



**Test Papers
Hub.**

HSC Physics Practice Paper 1

Year 12 · Modules 5–8 — Practice Examination

**Reading time 5 minutes · Working time 3 hours · Section I: 20 multiple-choice ·
Section II: 80 marks · 100 marks in all**

How to use this booklet

- Reading time – 5 minutes. Working time – 3 hours. Write using black pen. Draw diagrams using pencil.
- Calculators approved for use in the HSC may be used. A data and formulae sheet is provided at the back of the question paper.
- Section I: 20 multiple-choice questions (1 mark each). Section II: 21 written-response questions (80 marks).
- Worked solutions follow the paper: every question has step-by-step working, a key takeaway and (for multiple choice) a note on why each wrong option is wrong.

SECTION I

20 marks · Attempt Questions 1 – 20 · Allow about 35 minutes

Select the alternative A, B, C or D that best answers the question. Each question is worth 1 mark.

1. A satellite moves from a low orbit to a higher circular orbit around Earth. Compared with the low orbit, in the higher orbit its:

- A speed is lower and its period is shorter
- B speed is higher and its period is shorter
- C speed is the same and its period is longer
- D speed is lower and its period is longer

2. A car travels at constant speed around a roundabout. Which statement is correct?

- A The car is accelerating because its velocity direction is changing
- B The acceleration is directed along the car's motion
- C The car is not accelerating because its speed is constant
- D The net force on the car is zero

3. A ball is kicked from level ground at 28 m s^{-1} at 55° above the horizontal. Ignore air resistance and take $g = 9.8 \text{ m s}^{-2}$. What is the ball's time of flight?

- A 4.68 s
- B 3.28 s
- C 2.34 s
- D 5.71 s

4. Consider the power dissipated in a resistor ($P = V^2/R$). The voltage across it is multiplied by 1.5 and its resistance is doubled, with everything else unchanged. By what factor does the quantity change?

- A $\times \frac{81}{64}$
- B $\times \frac{9}{4}$
- C $\times \frac{9}{8}$
- D $\times \frac{8}{9}$

5. A frictionless banked curve of radius 210 m is designed so that cars travelling at 25 m s⁻¹ do not need friction to turn. At what angle to the horizontal should the road be banked?

- A 73.1 °
- B 16.9 °
- C 0.696 °
- D 17.7 °

6. A coil of 200 turns and cross-sectional area 0.041 m² is placed with its plane perpendicular to a uniform magnetic field. The field increases steadily by 0.66 T in 0.71 s. The coil is connected to a resistor so that the total resistance of the circuit is 36 Ω. What is the magnitude of the average induced emf?

- A 3.84 V
- B 0.0381 V
- C 186 V
- D 7.62 V

7. A rectangular motor coil of 40 turns has dimensions 0.020 m by 0.090 m and carries a current of 2.7 A in a uniform field of 0.060 T. The plane of the coil makes an angle of 30° with the field direction. What is the torque on the coil?

- A 5.83×10^{-3} N m
- B 2.53×10^{-4} N m
- C 0.0117 N m
- D 0.0101 N m

8. A positive charge is moved from one point to another in a uniform electric field so that its potential energy increases. The charge was moved:

- A in any direction, since the field is uniform
- B in the direction of the field
- C against the direction of the field
- D perpendicular to the field

WORKED SOLUTIONS

Answers & worked solutions

Multiple-choice answer key

1	D	2	A	3	A	4	C	5	B	6	D
7	D	8	C	9	C	10	B	11	D	12	A
13	C	14	A	15	B	16	A	17	B	18	B
19	C	20	D								

SECTION I

1. A satellite moves from a low orbit to a higher circular orbit around Earth. Compared with the low orbit, in the higher orbit its: [Gravitation and orbits]

Correct answer: D — speed is lower and its period is longer

- $v = \sqrt{GM/r}$, so a larger r gives a smaller speed.
- T^2 is proportional to r^3 , so a larger r gives a longer period.
- Why the other options are wrong:
 - A (speed is lower and its period is shorter): the period increases with radius (T^2 is proportional to r^3)
 - B (speed is higher and its period is shorter): orbital speed decreases with radius: $v = \sqrt{GM/r}$
 - C (speed is the same and its period is longer): the speed depends on the orbital radius

LOS: Gravitation and orbits

KEY TAKEAWAY

Higher orbits are slower and have longer periods — the satellite must LOSE speed (kinetic energy) while gaining gravitational potential energy.

2. A car travels at constant speed around a roundabout. Which statement is correct? [Circular motion]

Correct answer: A — The car is accelerating because its velocity direction is changing

- Velocity is a vector: changing direction changes the velocity.
- So the car accelerates towards the centre of the circle, which needs a net inward force.
- Why the other options are wrong:
 - B (The acceleration is directed along the car's motion): the acceleration is directed towards the centre, at right angles to the motion
 - C (The car is not accelerating because its speed is constant): acceleration is a change in VELOCITY, which includes direction
 - D (The net force on the car is zero): a centripetal net force is needed to change the direction

LOS: Circular motion