

So how did you really do?

*HIGHER REVISION TEST* ***ANSWERS***

**HIGHER PHYSICS COURSE**

**J. A. Hargreaves**

**18th August 2013**

***BOOKLET 3B***

Carefully mark your answers. Be honest with yourself. If you did not understand the question check through your notes. Roughly each point you make is worth either ½ or 1 mark. If you need help ask your teacher, remember we are in this together!

## Mrs. H

**SECTION Units Prefixes & Sci Notation TEST**

1. a) metre

b) kilogram

c) metres per second squared

d) metres per second

e) kilogram metres squared per second squared (kg m2 s-2)

2. This question is checking your ability to stick to a significant number of figures.



The acceleration is 0.3 ms –2. You must not write any more than one sig. fig. as this is the level of accuracy given in the question.

3. This question is checking that you are aware of prefixes used in Physics.

m = 0.1g = 0.1×10 –3 kg

W=mg

W=0.1×10 –3×9.8 = 9.8×10 –4N

F=9.48×10 –4N

W=9.8×10 –4N

Unbalanced force = W-F

Fun =0.32×10 –4 N

Fun =ma

0.32×10 –4 = 0.1×10 –3a

a=0.32ms –2

4. a) 5.0×10 –2 A

b) 3.0×10 –10 F

c) 2.00×10 2 s

d) 4.5×10 –5 F

**SECTION Uncertainties TEST** **ANSWERS**

1. ½ scale division ÷ reading × 100%

5/37 × 100% =13.5%

2. a) Fluff on a wheel, wind, door opening during an experiment etc.

b) Zero errors on equipment, bad design ( give egs) etc.

3. mean =Σx÷n

1.58+1.55+1.59+1.56+1.56+1.58= 9.42

mean average =1.57

approx. random error = (max-min) ÷ no. of readings

= (1.59-1.55)÷6 =(0.04)÷6 =0.0067

% uncertainty = a.r.e.÷mean ×100%

% uncertainty= 0.0067÷1.57×100% = 0.42%

4. You must be aware that any experiment is liable to error, just look for them!

5. You can reduce your error by taking many readings, **but this will not help improve the accuracy if you have a systematic error**.

6. The best measurement that we can hope for is that the mean value is close to the “true” value.

7.

or If the arrow represents the true value the x represent your readings.

x x x

xxx x x

xx x

8. a) (0.01/0.12)× 100% = 8.3%

b) (0.1/1.0) × 100% = 10%

9. mean =x÷n

0.97+0.92+1.07+1= 3.96

mean average =0.99

approx. random error = (max-min) ÷no. of readings

= (1.07-0.92)÷4 =(0.15)÷4 =0.0375

% uncertainty = a.r.e. mean ×100%

% uncertainty= 0.03750.99×100% = 3.8%

**However, as one of the results is recorded only to one sig fig this level of accuracy ought to be used throughout.**

b) The error made was that as one of the answers was 1.00 this was wrongly recorded as 1.

10. Find the largest percentage error in the measurements

0.01/1.00×100% = 1.0%

0.02/0.16×100% = 12.5%

The error in the speed calculation will be 12.5%

speed = distance/time

= 1.00/0.16

= 6.25 ms –1

Speed = 6.25 ms –1± 12.5%

or

Speed = 6.25±0.78 ms –1 (where 0.78 is 12.5% of 6.25)

# **SECTION 1.1 TEST ANSWERS**

1.

Don’t forget the angle!

2. The average speed is calculated by dividing the total distance from the kennel to the gate and back, by the time the dog took.

Its average velocity is zero since its displacement is zero and



3. a) A vector quantity has both a size and a direction

b) *Energy* is a scalar quantity, while *force* is a vector quantity.

c) **A** is a vector quantity since both its size and direction are measured.

**B** is a scalar since it has size only, and so is **C** even though the size required happens to be an angle.

4.

The resultant is 4.5ms-1 at 37o east of north.

5. It is the single force that has the same effect as the several forces actually acting on the object.

6. x = 25cos30 = 21.65 units

y = 25sin30 = 12.5 units

7.



The resultant force is 9 x 10-3 N at an angle of 36.9o west of north.

**Section – More Introduction to Our Dynamic Universe. (Part 2) Answers**

1. A force of 1N

2. a) F=ma gives 17 = m×1.8 Thus m = 9.4

The mass is 9.4 kg

b) F=ma gives 2×104 = 1.25×103 **a**

Thus a = 16

The acceleration is 16ms-2

3. a)





b) F=ma gives 2 = 2a Thus a = 1 It accelerates at 1ms-2 horizontally.

4. a) Vertical height in one step = 0.2m

No. of steps = 60

∴Total vertical height of stairs = 60 ×0.2 = 12m

Weight of girl = 500N

Work done by girl = F×s = 500 × 12 = 6000J

Time taken to climb the stairs = 20s

Power = Ew÷ t

Power = 6000/20 = 300

The power of the girl climbing the stairs is 300W.

b) Ep of bob at highest point = mgh

=1.0×9.8×0.45 =4.4J

∴total energy at highest point = 4.4J

∴total energy at lowest point = 4.4J

∴Ek at lowest point = 4.4J

∴ ½ mv2 = 4.4

∴ ½ ×1.0×v2 =4.4

∴v2 = 8.8

∴v = 3.0

The speed of the bob at its lowest point is 3.0ms –1 .