

GCSE Physics A (Gateway)

J249/04 Physics A P5-P8 and P9 (Higher Tier)

Question Set 28

Multiple Choice Questions

P8: Global Challenges

1 The National Grid transfers energy efficiently using high voltages.

Why are high voltages more efficient?

- A High voltages produce a high current which heats wires less.
- B High voltages produce a high current which heats wires more.
- C High voltages produce a low current which heats wires less. ✓
- D High voltages produce a low current which heats wires more.

Due to the equation
Power loss = $I^2 R$.

Your answer

C

[1]

2 Which row correctly describes the domestic electricity supply in the UK?

	a.c. or d.c.	Frequency (Hz)	Voltage (V)
A	a.c.	50	230
B	a.c.	230	50
C	d.c.	50	230
D	d.c.	230	50

Your answer

A

[1]

3 What is a typical weight of an empty single decker school bus?

- A 1 200 N
- B 12 000 N
- C 120 000 N
- D 1 200 000 N

Approx 10 tonnes

Your answer

C

[1]

4 How was the Sun formed?

- A From dust and gas pulled together by gravity leading to a fission reaction.
- B From dust and gas pulled together by gravity leading to a fusion reaction.
- C From dust and gas pushed together by gravity leading to a fission reaction.
- D From dust and gas pushed together by gravity leading to a fusion reaction

Your answer

B

[1]

5 A hockey player used pads on her legs to reduce injuries when hit by the ball.
How do the pads affect the ball?

- A The acceleration and force of the ball is increased.
- B The acceleration and force of the ball is decreased.
- C The acceleration of the ball is decreased and the force is increased.
- D The acceleration of the ball is increased and the force is decreased.

Your answer

B

$$F=ma$$

[1]

6 Which of the following correctly describes the domestic electricity supply in the UK?

- A 230 V a.c. at 50 Hz
- B 230 V a.c. at 60 Hz
- C 230 V d.c. at 50 Hz
- D 230 V d.c. at 60 Hz

Your answer

A

[1]

7 A car accelerates from 0 to 60 mph (miles per hour) in about 9 seconds.

Use the relationship: $1 \text{ m/s} = 2.24 \text{ mph}$

Estimate the acceleration for this car in m/s^2 .

- A 1 m/s^2
- B 3 m/s^2
- C 7 m/s^2
- D 15 m/s^2

$$\frac{\text{End speed} - \text{Start speed}}{\text{time}} = \text{acceleration}$$

$$\frac{(60 \div 2.24) - 0}{9}$$

Your answer

D

$$= 2.97$$

$$= 3 \text{ ms}^{-2}$$

[1]

8 A planet moves in a circular orbit around its star.

Which statement is correct?

- A The planet travels at changing speed and changing velocity.
- B The planet travels at changing speed but constant velocity.
- C The planet travels at constant speed and velocity.
- D The planet travels at constant speed but changing velocity.

Your answer

D

[1]

9 A student measures the time it takes for a bicycle to stop in an emergency.

She repeats the measurement to get three results.

The average time for her results is 2.72 s.

The first two results are 2.66 s and 2.60 s. What is the value of her third result?

- A 2.63 s
- B 2.66 s
- C 2.72 s
- D 2.90 s

$$\frac{2.66 + 2.60 + x}{3} = 2.72$$

Your answer

D

$$x = (2.72 \times 3) - (2.66 + 2.60) \\ = 2.90 \text{ seconds} \quad [1]$$

10 An artificial satellite is kept in its low polar orbit by a gravity force from a planet.

The satellite is moved to a higher orbit above the planet.

Which statement is correct about the satellite in this higher orbit?

- A The force of gravity is greater and its speed decreases.
- B The force of gravity is greater and its speed increases.
- C The force of gravity is less and its speed decreases.
- D The force of gravity is less and its speed increases

Your answer

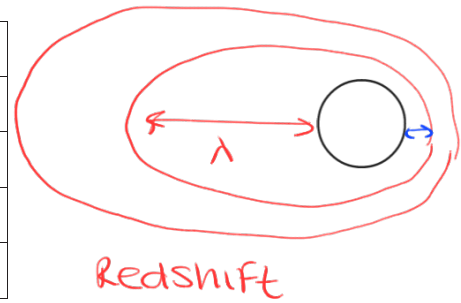
C

[1]

11

Which row **A**, **B**, **C** or **D**, describes what has happened to light that has undergone red shift?

	Wavelength	Frequency
A	Decreases	Decreases
B	Decreases	Increases
C	Increases	Decreases
D	Increases	Increases



Your answer

C

[1]

12

An adult on a bicycle travels at 8 m/s on a level road. She sees a hazard and applies her brakes using full force.

Estimate the force of the brakes.

- A** 5 N
- B** 50 N
- C** 500 N
- D** 5000 N

Your answer

B

[1]

13

Which row in the table shows realistic speeds?

	Speed (m/s)		
	Road cyclist	Gale force wind	Sound in air
A	40	12	1 000
B	6	24	340
C	20	6	760
D	15	55	250

Your answer

B

[1]

14 Which statement shows energy resources that are **all renewable**?

- A Bio-fuel, wind, hydro-electricity and tides.
- B Fossil fuels, bio-fuel, wind and hydro-electricity.
- C Fossil fuels, nuclear fuel, hydro-electricity and tides.
- D Nuclear fuel, bio-fuel, wind and tides.

Your answer

A

[1]

15 The table contains statements about red-shift and galaxies.

Which row in the table is correct?

	Statement 1	Statement 2
A	All galaxies move apart at the same speed.	They show both red-shift and blue-shift.
B	Distant galaxies show more red-shift.	The distant galaxies are moving apart faster than nearby ones.
C	Distant galaxies show more red-shift.	The distant galaxies are moving apart slower than nearby ones.
D	There are no galaxies that show blue-shift.	All galaxies are moving away from each other.

Your answer

B

[1]

16 All bodies emit electromagnetic radiation.

Body **R** is at a higher temperature than body **S**.

Which statement is correct?

- A **R** emits radiation with a mean higher frequency.
- B **R** emits radiation with a mean longer wavelength.
- C **S** emits radiation with a higher intensity.
- D **S** emits radiation with a mean shorter wavelength.

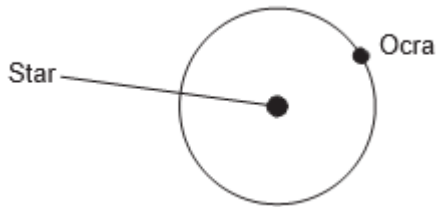
Your answer

A

[1]

17

Planet Ocra is in a circular orbit around a star.



Which statement is correct?

- A The acceleration of Ocra is zero.
- B The speed of Ocra is changing.
- C The velocity of Ocra is changing.
- D The velocity of Ocra is zero.

Your answer

C

[1]

18

An artificial satellite orbits the Earth in a circular path.

The satellite is moved further away from Earth to another orbit.

Which row in the table is correct?

	Force of gravity	Speed in orbit	Time period
A	decreases	decreases	decreases
B	decreases	decreases	increases
C	decreases	increases	increases
D	increases	increases	increases

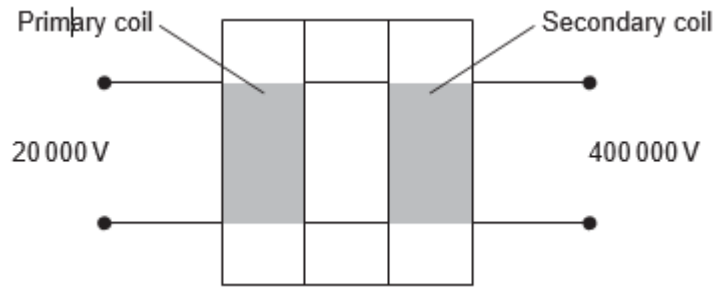
Your answer

B

[1]

19

This is a diagram of a transformer used in the national grid.



Why is this transformer used in the national grid?

- A To decrease the power in the national grid by a factor of 20.
- B To decrease the power loss in the national grid by a factor of 400.
- C To increase the power in the national grid by a factor of 20.
- D To increase the power loss in the national grid by a factor of 400.

Your answer

B

[1]

Total Marks for Question Set 4: 19

Equations in physics

$$(\text{final velocity})^2 - (\text{initial velocity})^2 = 2 \times \text{acceleration} \times \text{distance}$$

$$\text{change in thermal energy} = \text{mass} \times \text{specific heat capacity} \times \text{change in temperature}$$

$$\text{thermal energy for a change in state} = \text{mass} \times \text{specific latent heat}$$

$$\text{energy transferred in stretching} = 0.5 \times \text{spring constant} \times (\text{extension})^2$$

$$\text{potential difference across primary coil} \times \text{current in primary coil} = \text{potential difference across secondary coil} \times \text{current in secondary coil}$$

Higher tier only –

$$\text{force on a conductor (at right angles to a magnetic field) carrying a current} = \text{magnetic flux density} \times \text{current} \times \text{length}$$

OCR

Oxford Cambridge and RSA

Copyright Information

OCR is committed to seeking permission to reproduce all third-party content that it uses in its assessment materials. OCR has attempted to identify and contact all copyright holders whose work is used in this paper. To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced in the OCR Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download from our public website (www.ocr.org.uk) after the live examination series.

If OCR has unwittingly failed to correctly acknowledge or clear any third-party content in this assessment material, OCR will be happy to correct its mistake at the earliest possible opportunity.

For queries or further information please contact The OCR Copyright Team, The Triangle Building, Shaftesbury Road, Cambridge CB2 8EA.

OCR is part of the Cambridge Assessment Group; Cambridge Assessment is the brand name of University of Cambridge Local Examinations Syndicate (UCLES), which is itself a department of the University of Cambridge