

Revision Sheet 复习练习卷

A-Level Physics · Unit 3 Dynamics

11 vocabulary items · 27 marks of exam questions (9 questions)

Part 1 · Vocabulary review 词汇复习 (11 items). The terms this unit is examined on most. Mark it yourself from the answer key. 本单元最常考的词汇，请自行对照答案批改。

Section A · Chinese to English 中译英

Write the English word.

1.

合力

[1]
2.

碰撞

[1]
3.

动能

[1]
4.

重力场

[1]
5.

黏性

[1]
6.

阻力

[1]
7.

重力势能

[1]
8.

动量守恒

[1]
9.

弹性碰撞

[1]
10.

相对速率

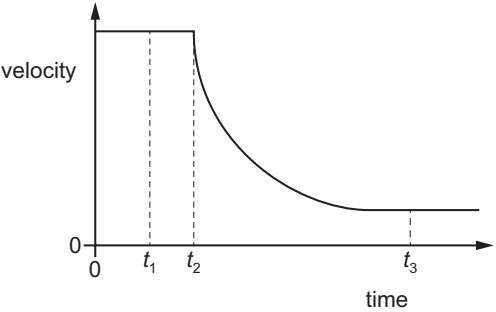
[1]
11.

非弹性碰撞

[1]

Part 2 · Exam questions 考试题 (27 marks, 9 questions) begins on the next page. They are ordered easy to difficult and none of them has been set before. 第二部分从下页开始，由易到难。

12 A skydiver is falling at constant velocity. She then opens her parachute. The graph shows the variation with time of her velocity.

☐

Which statements about the motion of the skydiver are correct?

- 1

The magnitude of the acceleration is maximum at time t_2 .
- 2

The magnitude of the drag force at time t_1 equals the magnitude of the drag force at time t_3 .
- 3

The magnitude of the drag force is maximum at time t_1 .

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

13 The acceleration of free fall on the Earth is different to the acceleration of free fall on the Moon.

☐

How do the mass and weight of an object on the Earth compare to its mass and weight on the Moon?

	mass	weight
A	different	different
B	different	same
C	same	different
D	same	same

14 A moving object X collides with a stationary object Y.

☐ The objects separate after the collision.

The collision is perfectly elastic and there are no external forces acting.

Which word equation is **not** correct?

- A** during the collision, (force acting on object X) + (force acting on object Y) = zero
- B** (relative speed of approach of X and Y) + (relative speed of separation of X and Y) = zero
- C** (total kinetic energy before collision) = (total kinetic energy after collision)
- D** (total momentum before collision) = (total momentum after collision)

15 Which statement does **not** describe an elastic collision between two objects?

- ☐ **A** The relative speed of approach of the two objects equals the relative speed of separation.
- B** The total kinetic energy of the objects is conserved.
- C** The total kinetic energy of the objects is reduced.
- D** The total linear momentum of the objects is conserved.

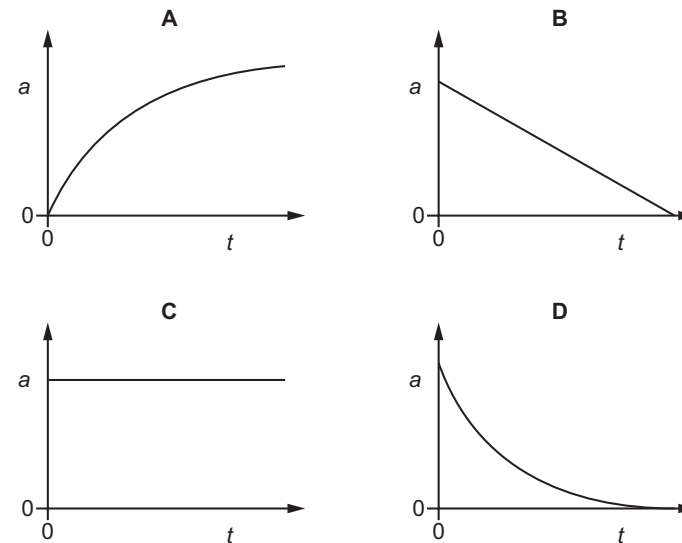
16 A cyclist is riding at a constant speed on a level road.

☐ According to Newton's third law of motion, what is equal and opposite to the backward push of the back wheel on the road?

- A** the force exerted by the cyclist on the pedals
- B** the forward push of the road on the back wheel
- C** the tension in the cycle chain
- D** the total air resistance and friction force

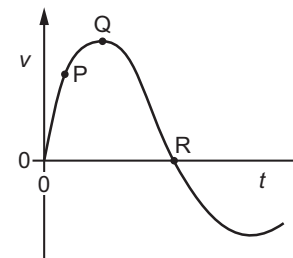
17 A stone is released from rest and falls a long distance in air.

☐ Which graph could show the variation with time t of the acceleration a of the stone?



18 The graph shows how velocity v varies with time t for a bungee jumper.

☐



At which point is the bungee jumper momentarily at rest and at which point does she have zero acceleration?

	jumper at rest	jumper with zero acceleration
A	Q	P
B	Q	R
C	R	Q
D	R	R

- 19** An object of constant mass moves in a straight line. The variation with time t of the momentum p of the object is shown in Fig. 2.1.

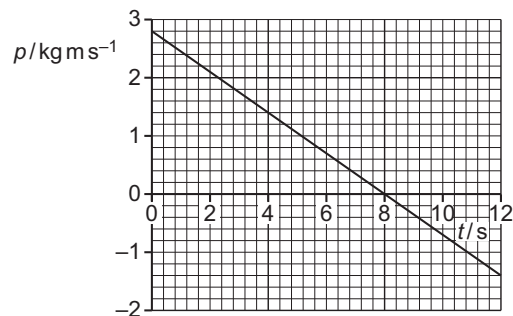


Fig. 2.1

- (a)** Define momentum.

.....
 [1]

- (b)** Calculate the change in momentum of the object from time $t = 0$ to $t = 12$ s.

change in momentum = kg ms^{-1} [1]

- (c)** Calculate the magnitude of the resultant force acting on the object.

force = N [2]

- (d)** Describe the variation of the speed of the object from time $t = 0$ to $t = 8.0$ s.

.....
 [1]

- (e)** By reference to Fig. 2.1, explain why the resultant force acting on the object during the first 8.0 s of its motion cannot be due to air resistance.

.....

 [2]

- (f)** At time $t = 0$ the displacement d of the object is zero.

On Fig. 2.2, sketch the variation of d with time t from $t = 0$ to $t = 12$ s.

Numerical values of d are not required.

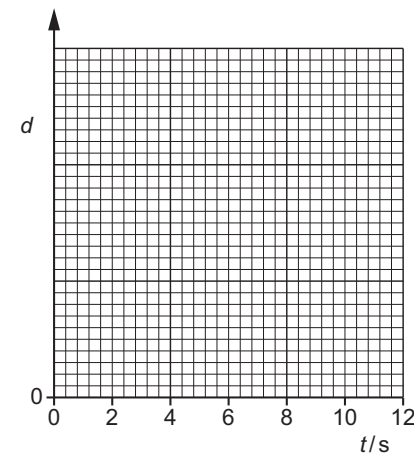


Fig. 2.2

[3]

[Total: 10]

20 (a) Define velocity.

.....
 [1]

(b) A rock of mass 7.5 kg is projected vertically upwards from the surface of a planet. The rock leaves the surface of the planet with a speed of 4.0 ms^{-1} at time $t = 0$. The variation with time t of the velocity v of the rock is shown in Fig. 1.1.

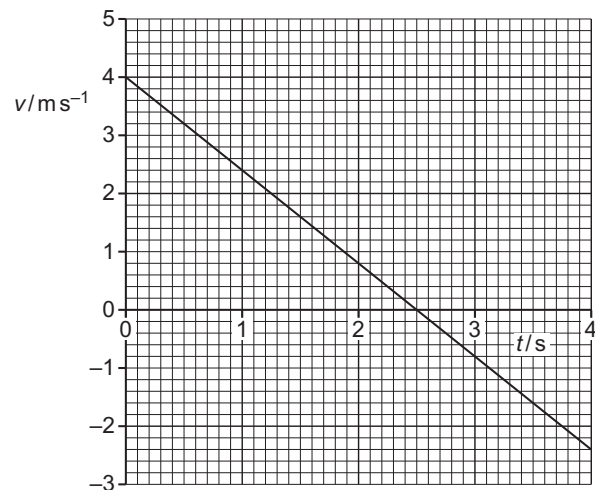


Fig. 1.1

Assume that the planet does not have an atmosphere and that the viscous force acting on the rock is always zero.

(i) Determine the height of the rock above the surface of the planet at time $t = 4.0\text{ s}$.

height = m [3]

(ii) Determine the change in the momentum of the rock from time $t = 0$ to time $t = 4.0\text{ s}$.

change in momentum = N s [2]

(iii) Determine the weight W of the rock on this planet.

$W =$ N [2]

(c) In practice, the planet in **(b)** does have an atmosphere that causes a viscous force to act on the moving rock.

State and explain the variation, if any, in the resultant force acting on the rock as it moves vertically upwards.

.....

 [2]

[Total: 10]