

IGCSE

(Syllabus 0625)

PHYSICS

Paper 2 MCQ (Extended)

All Variants (Topical)

Appointed Agents & Wholesalers in PAKISTAN:

BOOK LAND

Urdu Bazaar, Lahore. Tel: 042-37124656

NATIONAL BOOK SERVICE

Urdu Bazaar, Lahore. Tel: 042-37247310.

UNITED BOOKS

Urdu Bazaar Lahore. Tel: 042-37353153, 37361252

BURHANI BOOK CENTRE

New Urdu Bazaar, Karachi, Tel: 021-32634718

MARYAM ACADEMY

Urdu Bazaar, Karachi, Tel: 0331-2425264

WAQAR BROTHERS

Urdu Bazaar, Karachi, Tel: 0321-2202576

REHMAN BOOKS

College Road, Rawalpindi

Tel: 051-5770603, 0313-5618976

UNITED BOOKS

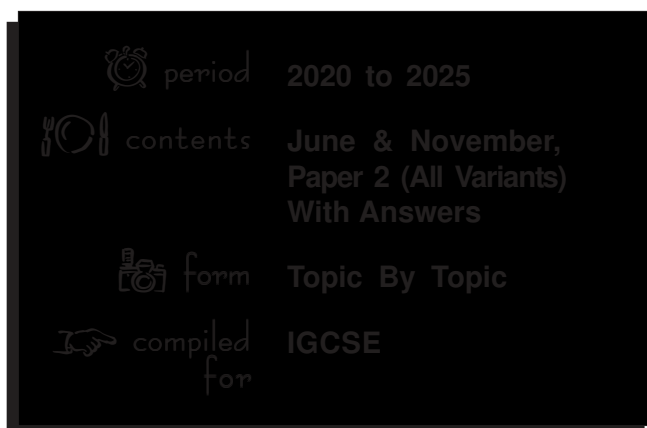
College Road, Rawalpindi,

Tel: 051-5533151, 0336-9574147

WELCOME BOOKS

Soneri Masjid Road, Peshawar Cantt.

Tel: 091-5274932, 0300-5860068



© **REDSPOT PUBLISHING**

📞 Tel No : 042-35201010

📞 Mobile No : 0300-8447654

✉ E-Mail : info@redspot.com.pk

🌐 Website : redspot.pk

📖 E-Books : ebook.redspot.pk

📍 Address : P.O. Box 5041, Model Town, Lahore, Pakistan.



For Online Orders, visit
pak.redspot.pk

E-Books: **ebook.redspot.pk**

All rights reserved. No part of this publication may be reproduced, copied or transmitted in any form or by any means, electronic or mechanical, including photocopy, recording, or any information storage and retrieval system, without permission in writing from the publisher/distributor.

**C
O
N
T
E
N
T
S**

Motion, Forces and Energy

Topic 1 Physical Quantities and Measurement Techniques

1.1 Units, Symbols and Measurement Techniques

1.2 Scalars and Vectors

Topic 2 Motion

2.1 Speed, Velocity and Acceleration

2.2 Graphical Analysis of Motion

Topic 3 Mass, Weight and Gravitational fields

Topic 4 Volume and Density

Topic 5 Forces

Balanced & Un-balanced Forces, Friction, Circular Motion,
Thinking & Braking distance

Topic 6 Turning Effect of Forces

Moments, Centre of gravity, Stability

Topic 7 Elastic Deformation,

Load-Extension Graphs, Limit of Proportionality

Topic 8 Momentum

Topic 9 Energy, Work and Power

9.1 Energy Forms and Major Sources of Energy

9.2 Work, Efficiency & Power

Topic 10 Pressure

Thermal Physics

Topic 11 Kinetic Particle Model of Matter

States of matter, Particle model, Gas Laws, Absolute Scale

Topic 12 Thermal Properties and Temperature

12.1 Thermal Expansion of Solids, Liquids & Gases

12.2 Specific Heat Capacity

12.3 Melting, Boiling and Evaporation

**C
O
N
T
E
N
T
S**

Topic 13 Transfer of Thermal Energy

13.1 Conduction and Convection

13.2 Radiation

Waves

Topic 14 General Properties of Waves

14.1 General Properties of Waves

14.2 Reflection, Refraction & Diffraction of Waves

Topic 15 Light

15.1 Reflection of Light

15.2 Refraction of Light

15.3 Thin Lenses

15.4 Dispersion of Light

Topic 16 Electromagnetic Spectrum

Properties & Applications of Electromagnetic Waves

Topic 17 Sound

Sound, Speed of Sound, Ultrasound

Electricity and Magnetism

Topic 18 Simple Magnetism and Magnetic fields

Topic 19 Electric Charge

Topic 20 Electric Current

Current, Electromotive Force, Potential difference, Resistance

Topic 21 Electric Circuits

21.1 Current & Potential difference in Circuits,
Series & Parallel Circuits

21.2 Action and Use of Circuit Components

Topic 22 Practical Electricity

Uses of Electricity, Electrical Safety

**C
O
N
T
E
N
T
S**

Topic 23 Electromagnetic Effects

- 23.1 Principles of Electromagnetic Induction
- 23.2 The A.C. Generator
- 23.3 Magnetic Effect of a Current
- 23.4 Force on a Current-Carrying Conductor
- 23.5 The D.C. Motor
- 23.6 The Transformer

Nuclear Physics

Topic 24 The Nuclear Model of the Atom

The Atom, The Nucleus, Nuclear Fission, Nuclear Fusion

Topic 25 Radioactivity

- 25.1 Detection of Radioactivity,
The Three Types of Nuclear Emission
- 25.2 Radioactive Decay, Half-life
- 25.3 Safety Precautions & Uses of Isotopes.

Space Physics

Topic 26 The Earth and The Solar System

Topic 27 Stars and The Universe

Topic 1 Physical Quantities and Measurement Techniques

TOPIC 1.1

Units, Symbols and Measurement Techniques

1. A pendulum makes 50 complete swings in 2 min 40 s.
What is the time period for 1 complete swing?

A 1.6 s

B 3.2 s

C 4.8 s

D 6.4 s

[June 2020/P21/Q1]

2. Diagram 1 shows a solid, rectangular-sided block.

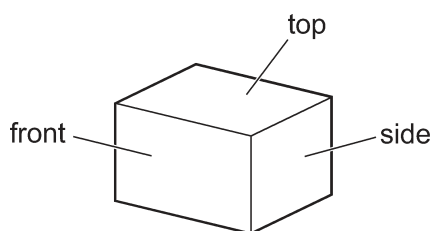


diagram 1

Diagram 2 shows the same block from the front and from the side.

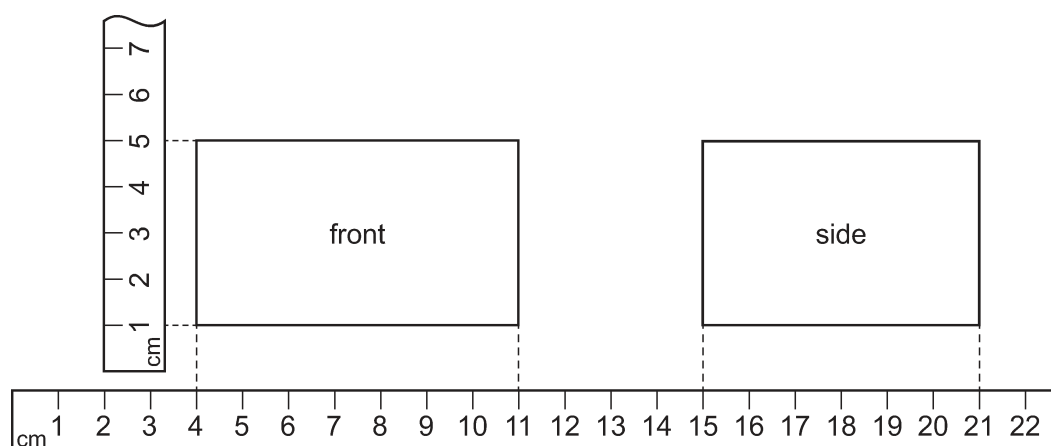


diagram 2

Metre rules have been shown close to the edges of the block.
What is the volume of the block?

A 120 cm³

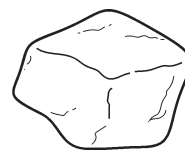
B 168 cm³

C 264 cm³

D 1155 cm³

[June 2020/P23/Q1]

3. The diagram shows a stone of irregular shape.
Which property of the stone can be found by lowering it into a measuring cylinder half-filled with water?



- A length B mass
C volume D weight

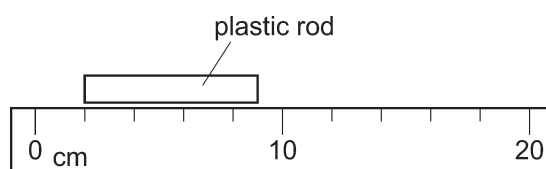
[June 2021/P21/Q1]

4. Which piece of apparatus is the most suitable for measuring the mass of a pencil sharpener?

- A digital balance B measuring cylinder
C newton meter D ruler

[June 2021/P22/Q1]

5. The diagram shows a plastic rod alongside a ruler.



What is the length of the rod?

- A 2.5 cm B 3.5 cm C 7.0 cm D 9.0 cm

[June 2021/P23/Q1]

6. Which measuring devices are most suitable for determining the length of a swimming pool and the thickness of aluminium foil?

	length of a swimming pool	thickness of aluminium foil
A	ruler	measuring cylinder
B	tape measure	micrometer screw gauge
C	tape measure	ruler
D	ruler	micrometer screw gauge

[June 2022/P21/Q1]

7. A wire is approximately 48 cm long and has an approximate diameter of 0.3 mm.

Which measuring instruments can be used to obtain more precise values of the dimensions of the wire?

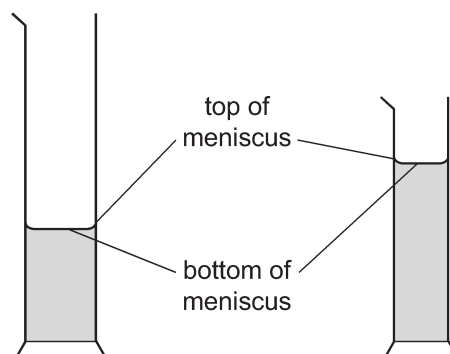
	length of the wire	diameter of the wire
A	30 cm ruler	micrometer
B	half-metre rule	30 cm rule
C	half-metre rule	micrometer
D	micrometer	half-metre rule

[Nov 2022/P23/Q1]

8. A student wishes to measure accurately the volume of approximately 40 cm^3 of water. She has two measuring cylinders, a larger one that can hold 100 cm^3 , and a smaller one that can hold 50 cm^3 . The water forms a meniscus where it touches the glass.

Which cylinder and which water level does the student use to ensure an accurate result?

	cylinder	water level
A	larger one	bottom of meniscus
B	larger one	top of meniscus
C	smaller one	bottom of meniscus
D	smaller one	top of meniscus



[June 2024/P22/Q1]

9. A student measures the volume of a small, irregularly shaped stone.

Which apparatus must be used?

- A** a ruler and a measuring cylinder containing water
- B** a measuring cylinder containing water only
- C** a ruler and an empty measuring cylinder
- D** a ruler only

[June 2024/P23/Q1]

10. A student uses a metre ruler to measure the length of a sheet of paper.

Which measurement is shown to the nearest millimetre?

- A** 0.2932 m
- B** 0.293 m
- C** 0.29 m
- D** 0.3 m

[Nov 2024/P21/Q1]

11. Which instrument is most suitable to determine the volume of a small irregularly shaped stone?

- A** 30 cm ruler
- B** digital timer
- C** measuring cylinder
- D** tape measure

[June 2025/P22/Q1]

12. Which quantity can be measured using a ruler?

- A** the distance travelled by a toy train in one second
- B** the temperature of a toy train
- C** the time taken for a toy train to travel one metre
- D** the volume of a toy train

[June 2025/P23/Q1]

- 13.** A student determines the diameter of a metal ball.

Which apparatus is needed to get an accurate measurement?

- A** a ruler and a protractor **B** a ruler only
C a protractor and a set square **D** a ruler and two rectangular blocks

[Nov 2025/P21/Q1]

- 14.** When a pendulum passes a marker, a timer displays 1 minute 30 seconds.

The pendulum passes the marker 12 more times from the same direction.

On the final pass, the timer displays a time of 2 minutes 18 seconds.

What is the time period of oscillation of the pendulum?

- A** 4.0 s **B** 4.4 s **C** 7.5 s **D** 12 s

[Nov 2025/P23/Q1]

- 15.** Which measuring instrument is used to compare masses?

- A** balance **B** protractor **C** stop-watch **D** voltmeter

[Nov 2025/P23/Q4]

Topic 1.1

Answer Keys

- | | | | | | |
|--------------|--------------|--------------|--------------|--------------|--------------|
| 1. B | 2. B | 3. C | 4. A | 5. C | 6. B |
| 7. C | 8. C | 9. B | 10. B | 11. C | 12. A |
| 13. D | 14. A | 15. A | | | |

TOPIC 5

Forces

Balanced & Un-balanced Forces, Circular Motion, Friction, Thinking & Braking distance

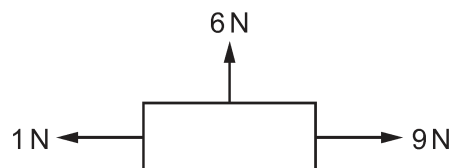
1. A satellite orbits the Earth at constant speed in a circular orbit.

Which statement is correct?

- A The resultant force on the satellite is zero.
- B The resultant force on the satellite is towards the Earth.
- C The resultant force on the satellite is away from the Earth.
- D The resultant force on the satellite is in the direction of motion.

[June 2020/P22/Q7]

2. The diagram shows three forces acting on an object.

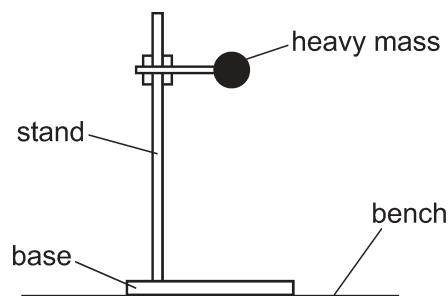


What is the value of the resultant force acting on the object?

- A 2 N
- B 10 N
- C 14 N
- D 16 N

[Nov 2020/P21/Q8]

3. The diagram shows a stand. The stand holds a heavy mass above the bench.



Which two changes would definitely make the stand more stable?

- A Lower the mass and make the base narrower.
- B Lower the mass and make the base wider.
- C Raise the mass and make the base narrower.
- D Raise the mass and make the base wider.

[Nov 2020/P22/Q8]

4. A footballer kicks a stationary football.

His foot is in contact with the ball for 0.050 s.

The mass of the ball is 0.40 kg.

The speed of projection of the ball is 25 m / s.

What is the average force exerted on the ball by his foot?

- A 0.32 N B 0.50 N C 200 N D 1300 N

[Nov 2020/P22/Q9]

5. A cart has a mass of 10 kg. A boy pushes on the cart horizontally with a force of 50 N. The cart accelerates at 0.50 m / s^2 .

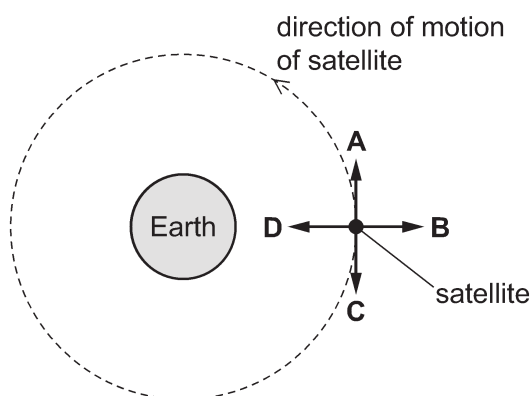
What is the frictional force acting on the cart?

- A 5.0 N B 20 N C 30 N D 45 N

[June 2021/P21/Q7]

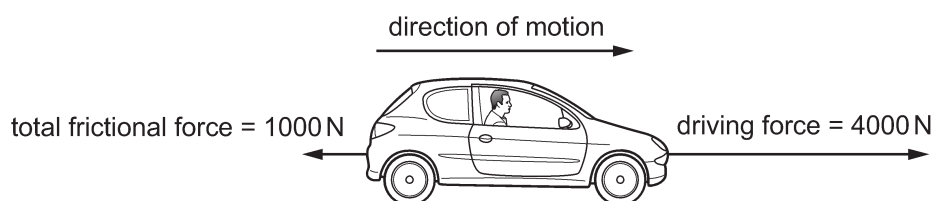
6. A satellite orbits the Earth in an anticlockwise direction at constant speed, as shown.

When the satellite is in the position shown, in which direction does the resultant force act upon it?



[June 2021/P22/Q7]

7. A car of mass 1200 kg is travelling along a horizontal road.



What is the acceleration of the car?

- A 0.83 m / s^2 B 1.2 m / s^2 C 2.5 m / s^2 D 3.3 m / s^2

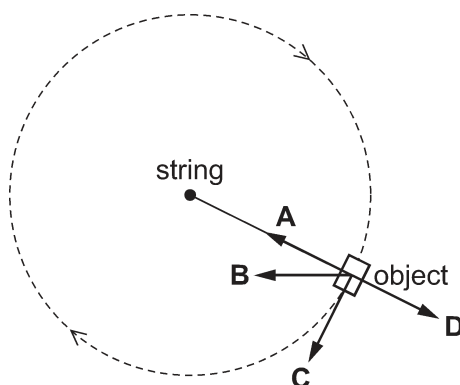
[June 2021/P23/Q7]

8. A rocket is launched upwards from the surface of the Moon.
Hot gases are ejected downwards over a very short period of time.
Which statement is **not** correct?

A The rocket experiences a downward force.
B The rocket experiences an upward force.
C The total momentum of the hot gases is equal to the momentum of the rocket.
D The total momentum of the hot gases and rocket when the hot gases have been ejected is zero.

[Nov 2021/P22/Q7]

9. An object on the end of a string moves in a clockwise circular path at constant speed. The diagram shows the object as viewed from above.
What is the direction of the resultant force on the object when it is in the position shown?



[June 2022/P21/Q6]

10. An object moves at constant speed around a circular path.
Which statement is correct?

A A resultant force acts on the object outwards from the centre of the circle.
B A resultant force acts on the object in the direction it is travelling.
C A resultant force acts on the object towards the centre of the circle.
D There is no resultant force acting on the object because it is moving at constant speed.

[June 2022/P22/Q6]

11. A box of mass 4.0 kg is pulled along a horizontal floor in a straight line by a constant force F .
The constant frictional force acting on the box is 2.0 N.
The speed of the box increases from 0.50 m/s to 2.5 m/s in 2.0 s.
What is the value of F ?

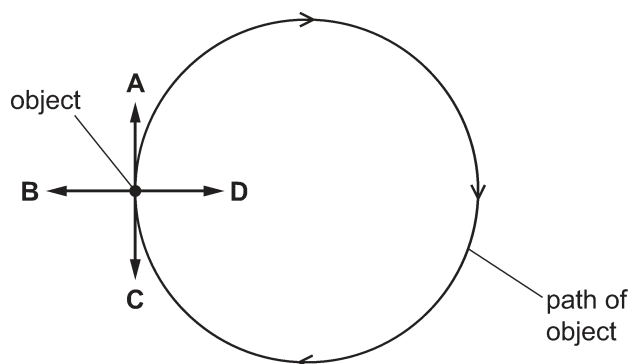
A 2.0 N B 4.0 N C 6.0 N D 7.0 N

[June 2022/P23/Q6]

12. The diagram shows an object moving at a constant speed in a circular path in the direction shown.

A force acts on the object to keep it in the circular path.

In which labelled direction does this force act, when the object is in the position shown?



[Nov 2022/P22/P23/Q6]

13. A force F acts on a body of mass m for a time t . During this time, the velocity of the body increases from u to v .

Which equation relates F , m , t , u and v ?

A $Fm = t(v - u)$

B $Fm = t(v + u)$

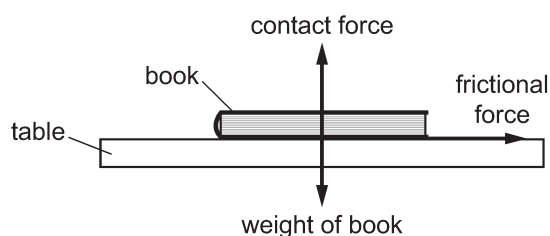
C $Ft = m(v - u)$

D $Ft = m(v + u)$

[Nov 2022/P23/Q7]

14. A train is travelling horizontally in a straight line. A book is on a table in the train.

The diagram shows all the forces acting on the book.

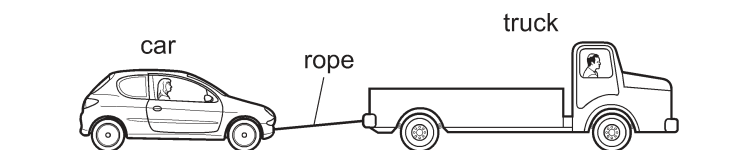


How is the train moving?

- A accelerating to the left of the diagram
B accelerating to the right of the diagram
C moving at uniform speed to the left of the diagram
D moving at uniform speed to the right of the diagram

[June 2023/P21/Q7]

15. A truck is towing a car along a straight horizontal road at a constant speed.



The rope breaks.

Which row gives the direction of the initial acceleration of the truck after the rope breaks and the reason for the acceleration?

	direction of acceleration of the truck	reason
A	left	the driving force is greater than the resistive forces on the truck
B	left	the driving force is smaller than the resistive forces on the truck
C	right	the driving force is greater than the resistive forces on the truck
D	right	the driving force is smaller than the resistive forces on the truck

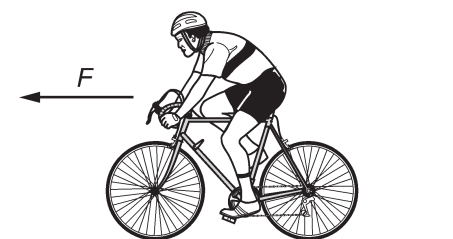
[June 2023/P22/Q7]

16. A resultant force of 2.0 N acts on an object of mass 3.0 kg for 6.0 s.
What is the change in velocity of the object?

A 0.25 m / s **B** 1.0 m / s **C** 4.0 m / s **D** 36 m / s

[June 2023/P22/Q9]

17. A cyclist is travelling in a straight line along a horizontal road at a constant speed.
A constant driving force F acts on the cyclist in the forward direction shown.



Which statement about the magnitude of the frictional forces acting on the cyclist is correct?

- A** The magnitude is equal to F .
B The magnitude is smaller than F , but greater than zero.
C The magnitude is greater than F .
D The magnitude is zero.

[June 2023/P23/Q6]

Topic 5

Answer Keys

1. B	2. B	3. B	4. C	5. D	6. D
7. C	8. C	9. A	10. C	11. C	12. D
13. C	14. B	15. C	16. C	17. A	18. B
19. B	20. B	21. D	22. C	23. A	24. A
25. C	26. A	27. B	28. D	29. A	30. B
31. B	32. B				

TOPIC 15.2

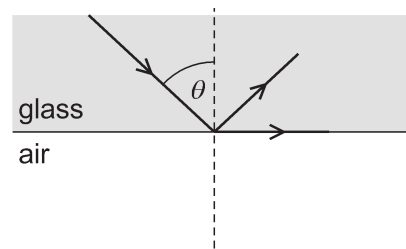
Refraction of Light

1. Which statement is correct?

- A** The speed of light in glass is equal to the speed of light in a vacuum multiplied by the refractive index of glass.
- B** The incident angle of a light ray at an air-glass surface is the angle between the ray and the glass surface.
- C** The sine of the critical angle at an air-glass surface is equal to $\frac{1}{\text{refractive index of glass}}$.
- D** The angle of refraction for light passing through an air-glass surface is proportional to the angle of incidence at that surface.

*[June 2020/P21/P23/Q22]
Repeat [June 2020/P22/Q23]*

2. The diagram shows a narrow beam of light incident on a glass-air boundary. Some of the light emerges along the surface of the glass and some is reflected back into the glass.



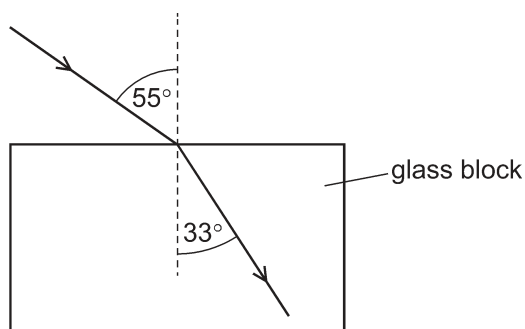
Which row is correct?

	this is an example of total internal reflection	angle θ is the critical angle
A	no	yes
B	no	no
C	yes	no
D	yes	yes

[June 2021/P21/Q23]

3. Light travelling at a speed of 3.0×10^8 m / s strikes the surface of a glass block and undergoes refraction as it enters the block.

The diagram shows a ray of this light before and after it enters the block.

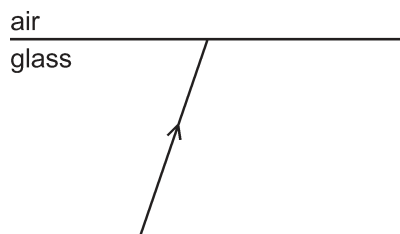


What is the speed of light in the glass?

- A** $1.8 \times 10^8 \text{ m/s}$ **B** $2.0 \times 10^8 \text{ m/s}$ **C** $4.5 \times 10^8 \text{ m/s}$ **D** $5.0 \times 10^8 \text{ m/s}$

[June 2021/P21/P22/P23/Q22]

4. The diagram shows a ray of light in glass incident on the surface between the glass and air.



What happens if the angle of incidence is made larger than the critical angle for the glass?

- A** The angle of refraction becomes equal to 90° .
B There is a refracted ray and a ray reflected inside the glass.
C There is a refracted ray only.
D There is only a ray reflected inside the glass.

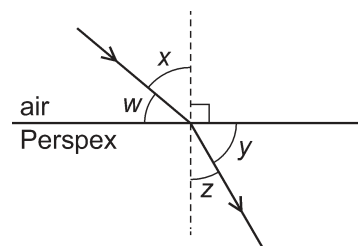
[Nov 2021/P21/Q21]

5. The diagram shows how a ray of light refracts when going from air to Perspex.

The critical angle of Perspex is c .

Which expression is correct?

- A** $\frac{\sin x}{\sin z} = \sin c$ **B** $\frac{\sin z}{\sin x} = \sin c$
C $\frac{\sin w}{\sin y} = \sin c$ **D** $\frac{\sin y}{\sin w} = \sin c$



[Nov 2021/P22/Q19]

6. A ray of light travels from air into a glass block.

	in air	in glass
speed of ray	v_a	v_g
wavelength of ray	λ_a	λ_g
frequency of ray	f_a	f_g

Three suggestions as to how the refractive index of glass n may be calculated are listed.

1 $n = \frac{v_a}{v_g}$

2 $n = \frac{\lambda_a}{\lambda_g}$

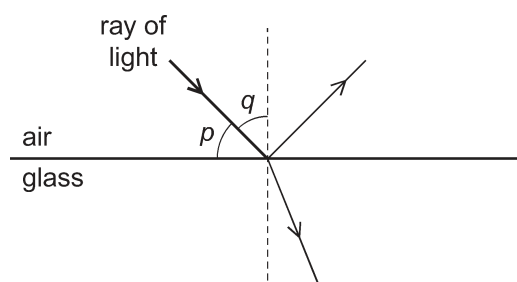
3 $n = \frac{f_a}{f_g}$

Which suggestions are correct?

- A** 1, 2 and 3 **B** 1 and 2 only **C** 1 and 3 only **D** 2 and 3 only

[Nov 2021/P23/Q19]

7. The diagram shows a ray of light in air incident on a glass block. Some of the light is refracted and some of the light is reflected. Two angles, p and q , are marked on the diagram.

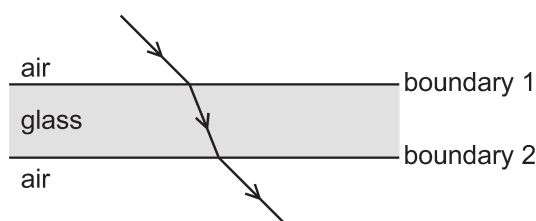


Which row gives the angle of incidence and states whether total internal reflection occurs?

	angle of incidence	total internal reflection
A	p	no
B	p	yes
C	q	no
D	q	yes

[Nov 2021/P21/P22/P23/Q20]

8. A ray of light passes from air through a sheet of glass and out the other side, as shown.



Which two angles are equal to each other?

- A** angle of incidence at boundary 1 and angle of incidence at boundary 2
B angle of incidence at boundary 1 and angle of refraction at boundary 1
C angle of incidence at boundary 1 and angle of refraction at boundary 2
D angle of refraction at boundary 1 and angle of refraction at boundary 2

[June 2022/P23/Q23]

9. The speed of light in air is 3.0×10^8 m / s.

The critical angle for light in a transparent plastic material placed in air is 37° .

What is the speed of light in the plastic material?

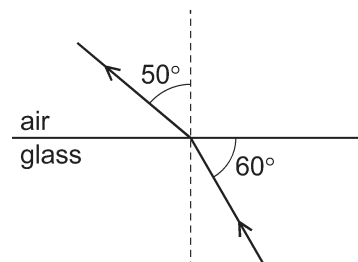
- A** 1.8×10^8 m / s **B** 2.4×10^8 m / s **C** 3.8×10^8 m / s **D** 5.0×10^8 m / s

[June 2022/P21/P22/P23/Q25]

20. A ray of light is refracted as it enters air from glass, as shown.

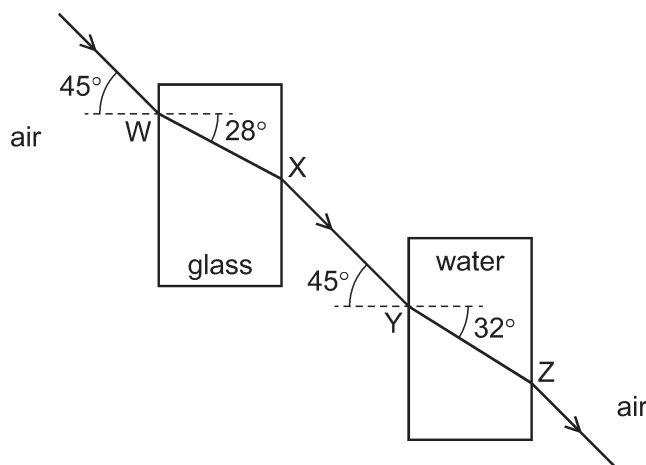
What is the speed of light in the glass?

- A $2.0 \times 10^8 \text{ m/s}$
 B $2.2 \times 10^8 \text{ m/s}$
 C $2.3 \times 10^8 \text{ m/s}$
 D $2.7 \times 10^8 \text{ m/s}$



[June 2024/P23/Q20]

21. A light ray is passed through air, glass and water.

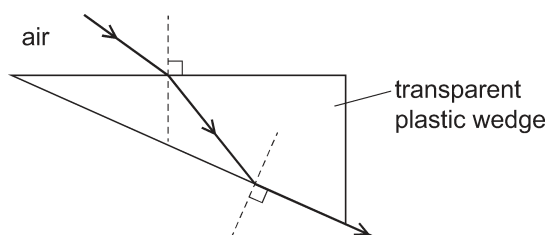


At which points does the light speed decrease?

- A W and X B W and Y C X and Z D Y and Z

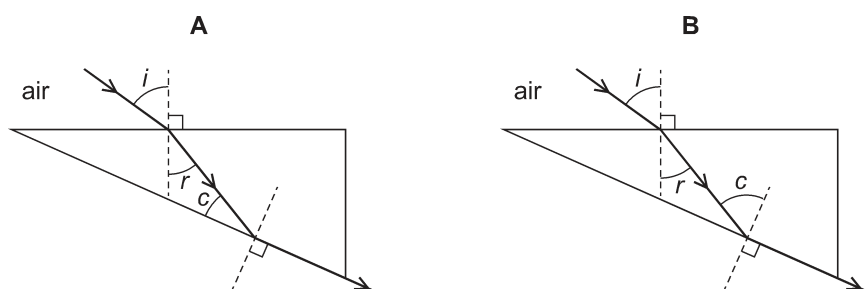
[Nov 2024/P21/Q18]

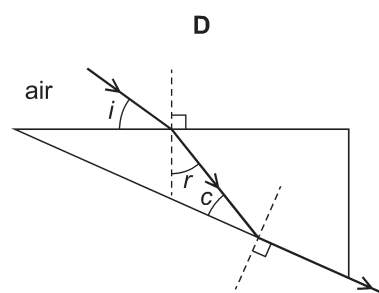
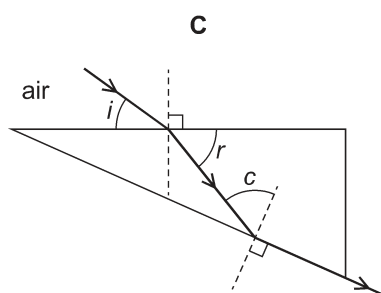
22. A ray of light enters a transparent plastic wedge from air and is incident on the lower surface at the critical angle, as shown.



The angle of incidence is i , the angle of refraction is r , and the critical angle is c .

In which ray diagram are the angles labelled correctly?



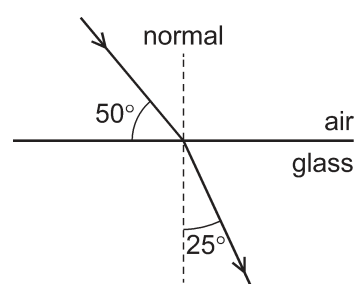


[Nov 2024/P21/Q20]

23. A ray of light passes from air into glass.

What are the angles of incidence and refraction of the ray?

	angle of incidence / °	angle of refraction / °
A	40	25
B	40	65
C	50	25
D	50	65



[Nov 2024/P22/Q20]

24. The speed of light in a material is 50% of the speed of light in air.

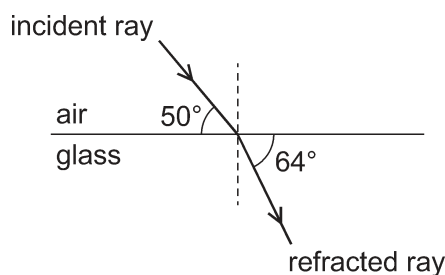
What is the refractive index of the material?

- A** 0.5 **B** 2.0 **C** 6.0×10^8 **D** 1.5×10^8

[June 2025/P21/Q20]

25. A ray of light, travelling in air, is incident on an air–glass boundary.

The angles between the incident ray, the refracted ray and the boundary are shown.



Which equation is used to calculate the refractive index n of the glass?

A $n = \frac{\sin 40^\circ}{\sin 26^\circ}$

B $n = \frac{\sin 40^\circ}{\sin 64^\circ}$

C $n = \frac{\sin 50^\circ}{\sin 26^\circ}$

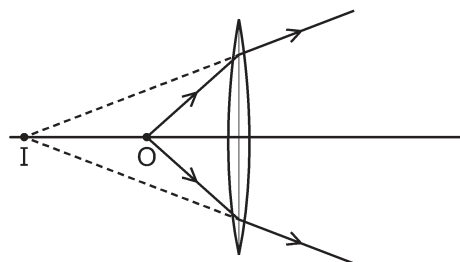
D $n = \frac{\sin 50^\circ}{\sin 64^\circ}$

[June 2025/P22/Q21]

26. A small object O is placed near a converging lens, as shown. The lens forms an image I.

Which statement is correct?

- A The image I is diminished.
- B The image I is inverted.
- C The image I is real.
- D The object O is closer to the lens than its principal focus.



[June 2025/P22/Q22]

27. Which statement about total internal reflection at a glass–air boundary is correct?

- A The angle of incidence inside the glass must be equal to the critical angle.
- B The angle of incidence inside the glass must be less than the critical angle.
- C The critical angle is proportional to the refractive index of the glass.
- D The speed of light in glass must be less than the speed of light in air.

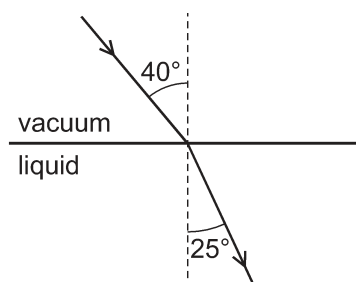
[June 2025/P23/Q20]

28. A beam of light passes through a vacuum and then enters a transparent liquid. The diagram shows the path it takes.

The light travels through the vacuum at a speed of 3.0×10^8 m/s.

What is the speed of light in the liquid?

- A 1.9×10^8 m/s
- B 2.0×10^8 m/s
- C 4.6×10^8 m/s
- D 4.8×10^8 m/s



[Nov 2025/P21/Q19]

29. Total internal reflection may occur when light reaches an air–glass boundary. Under which conditions is light totally internally reflected?

	medium in which light travels towards the boundary	angle of incidence
A	air	greater than the critical angle
B	air	less than the critical angle
C	glass	greater than the critical angle
D	glass	less than the critical angle

[Nov 2025/P22/Q20]

30. The speed of light in a vacuum is 3.0×10^8 m/s.

The speed of light in glass is 2.2×10^8 m/s.

A light ray in a vacuum enters glass with an angle of incidence of 40° .

What is the angle of refraction within the glass?

- A 28°
- B 29°
- C 55°
- D 61°

[Nov 2025/P23/Q20]

Topic 15.2

Answer Keys

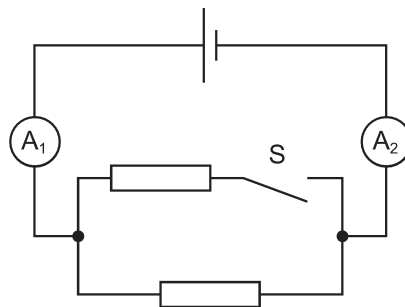
- | | | | | | |
|-------|-------|-------|-------|-------|-------|
| 1. C | 2. A | 3. B | 4. D | 5. B | 6. B |
| 7. C | 8. C | 9. A | 10. C | 11. C | 12. A |
| 13. A | 14. C | 15. B | 16. D | 17. B | 18. D |
| 19. C | 20. A | 21. B | 22. B | 23. A | 24. B |
| 25. A | 26. D | 27. D | 28. B | 29. C | 30. A |

Topic 21 Electric Circuits

TOPIC 21.1

Current & Potential Difference in Circuits, Series & Parallel Circuits

1. In the circuit shown, A_1 and A_2 are ammeters.



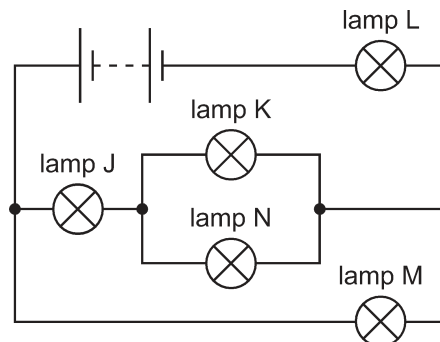
Switch S is closed.

Which row is correct?

	the resistance of the whole circuit	reading of A_1	reading of A_2
A	decreases	stays the same	increases
B	decreases	increases	increases
C	increases	stays the same	stays the same
D	increases	decreases	decreases

[June 2020/P21/Q31]

2. The circuit shown contains five lamps J, K, L, M and N. All the lamps are glowing.



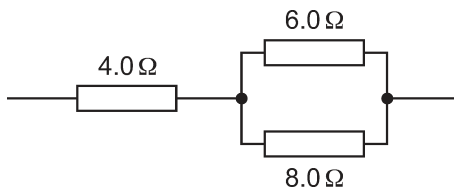
One lamp is removed and two other lamps go out.

Which lamp is removed?

- A** lamp J **B** lamp K **C** lamp L **D** lamp M

[June 2020/P22/Q31]

3. What is the effective resistance of the following combination of resistors?



A 1.8 Ω

B 7.4 Ω

C 11 Ω

D 18 Ω

[June 2020/P22/Q32]

4. A student uses the circuit shown to determine the resistance of two identical resistors.

The voltmeter reading is 2.2 V and the ammeter reading is 0.25 A.

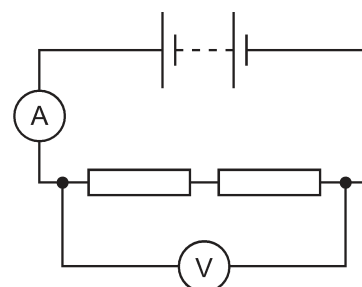
What is the resistance of each resistor?

A 0.275 Ω

B 0.55 Ω

C 4.4 Ω

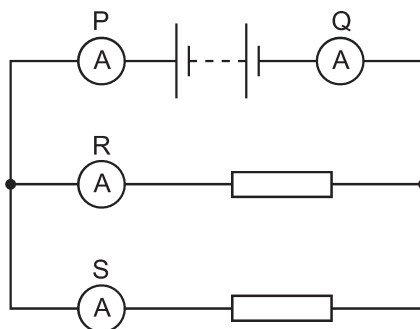
D 8.8 Ω



[June 2020/P22/P23/Q29]

Repeat [June 2020/P21/Q28]

5. A student uses four ammeters P, Q, R and S to measure the current in different parts of the circuit shown.



Which two ammeters read the largest current?

A P and Q

B P and R

C R and Q

D R and S

[Nov 2020/P23/Q31]

Repeat [Nov 2020/P21/Q33]

[Nov 2020/P22/Q32]

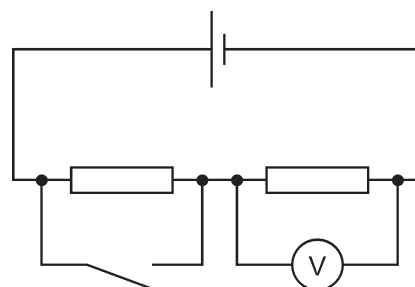
6. The diagram shows a circuit containing a cell, two resistors, a switch and a voltmeter.
- When the switch is open the voltmeter reads 1.5 V.
- When the switch is closed the voltmeter reads 2.0 V.
- What is the electromotive force (e.m.f.) of the cell?

A 0.5 V

B 1.5 V

C 2.0 V

D 3.5 V



[June 2021/P23/Q31]

20. Which statement about a voltmeter is correct?

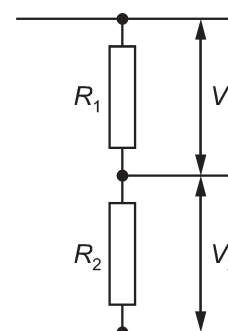
- A It has a scale which is marked in amperes (A).
- B It must be connected in series in a circuit.
- C It measures potential difference (p.d.).
- D It must have three terminals.

[Nov 2023/P21/Q26]

21. Two resistors, with resistances R_1 and R_2 , are used as a potential divider.

What is the relationship between R_1 , R_2 and potential differences V_1 and V_2 ?

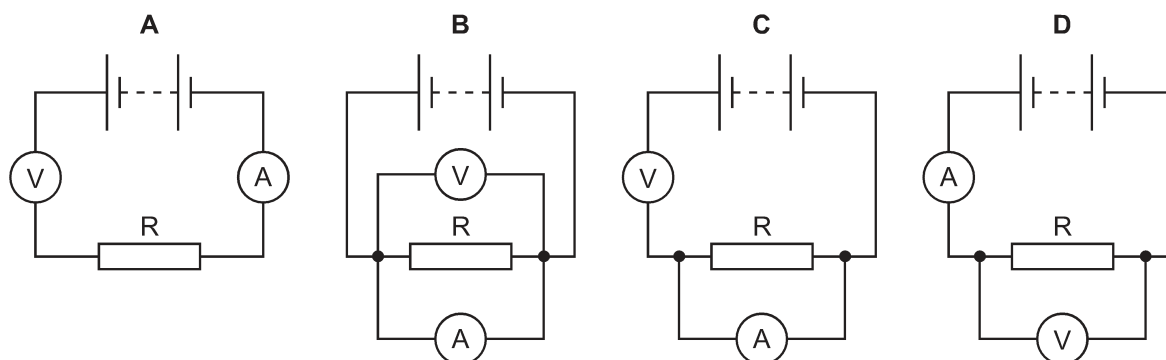
- A $R_1 \times R_2 = V_1 \times V_2$
- B $R_1 \times V_1 = R_2 \times V_2$
- C $\frac{R_1}{R_2} = V_1 \times V_2$
- D $\frac{R_1}{R_2} = \frac{V_1}{V_2}$



[Nov 2023/P23/Q29]

22. A student determines the resistance of resistor R. She uses a circuit including a voltmeter and an ammeter.

Which circuit does she use?



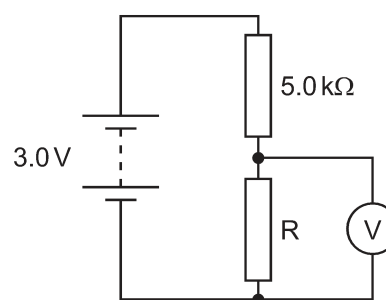
[June 2024/P21/Q26]

23. The diagram shows two resistors used as a potential divider.

The reading on the voltmeter is 1.8 V.

What is the resistance of the resistor R?

- A 3.0 k Ω
- B 3.3 k Ω
- C 7.5 k Ω
- D 13 k Ω

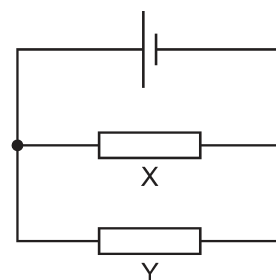


[June 2024/P22/Q29]

24. In the circuit shown, resistor X has twice the resistance of resistor Y.

Which statement about the circuit is correct?

- A The current in the cell is greater than the current in X.
- B The current in X is greater than the current in Y.
- C The potential difference (p.d.) across the cell is greater than the p.d. across X.
- D The p.d. across X is greater than the p.d. across Y.



[Nov 2024/P21/Q29]

25. A $4\ \Omega$ resistor and an $8\ \Omega$ resistor are connected in series with a power supply.

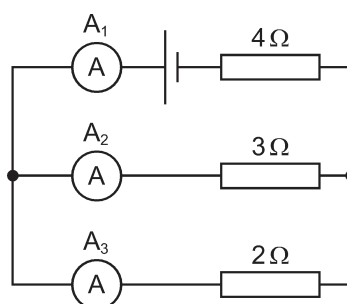
A voltmeter connected across the $8\ \Omega$ resistor reads 36 V.

What is the voltmeter reading when it is connected across the $4\ \Omega$ resistor?

- A 12 V
- B 18 V
- C 72 V
- D 108 V

[Nov 2024/P21/Q30]

26. The diagram shows an electrical circuit.



Which statement is correct?

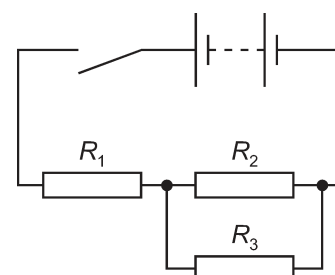
- A The current reading on ammeter A_1 is the highest.
- B The current reading on ammeter A_2 is the highest.
- C The current reading on ammeter A_3 is the highest.
- D The current readings on all three ammeters A_1 , A_2 and A_3 are the same.

[Nov 2024/P22/Q28]

27. The diagram shows an arrangement of resistors in series and parallel.

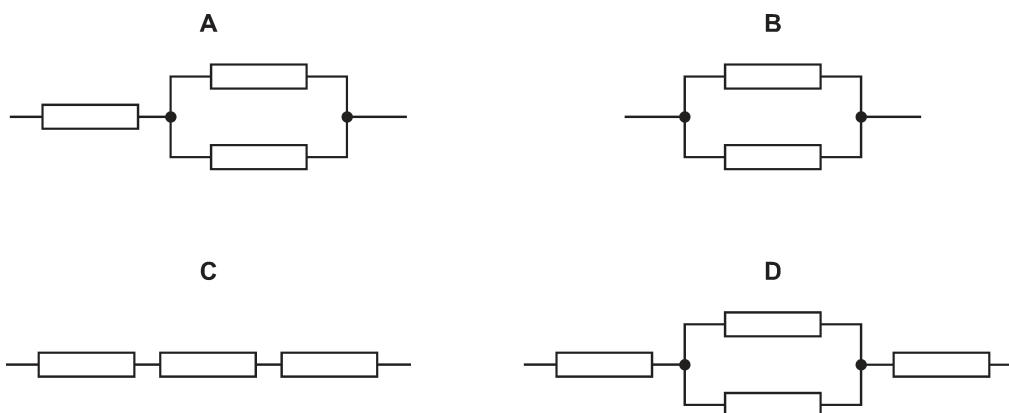
Which equation is used to calculate the combined resistance of the resistors?

- A $R_1 + \frac{R_2 + R_3}{R_2 \times R_3}$
- B $R_1 + \frac{R_2 \times R_3}{R_2 + R_3}$
- C $R_1 + \frac{1}{R_2 + R_3}$
- D $R_1 \times \frac{R_2 + R_3}{R_2 \times R_3}$



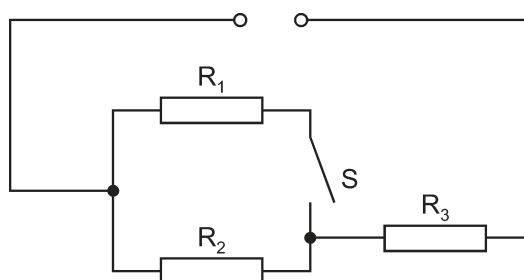
[Nov 2024/P22/Q29]

28. A number of identical resistors of resistance $10\ \Omega$ are arranged in circuits.
Which arrangement of resistors will give an overall resistance of $25\ \Omega$?



[Nov 2024/P23/Q29]

29. The diagram shows three $20\ \Omega$ resistors, R_1 , R_2 and R_3 , and a switch S connected to a d.c. power supply.



Switch S is open.

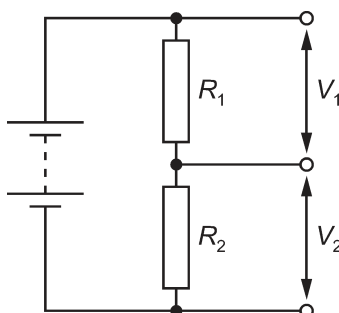
The potential difference (p.d.) across R_3 is $9.0\ \text{V}$.

What is the p.d. across R_3 when switch S is closed?

- A $3.0\ \text{V}$ B $6.0\ \text{V}$ C $12\ \text{V}$ D $27\ \text{V}$

[June 2025/P21/Q27]

30. The diagram shows the circuit for a potential divider.



Which equation is used to calculate V_1 ?

- A $V_1 = \frac{R_1}{V_2 \times (R_1 + R_2)}$ B $V_1 = \frac{V_2 \times R_1}{R_2}$ C $V_1 = \frac{V_2 \times R_1}{R_1 + R_2}$ D $V_1 = \frac{R_1}{V_2 \times R_2}$

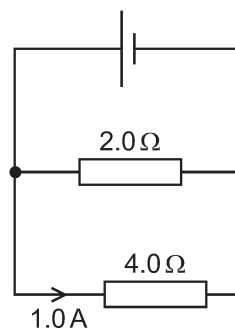
[June 2025/P22/Q29]

31. A cell is connected to a parallel combination of a $2.0\ \Omega$ resistor and a $4.0\ \Omega$ resistor.

The current in the $4.0\ \Omega$ resistor is $1.0\ \text{A}$.

What is the current in the cell?

- A $1.0\ \text{A}$ B $1.5\ \text{A}$
C $2.0\ \text{A}$ D $3.0\ \text{A}$



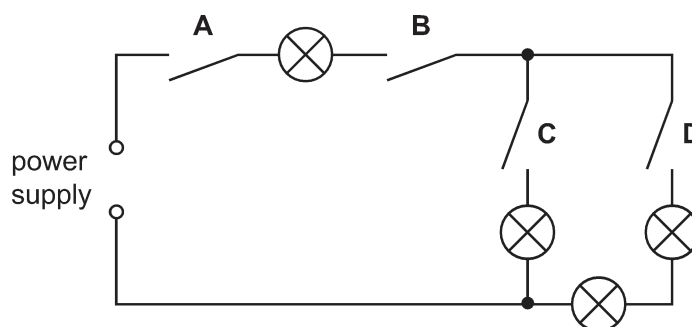
[June 2025/P22/Q31]

32. Four lamps and four switches are connected to a power supply, as shown.

When all the switches are closed, all the lamps are lit.

When one of the switches is then opened, only **one** lamp goes out.

Which switch is opened?



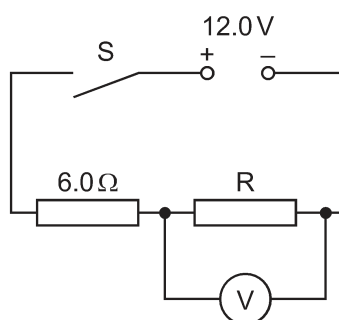
[June 2025/P23/Q28]

33. The diagram shows two resistors in series connected to a power supply.

The reading on the voltmeter is $3.0\ \text{V}$ when the switch is closed.

What is the resistance of resistor R?

- A $0.67\ \Omega$
B $1.2\ \Omega$
C $1.5\ \Omega$
D $2.0\ \Omega$



[Nov 2025/P21/Q28]

34. Lamps can be connected in series or in parallel to a power supply.

What is an advantage of connecting the lamps in parallel rather than in series?

- A All of the lamps can be switched on and off using the same switch.
B Fewer connecting leads are needed to make the circuit.
C When one lamp stops working, the others may continue to work.
D Less power is transferred from the supply.

[Nov 2025/P21/Q29]

35. In a circuit, two identical lamps are in parallel. The parallel pair of lamps is in series with a resistor and a battery.

The battery does 120 J of work moving 50 C of charge around the circuit in time t .

In each lamp, 40 J of work is done by the charge that passes through it in time t .

The electromotive force (e.m.f.) of the battery is E and the potential difference (p.d.) across one lamp is V .

Which statement about E and V is correct?

- A E is 2.4 V and V is 0.80 V. B E is 2.4 V and V is 1.6 V.
C E is 4.8 V and V is 2.4 V. D E is 4.8 V and V is 4.8 V.

[Nov 2025/P22/Q25]

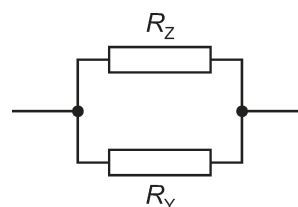
36. A teacher asks three students to write down an equation to determine the combined resistance R_C of resistors with resistances R_Y and R_Z .

Which students are correct?

student 1 $\frac{1}{R_C} = \frac{1}{R_Y} + \frac{1}{R_Z}$

student 2 $\frac{1}{R_C} = \frac{1}{R_Y + R_Z}$

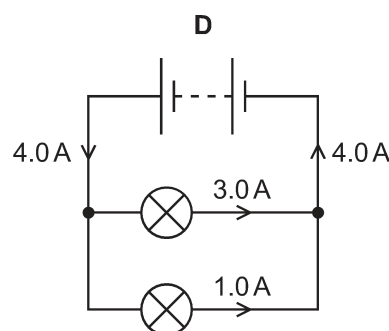
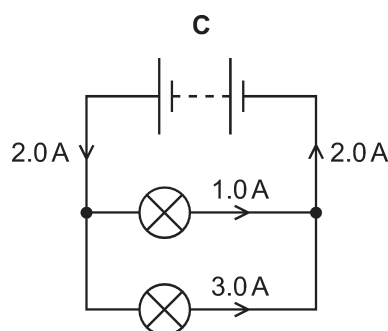
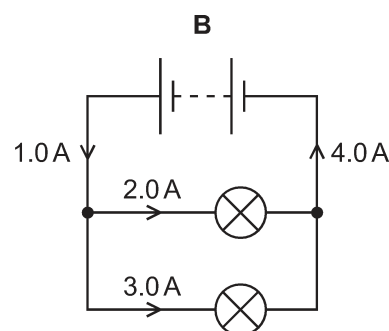
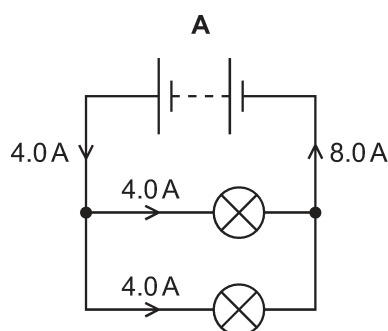
student 3 $R_C = \frac{1}{R_Y} + \frac{1}{R_Z}$



- A 1 and 2 B 1 only C 2 and 3 D 3 only

[Nov 2025/P22/Q28]

37. Which circuit shows possible correct values for the currents?



[Nov 2025/P23/Q30]

Topic 21.1

Answer Keys

- | | | | | | |
|-------|-------|-------|-------|-------|-------|
| 1. B | 2. A | 3. B | 4. C | 5. A | 6. C |
| 7. B | 8. B | 9. D | 10. A | 11. A | 12. A |
| 13. B | 14. D | 15. D | 16. A | 17. C | 18. D |
| 19. A | 20. C | 21. D | 22. D | 23. C | 24. A |
| 25. B | 26. A | 27. B | 28. D | 29. C | 30. B |
| 31. D | 32. C | 33. D | 34. C | 35. B | 36. B |
| 37. D | | | | | |