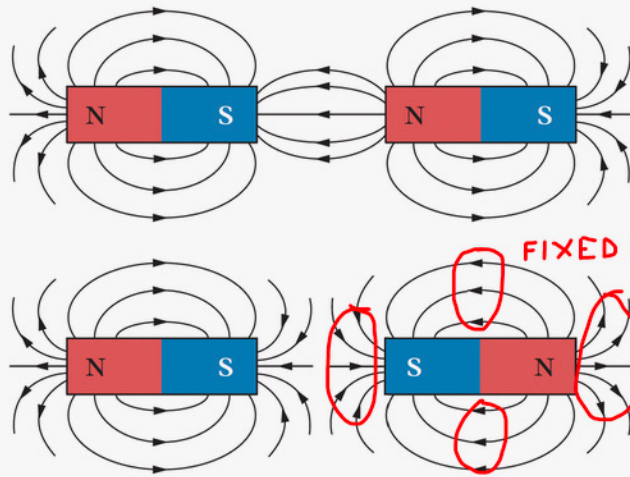


FIGURE 3 Field lines around two magnets with ~~like~~ poles facing, and with ~~unlike~~ poles facing

7.2 Table 1
page 284

Magnetic fields

$$B = \frac{\mu_0 I}{2\pi r}$$

current

Field strength is directly proportional to the ~~charge~~.

no 6.3.26

7.4
Experiment

9:03am Thu 26 Feb course.oxforddigital.com.au 79%

Home > Physics for Queensland Units 3 & 4 > Module 7 > Lesson 7.4
carrying wire is being treated as an electromagnet.

Aim
To investigate the strength of the magnetic field about a current-carrying wire at various distances

Materials

- ~~Connecting wire~~
- Variable laboratory DC power supply, regulated if possible, or materials for potentiometer circuit
- Momentary switch
- Magnetometer (magnetic field sensor), capable of reading 0–1,000 mT
- Computer
- Ruler
- Tape
- Potentiometer circuit (if not using a variable power supply)
- Ammeter or digital multimeter
- ~~Potentiometer (rheostat) (for a current of at least 5 A)~~
- ~~Power supply 6 V DC~~
- Connecting wires (just the regular, flexible light-duty hook-up wire is suitable)
- Graph paper or access to Excel

PLEASE DELETE PRAC 7.4 U3+4

Single page Book view Lesson plan

Start Practical: Strength of a magnetic field at various distances from a current-carrying wire

Lesson overview

Context

Aim

Materials

Methodology notes

Method

Results

Discussion

Methodology notes

End Related resources

7.9A MCQ
Q8 page
316

8 Determine the number of coils on a 150 cm solenoid that has a current of 10.0 A passing through it with a magnetic field strength of 0.00567 T.

- A** ~~400~~ **300**
C 500

- B** 450
D ~~550~~ **680**

Advised 7.3.26

<p>7.9A MCQ Q8 answer</p>	<p>8 Determine the number of coils on a 150 cm solenoid that has a current of 10.0 A passing through it with a magnetic field strength of 0.00567 T.</p> <p>A 400 300 567 B 450 C 500 D 550 680 ← CORRECT ANSWER 680 (D) COLOURED BLUE</p> <p>$B = \mu_0 n I$ $n = \frac{B}{\mu_0 I} = \frac{0.00567}{4 \times \pi \times 10^{-7} \times 10} = 451$</p> <p>$N = \frac{n}{L} \times 1.5$ $N = \pi L = 451 \times 1.5 = 681$</p>	<p>Advised 7.3.26</p>
<p>8.2 Review Q5</p>	<p>In the first line change “A square loop of side 25 cm has a magnetic field strength of 2.2 T threading it”.</p> <p>NOTE: Change 2.2 mT to 2.2 T.</p>	<p>Advised 23.3.26</p>
<p>8.4 Your turn Step 3 and 4</p>	<p>STEP3: Change “Flux lines at the end C will point in towards C.”</p> <p>STEP 4: Change “Flux lines at the end B will point in towards B.”</p>	<p>Advised 25.3.26</p>
<p>8.4 Your turn (after 8.4C page 351) change to answers</p>	<p>Change answers to Your Turn as shown in red:</p> <p>a No change positive to the left (1 mark) b positive to right no change (1 mark) c positive to the right (1 mark) d positive to the left (1 mark)</p>	<p>Advised 7.3.26</p>
<p>8.5D Your turn after WE 8.5D</p>	<p>Correct the question as shown below</p> <p>Your turn</p> <p>A square coil with a side of 20 cm contains 6,500 turns. It is placed in a uniform magnetic field of 0.80 T with the plane of the loop perpendicular to the field.</p> <p>Calculate the frequency in revolutions per second (rps) that will generate a desired average EMF of 167.5 V. Express your answer to an appropriate number of significant figures. (4 marks)</p>	<p>Advised 7.3.26</p>
<p>8.5D Your turn after WE 8.5D</p>	<p>Replace question and answer as shown below</p> <p>Your turn</p> <p>A square coil with a side of 20 cm contains 6,500 turns. It is placed in a uniform magnetic field of 0.80 T with the plane of the loop perpendicular to the field.</p>	<p>Advised 7.3.26</p>

	<p>Calculate the frequency in revolutions per second (rps) that will generate a desired average EMF of 167.5 V. Express your answer to an appropriate number of significant figures. (4 marks)</p> $\phi = BA \cos \theta, \text{ emf} = -N \frac{\Delta \phi}{\Delta t}$ <p>Since the angle goes from 90° to 0°, the change in flux depends on the cos component of the angle which goes from 0 to 1.</p> $\text{emf} = \frac{-N \times BA(\cos 0^\circ - \cos 90^\circ)}{\Delta t} \quad (1 \text{ mark})$ $\Delta t = \frac{-N \times BA(\cos 0^\circ - \cos 90^\circ)}{\text{emf}}$ $= \frac{6,500 \times 0.80 \times 0.20 \times 0.20(1 - 0)}{167.5}$ $= 1.2418 \text{ s} \quad (1 \text{ mark})$ <p>This is the time for one-quarter of a revolution (90°), so the time for 1 revolution (360°):</p> $\Delta t = 4 \times 1.2481 = 4.967 \text{ s} \quad (1 \text{ mark})$ <p>Frequency, $f = \frac{1}{\Delta t} = \frac{1}{4.967} = 0.20 \text{ rps} \quad (1 \text{ mark})$</p>	
11.4 Table 2	<p>Table of work functions.</p> <p>Platinum should be 6.35 NOT 5.63</p>	Advised 1.4.26