PHYSICS GRADE 10

OPENER EXAM TERM 2 2026

TIME: 2 HOURS

NAME……ADM NO……

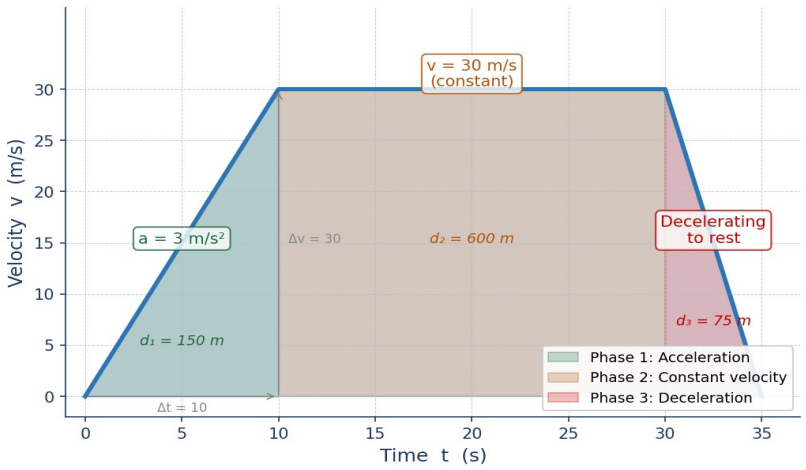
DATE……SIGN……

INSTRUCTIONS TO CANDIDATES

1. ***Write your name, admission number and class in the spaces provided above.***
2. ***Answer ALL questions in ALL sections.***
3. ***All working must be clearly shown.***

1.A car starts from rest and accelerates uniformly to a velocity of 30 m/s in 10 seconds. It then travels at this constant velocity for 20 seconds before decelerating uniformly to rest in 5 seconds.

Figure 1 — Velocity–Time Graph for a Moving Car



(a) Define the term acceleration and state its SI unit. (2 marks)

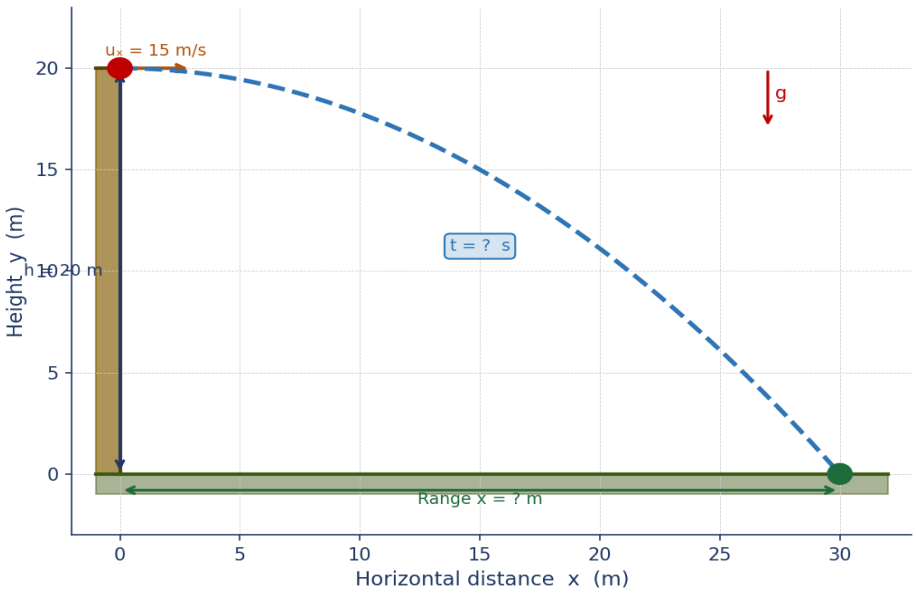
(b) Calculate the acceleration of the car during the first phase of motion. (3 marks)

(c) Using Figure 1, calculate the total distance travelled by the car. (4 marks)

(d) State one real-life application of uniform deceleration. (1 mark)

2.A ball is kicked horizontally from the top of a cliff 20 m high with an initial horizontal velocity of 15 m/s. ($g = 10\ m/s^2$)

Figure 2 — Projectile Motion from a Cliff



(a) Distinguish between a scalar quantity and a vector quantity, giving one example of each. (2 marks)

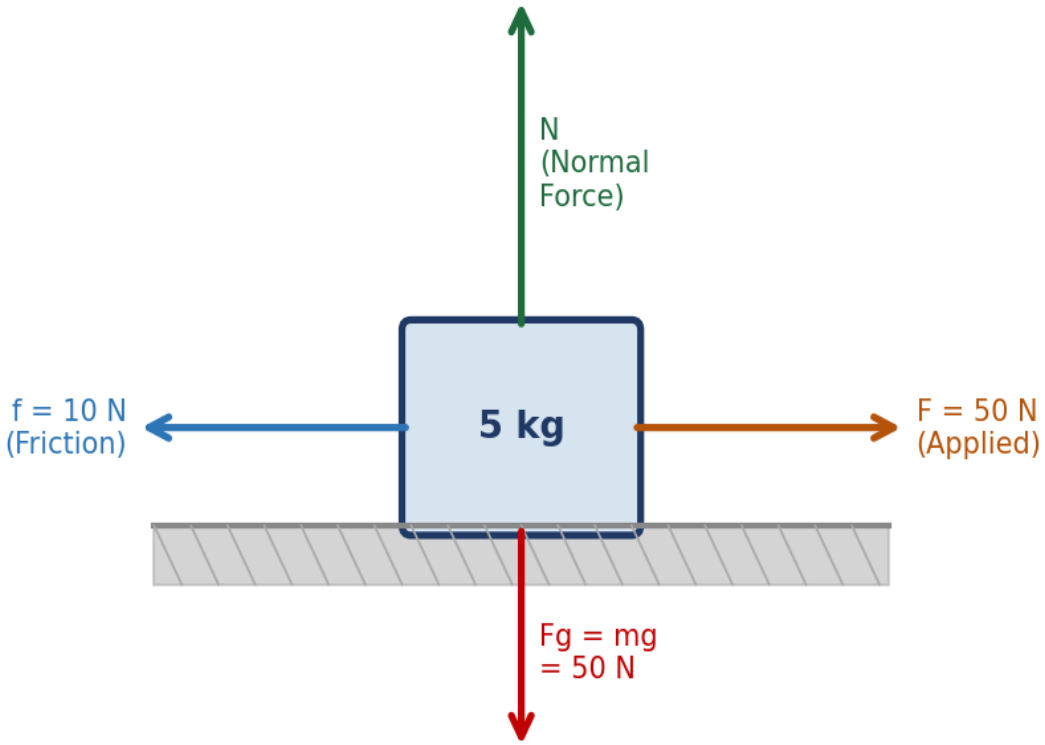
(b) Calculate the time taken for the ball to reach the ground. (3 marks)

(c) Determine the horizontal range covered before the ball hits the ground. (3 marks)

(d) State the principle that explains why the horizontal and vertical motions are independent. (2 marks)

3.Study the free body diagram below carefully and answer the questions that follow.

Figure 3 — Free Body Diagram of 5 kg Block



(a) State Newton's First Law of Motion. (2 marks)

(b) Calculate the net force acting on the block. (2 marks)

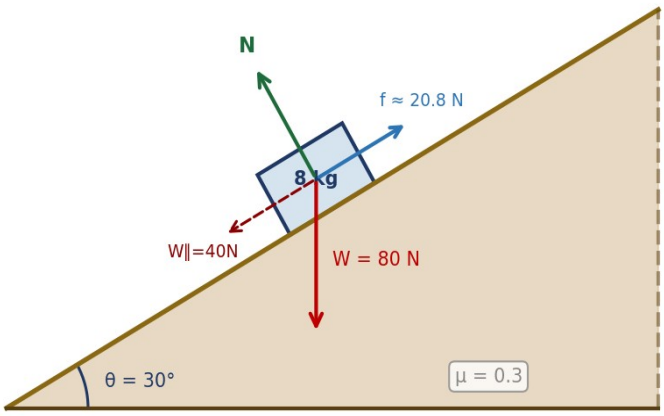
(c) Using Newton's Second Law, calculate the acceleration of the block. (3 marks)

(d) State one practical application of Newton's Third Law of Motion. (1 mark)

(e) Define the term 'inertia' and state what it depends on. (2 marks)

4.A wooden block of mass 8 kg is placed on a rough inclined plane making an angle of 30° with the horizontal. The coefficient of friction μ = 0.3.

Figure 4 — Block on Inclined Plane (θ = 30°)



(a) Resolve the weight of the block into components parallel and perpendicular to the incline. (3 marks)

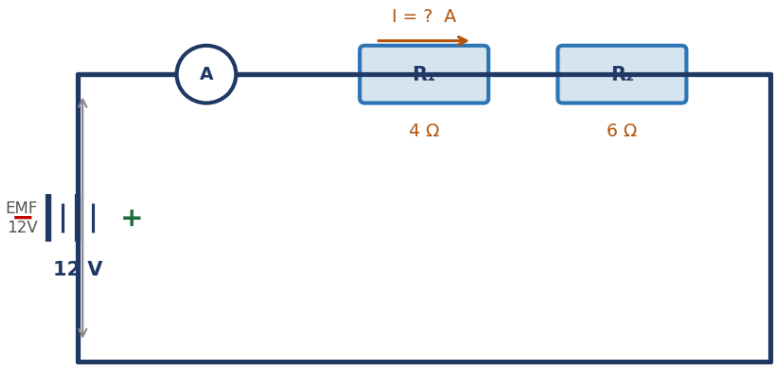
(b) Calculate the frictional force acting on the block. (2 marks)

(c) Determine whether the block will slide down the plane. Explain your answer. (3 marks)

(d) State two factors that affect the magnitude of the frictional force between two surfaces. (2 marks)

5.Study the series circuit diagram below and answer the questions that follow.

Figure 5 — Series Circuit: $R_1 = 4\ \Omega$ and $R_2 = 6\ \Omega$ with 12 V Battery



(a) State Ohm's Law. (2 marks)

(b) Calculate the total resistance in the series circuit. (2 marks)

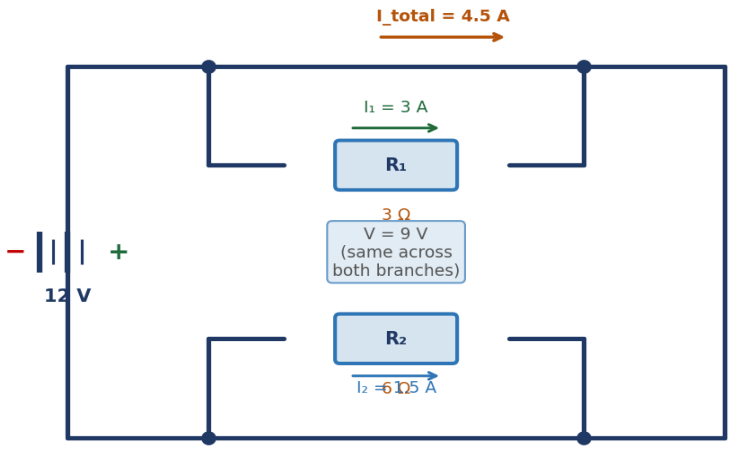
(c) Calculate the current flowing through the circuit. (2 marks)

(d) Calculate the potential difference (voltage drop) across each resistor. (2 marks)

(e) State one difference between series and parallel circuits in terms of current flow. (2 marks)

6.The circuit below shows two resistors connected in parallel to a 9 V battery.

Figure 6 — Parallel Circuit: R_1 = 3 Ω and R_2 = 6 Ω with 9 V Battery



(a) Calculate the equivalent resistance of the parallel combination. (3 marks)

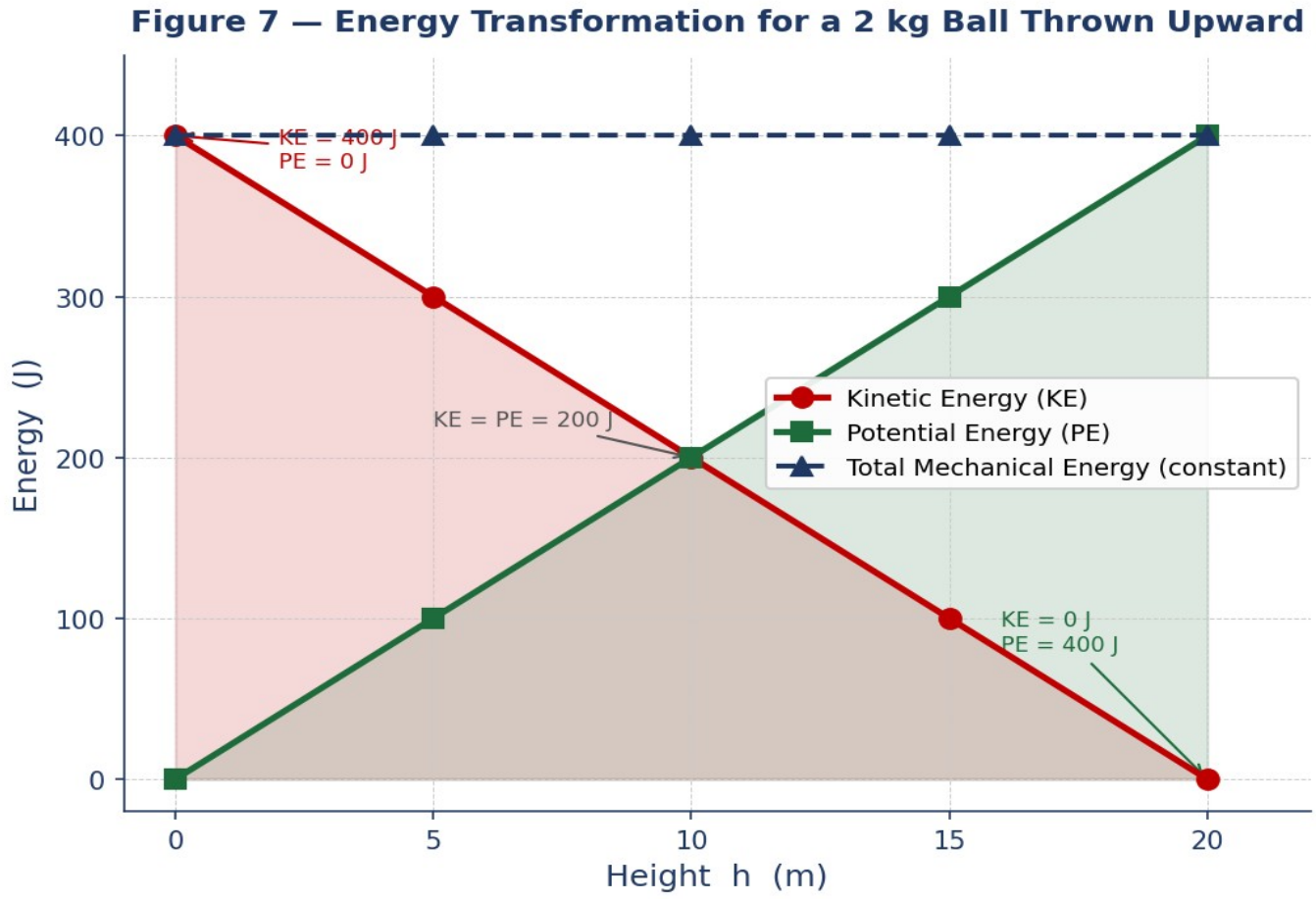
(b) Calculate the total current drawn from the battery. (2 marks)

(c) Calculate the electrical power dissipated in resistor R_1. (2 marks)

(d) State two advantages of connecting household appliances in parallel. (2 marks)

(e) Define electric current and state its SI unit. (1 mark)

7.A 2 kg ball is thrown vertically upward from the ground with an initial speed of 20 m/s.



(a) Define work done and state its SI unit. (2 marks)

(b) Calculate the initial kinetic energy of the ball. (2 marks)

(c) Using conservation of energy, calculate the maximum height reached by the ball. (3 marks)

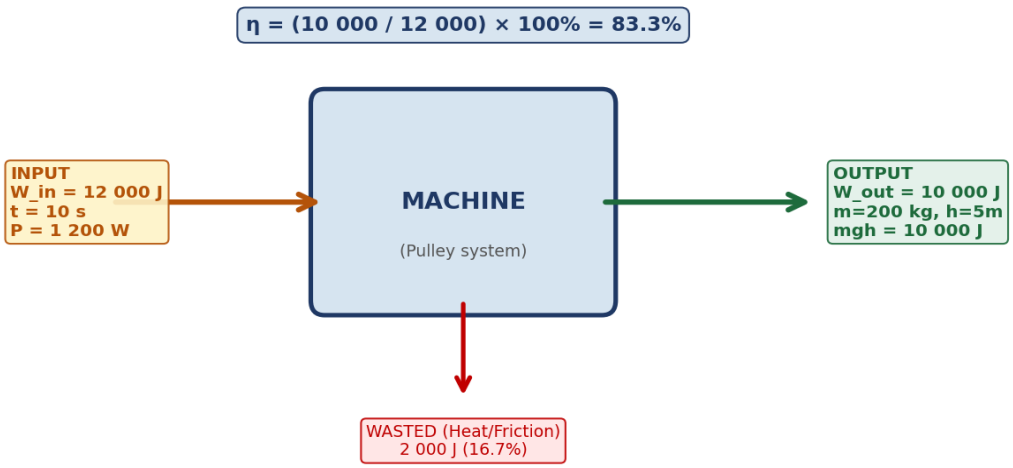
(d) Complete the table below using Figure 7 as a guide: (2 marks)

Position	Kinetic Energy (J)	Potential Energy (J)	Total Mechanical Energy (J)
Ground level	400 J	0 J	
Half-way up			400 J
Max. height	0 J		400 J

(e) State the Law of Conservation of Energy. (1 mark)

8.A machine is used to lift a 200 kg load through a height of 5 m in 10 seconds. The machine requires an input energy of 12 000 J.

Figure 8 — Energy Flow Diagram for a Machine



(a) Define power and state its SI unit. (2 marks)

(b) Calculate the useful work output done by the machine. (2 marks)

(c) Calculate the efficiency of the machine. (2 marks)

(d) Calculate the power input of the machine. (2 marks)

(e) State two ways in which the efficiency of a machine can be improved. (2 marks)