**PHYSICS 232/1**

**MARKING SCHEME**

1. Atmospheric pressure reduces, Air pressure in the balloon becomes more than atmospheric

pressure.1

2. Total mass = m1 + m2

M1 = 0.8x x m2= 1 x 100

= 0.8xg = 100g

Total = (0.8x + 100)g

1

Total volume = (x + 100) cm3

Density of mixture = 0.8x + 100 = 0.96 1

x + 100

x = 4 = 25 cm3 1

0.16

3. a) – 0.02 cm

b) 2.15 + 0.02

= 2.17 cm

4. As the temperature increases the bimetallic strip expands with brass expanding more than iron1, thus increases the curvature reducing 1 the size of the gaps. 1

5. T x 40 = 0.4 x 101

T = 0.4 x 10

40 1

= 0.1N1

6. The velocity of air in narrow section is higher than in the wider section. The pressure in the narrow

section is therefore lower than in the wider section. The higher1 pressure in the wider section raises

the ball up1

7. Pressure at the bottom of the ship is greater than pressure near the top, more water will enter into the

ship at the bottom then at the top. 1

8. a) Work done = F x d = Initial K.E. 1

½ x 10 x (400)2 = F x 4 1

1000 100

F = 20000 N 1

b) K.E. changes to heat and sound. 1

9. They slow down/their kinetic energy is reduced. 1

10. a) Detergent lowers the surface tension of water making it stick to dirt and remove it. 1/Penetrate the space between dirt and fabric.

b) – Lower the temperature

Either 1 1

- Remove impurities.

11. a) On collision they collapse increasing the time of impact 1. This reduces the rate of change of

momentum of the passengers, 1 thus the force of the impact reduced. 1

b) i) Total momentum = m1u1 + m2u2 1 before collision

= 150 x 20 + 90 x 0

= 3000 kgms1 1

ii) Total momentum = 3000kgms1 1after collision

iii) Momentum before collision = momentum after collision

(150 + 90)v = 3000 1

V = 3000

240

V = 12.5 ms-1 1

12. a) Velocity is a vector quantity while speed is a scalar quantity. 1

b) Acceleration on planet = 5 ms-21

3

Weight of object w = mg

30 = m x 1.0

M = 3 kg 1

Weight on planet wp = mgp

= 3 x 5

3

SN. 1

c) Velocity between w and x = 10 1

0.02 x 10

= 10 = 50 cm/s 1

02

Velocity between Y and z = 30 = 30 1

0.02 x 10 02 = 150 cm/s 1

Acceleration = 150 – 50

20 x 0.02 1

= 150 – 50

0.4

= 100 = 250 cms-2

0.4

= 25ms2

13. a) For an elastic material, the extension is directly proportional to the force producing it provided the

elastic limit is not exceeded. 1

b) i)

e (cm)

F (N)

Wire

Coil

ii) The wire has a greater constant of elasticity 1 than coil of the same material hence greater gradient.

c) K.E of stone = elastic potential energy of catapult

½ mv2 = ½ ke2

½ x 5 x v2 = ½ 100N

1000 1/1000  M (10/100)21

5v2 = ½ x 100 x 100 x 10 x 10 1

2000 100 x 100

5v2 = 100

100

v2= 100 x 1000 = 20,000

5

v = 141 ms-21

V(m/s)

Horizontal velocity remains constant

t

1

d) i)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Load | 0.00 | 1.00 | 2.00 | 4.00 | 5.00 | 6.00 |  |
| L | 10.00 | 11.50 | 13.50 | 16.00 | 18.00 | 24.00 |  |
| E | 0.00 | 1.50 | 3.50 | 6.00 | 8.00 | 14.00 | 1 |

ii) Suitable axes labelled 1

All points correct 1

Suitable line 1

iii) Springs constant K = F 1

e

Use students graph

Correct units 1

iv) Energy stored when the length is stretched by 16 cm

Area under the graph 1

Or E = ½ ke2

Use k from graph and e = 16 cm.

K must be correct.

Correct substitution 1

Answer correct unit 1

14. a) – Good thermal condudivity

- Expands regularly

Any two

- Wide range of temperature

- Clearly visible

b) Range of length = (8 – 2) = 6 cm 1

Temperature = 1 x 100 x 4 1

6

= 66.670C1

Density

grams

c i)

40 Temperature

c ii) - Freezing of lakes and ponds1 ice formed at 00c is less dense than water thus floats, water at 40c is denser thus remains at the bottom of the lake 1

Weathering of rocks. 1 when water in the cracks of a rock freeze it expands and breaks

the rocks. 1

Water pipes1

Water pipes burst when water flowing through them freezes and expands. 1

Any one correct.

d) A iron

B copper

15. a) i) Energy gain = work done 1

= Load x distance

= 40 x 2 x 22 x 14 1

7 100

= 35.20 J 1

ii) W.D. = effort x distance 1

= 10 x 2 x 22 x 70 1

7 100

= 44 J 1

b) V.R. = R = 70 = 51

r 14

c) A = Work output x 100 1 OR

Work input = M.A x 100 1

V.R.

= 35.20 x 100 1 = 4 x 100 1

44 5

= 80% 1 = 80% 1