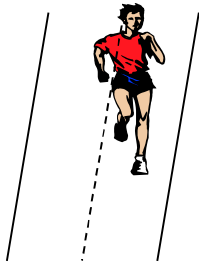# Dynamics and Space ó Exam Style Questions

1. Which one of the following is a scalar quantity?

    A   speed

    B   acceleration

    C   force

    D   weight

    E   velocity

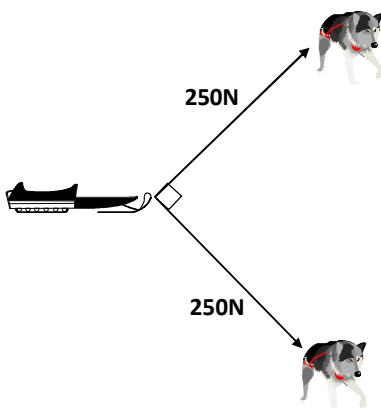**2.** A boy is training for a race on the school playing fields:

He runs 600m North, turns round and runs 150m South. He then stops for a rest.

The resultant displacement of the boy is:

    A   600m North

    B   450m North

    C   150m North
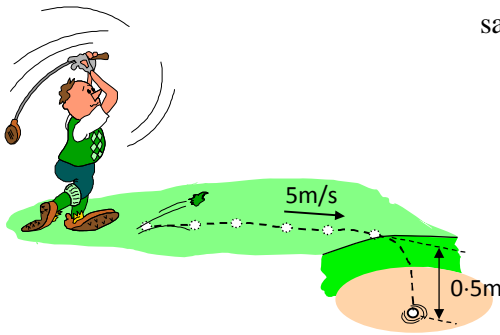
    D   150m South

    E   20m South

3. Two huskies pull a sleigh, with an equal force of 250 N, at right angles to each other.

The magnitude of the resultant force acting on the sleigh is about:

250N

250N

    A   170N

    B   240N

    C   350N

    D   28900N

    E   57800N

4. A golf ball is rolling with a horizontal velocity of 5m/s. It drops down 0·5m into a sand trap. This takes 0·31 s.

The vertical velocity of the ball as it hits the sand is:

5m/s

0·5m

A	0·5m/s
B	1·0m/s
C	1·4m/s
D	2·8m/s
E	3·0m/s

5. If an object accelerates at 5m/s^2 it:

A   has a steady speed of 5m/s

B   decreases its speed by 5m/s every second

C   decreases its speed to 5m/s

D   increases its speed to 5m/s

E   increases its speed by 5m/s every second

6. The weight of a man with a mass of 60kg on

a planet with a gravitational pull of 5N/kg is:

A   5kg

B   5N

C   60kg

D   300kg

E   300N

7. Two boys push a crate in the same direction. They each exert a force of 100N on it.

A frictional force of 50N also acts on the crate.

The magnitude of the resultant force on the crate is:

A   50N

B   100N

C   150N

D   200N

E   250N

8. Two men push a car of mass 1000kg along a narrow road.

One of them pushes the car with a force of   65N.

If the car accelerates at $0\cdot1\text{m/s}^2$ and friction is ignored, the second man is exerting a force of:

A   65N

B   35N

C   25N

D   15N

E   5N

9. The unit of work done is:

A   N/s

B J/s^2

C   Ns

D W/s^2

E   J

10. Which of the following happens when boiling water changes to steam?

I   There is no temperature change.

II   The water molecules move further apart.

III The water molecules move faster.

A   I only

B   II only

C   III only

D   I, II and III

E   II and III only

11. The time taken, in hours, for a car to travel 108km at 30m/s is:

A $2 \cdot 8 \times 10^{-4}$ h

B $0 \cdot 28$ h

C   1 h

D $3 \cdot 6$ h

E   3600 h

12. The forces acting on a toy helicopter are shown below. If the weight has already been taken into account, the resultant force on the helicopter is:
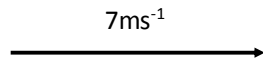

5N

6N
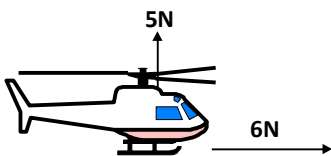
A   1N to the right

B   1N upwards

C   7.8N at 50° to the right of vertical

D   7.8N at 40° to the right of vertical

E   7.8N at 50° to the left of vertical

13. A boat sails North at 3ms^{-1}. A wind blows from the West to the East at 4ms^{-1}.

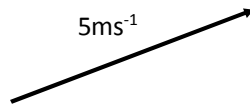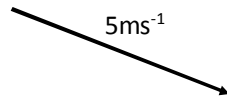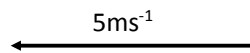Which of the following vectors represents the resultant direction of the

boat?

N

A

7ms^{-1}

B

5ms^{-1}

C

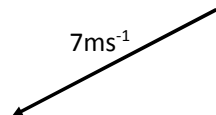5ms^{-1}

D

5ms^{-1}

E

7ms^{-1}

14. A car has a velocity of 10ms^{-1}. It then accelerates for 10s at 2ms^{-2}. The speed of the car at the end of the 10 seconds is:
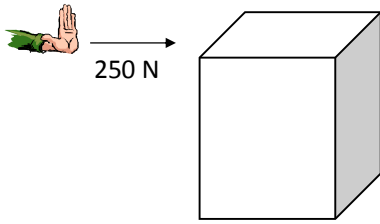
A 10ms^{-1}

B 20ms^{-1}
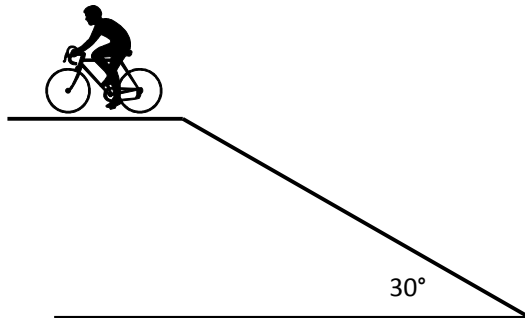
C 30ms^{-1}

D 40ms^{-1}

E 50ms^{-1}

15. A crate of weight 2000N is pushed along with a horizontal force of 250N. It travels at a constant speed.

What is the force of friction between the floor and the crate?

250 N

A   8N

B   250N

C   1000N

D   1750N

E   2000N

16. A man cycles 50 metres to the top of a hill with a 30° incline. The combined mass of the man and the bike is 80kg.

30°

Assuming that the friction is negligible, the work done by the man to reach the top of the hill is:

A   2000 J

B   3460 J

C   4000 J

D   19600 J

E   33900 J

17. Which of the following shows one vector and two scalar quantities?

   A   force, velocity, weight

   B   mass, force, velocity

   C   weight, mass, speed

   D   speed, velocity, force

   E   mass, velocity, momentum

18. A geostationary satellite makes one complete orbit of the earth every

   A   hour

   B   day

   C   week

   D   month

   E   year.

19. Which of the following are **both** vectors?

   A   momentum and velocity

   B   momentum and mass

   C   momentum and speed

   D   speed and velocity

   E   mass and velocity

20.   Two objects, A and B, are dropped from the same height.

A has twice the mass of B.

Which of the following statements is/are correct?

     I   At the top, A has twice the potential energy of B.

    II   At the bottom, A has twice the kinetic energy of B.

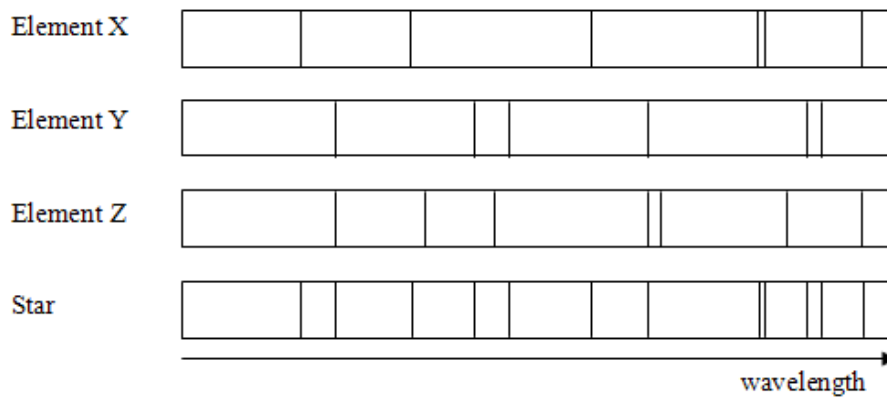   III   At the bottom, A has twice the speed of B.

A   I only

B   II only

C   III only

D   I and II only

E   I, II and III

21. The line spectra produced by three elements X, Y and Z and that produced by a star are shown below.

The element(s) present in the star is/are:

A   X only

B   Z only

C   X and Y only

D   Y and Z only

E   X, Y and Z.

22. A man walks 6 km due East. He then turns around and walks 2 km due West. The total journey takes 2 hours.

Which row in the following table gives the correct values for his average velocity and average speed?

	average velocity	*average speed*
A	2 km h ^{1} due East	2 km h ^{1}
B	2 km h ^{1} due East	3 km h ^{1}
C	2 km h ^{1} due East	4 km h ^{1}
D	4 km h ^{1} due West	2 km h ^{1}
E	4 km h ^{1} due West	4 km h ^{1}

23. The total mass of a motorcycle and rider is 250 kg. During braking, they are brought to rest from a speed of 16.0ms ^{1} in a time of 10.0 s.
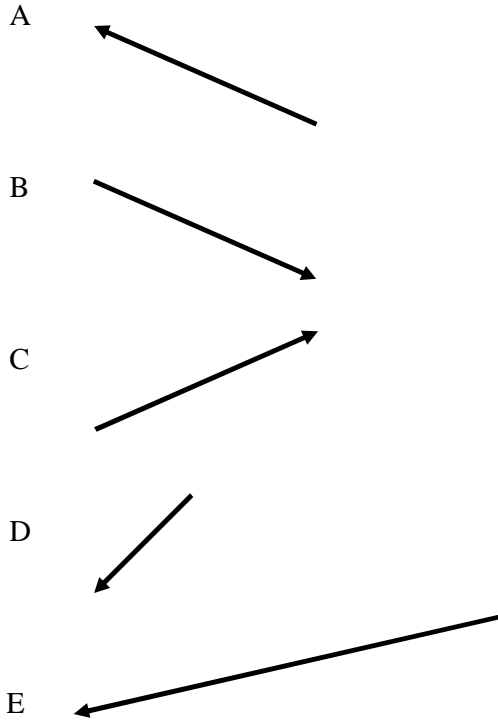
The maximum energy which could be converted to heat in the brakes is

    A   2000 J

    B   4000 J

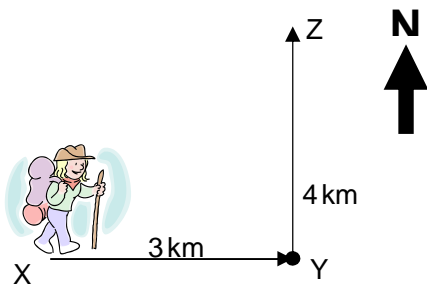   C   32 000 J

    D   40 000 J

    E   64 000 J

24. The diagram shows two vectors.

Which of the diagrams below show the resultant vector?

A

B

C

D

E

25. A woman walks from X to Y and then from Y to Z as shown below.

Her journey takes 1 hour and 15 minutes.

Which row in the table shows her displacement and average velocity?

	Displacement	Average velocity
A	5 km	1·11 ms⁻¹ (037)
B	5 km	1·11 ms⁻¹ (053)
C	5 km	6·67 ms⁻¹ (037)
D	7 km	6·67 ms⁻¹ (053)
E	7 km	1·11 ms⁻¹ (037)

26. The change in velocity per unit time of an object is

    A   acceleration

    B   displacement

    C   impulse

    D   speed

    E   velocity

27. A rocket of mass 300 kg accelerates vertically upwards at 4 ms^{-2} from the moon.

The gravitational field strength on the moon is 1.6 Nkg^{-1}.

The force supplied by the rocket's engines is

    A   480 N

    B   720 N

    C   1200 N

    D   1680 N

    E   4140 N

28. Which row in the table shows both quantities classified correctly?

	Vector	Scalar
A	Force	Kinetic Energy
B	Power	Speed
C	Momentum	Velocity
D	Work	Potential Energy
E	Displacement	Acceleration