# YEAR 10 REVISION – SEMESTER II EXAM

NAME _____

PHYSICS

1. What are the similarities and differences between average velocity and average speed?
2. A car takes 80s to complete one lap of a 2km circuit. What is its average speed and average velocity?
3. A cricket ball is thrown from the boundary to the wickets at a horizontal average speed of $28ms^{-1}$. How long will it take to reach the wickets which are 90m away?
4. A train is moving with an average speed of $90kmh^{-1}$. It takes 0.8 hours to reach its destination. What is the distance for the trip? (Give your answer in m.)
5. A person walks for 8 s at $1.3ms^{-1}$, then another 6 s at $2ms^{-1}$ in the same direction. Find
   a. the total displacement and,
   b. average velocity
6. A cyclist travels around the Swan River in a circuit using the Narrows and Fremantle Traffic Bridges as crossing points. The cyclist travels at an average velocity of $25kmh^{-1}$ for the whole trip which takes 2.14hrs to complete by the time the cyclist reaches their departure point. What is the final displacement of the cyclist?
7. What was the total distance traveled by the cyclist in question 6?
8. A car changes it's velocity from $25ms^{-1}$ to $36ms^{-1}$ in 2.5s. What is the average acceleration of the car?
9. A ball rolling down a slope from rest is accelerated at $3.5ms^{-2}$. What is the ball's velocity after 6s?
10. A plane flying at $174ms^{-1}$ slows down uniformly at $3ms^{-2}$. What is the planes velocity after 28s?
11. A cyclist breaks suddenly with a uniform acceleration of $-3ms^{-2}$ and slows to $3ms^{-1}$ in 1.3s. Determine the initial velocity of the cyclist.
12. A train initially at rest leaves a railway station with an acceleration of $0.46ms^{-2}$ for a period of 38s. find the :
    a. displacement
    b. final velocity
    c. average velocity for this part of the trip.
13. A person starting from rest takes 7s to reach terminal velocity down a slippery slope. Assuming a constant acceleration of $5.8ms^{-2}$ find the:
    a. distance travelled in 7s
    b. maximum velocity attained by the skier.
14. A car traveling at $42ms^{-1}$ can be stopped in 7.8s. find the:
    a. acceleration
    b. maximum distance required to stop the car.
15. Determine the distance required for a car to accelerate from rest to $110kmh^{-1}$ in 28s.
16. A stone is dropped from rest into a well. Find the depth of the well if it takes 0.69s for the stone to strike the bottom.
17. A ball is thrown vertically upwards at $13ms^{-1}$. What is it's velocity after 1.35s?
18.
    a. State Newton's 3 laws of motion.
    b. Paraphrase each law by describing it in your own words. Include any formula that will help you explain each law.
19. What force must act on a bitumen roller of 4 tonnes to produce an acceleration of $1.23ms^{-2}$?
20. What is the mass of a motor bike which is accelerated at $3.5ms^{-2}$ with a force of 350N?
21. A stationary mass of 12.6kg is acted on by a force of 12N for 6s. determine the:-
    a. final velocity
    b. displacement.
22. Find the weight of a student of mass 37kg.
23. A body of mass 60kg falls from a cliff. What is its weight force?
24. A body of mass 4.5kg at rest is acted on by an unbalanced external force equal to half its weight. After 3s determine:
    a. velocity
    b. displacement
25. NASCAR racing cars race on oval race tracks. They (obviously) slow down for the corners and speed up on the straits. Sketch a displacement-time, and a velocity-time graph for a car on one lap of the track. Match both graphs for time! Be prepared to explain your graphs.
26. Drums of mass 20kg are being loaded onto a ute over a vertical distance of 0.8m. Mr Muscle is showing off by lifting the drums vertically. Mrs Brain is rolling them up a ramp to get them onto the ute. The ramp is at 28^0 to the horizon. How much work is being done by each person?
27. Calculate the distance traveled by an object if 390J of work is done by an applied force of 33N.

28. A fork-lift raises crates of mass 800kg to a height of1.8m. How much work is done?
29. How much energy is transferred when a force of 440N is required to move a pot 5.3m across a floor?
30. A 400g branch falls to the ground. If 20J of energy is transferred, determine the height from which it fell.
31. Determine the velocity of an aeroplane of mass 0.75 tonnes which has a kinetic energy value of 4.5MJ.
32. A body of mass 25kg is accelerated from rest to 40ms^{-1}. What is its gain in kinetic energy?
33. A model rocket of mass 400g reaches a maximum height of 250m before beginning its descent back to earth. What is its maximum potential energy?
34. A brick of mass 980g is dropped from the top of a tower. How high is the tower if the velocity of the brick is 30ms^{-1} just before it hits the ground?
35. A Newton's Cradle contains 4 bobs each weighing 500g. At the end of the swing, the first bob is traveling at a speed of 0.74ms^{-1}. What will happen to the remaining bobs in the cradle? Support your answer with values for each of the bobs. Neglect any friction in the system.
36. A juggler is tossing 2 identical balls in and out of one hand. Each ball weighs 100g and is give an initial velocity of 23kmh^{-1}. determine the:
    a. Kinetic energy and
    b. Potential energy
    When its upward velocity has decreased to 5kmh^{-1}, and 0kmh^{-1}
37. For Q35 above, at what height will the potential and kinetic energies of a ball be the same?
38. A toy box is pushed along the floor by a child over a distance of 3m in 9s. If the force applied was 7N what power was used by the child?
39. A pen weighing 7g is accelerated at 5.6ms^{-2} for 0.4 s. What power is used by the muscles in doing this movement?
40. A motor car with a power rating of 1300W is moving at a constant speed against a frictional resistance of 180N. What is the distance it travels in 1 minute on a horizontal road?

CHEMISTRY

1. What do the following shorthand notations tell you? Fully describe everything that you can regarding the notations.

1

$^{1}_{1}H$

2 **+**

$^{2+}_{1}H$

3 **–**

$^{-}_{1}H$
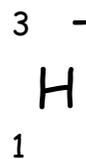
2. What is the electron configuration of: (Draw diagrams of the atoms if you can for extra $$$!)
    a.
    $^{4}_{2}He$

    b.
    24   2+
    $^{2+}_{12}Mg$ (24)
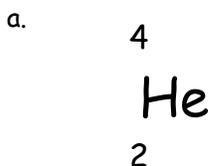
3. Calculate the number of moles of
    a. water molecules in 602×10^{23} molecules of water
    b. carbon dioxide in 3.01×10^{24} molecules of CO_2
    c. sulphuric acid in 1.806×10^{22} molecules of sulphuric acid
4. Determine the number of:
    a. atoms of carbon in 2 moles of carbon
    b. molecules of nitrogen dioxide in 5 moles of nitrogen dioxide
    c. atoms of carbon in 4 moles ethane (C_2H_6)
5. Determine the mass of:
    a. 1.5 moles of barium carbonate
    b. 3.2 moles of potassium sulfate
    c. 0.37 moles of iron III sulfide
6. Determine the number of moles of
    a. carbon dioxide in 4.4g of CO_2
    b. potassium hydroxide in 5.6g of potassium hydroxide
    c. silver chloride in 114g of silver chloride
7. Determine the formula mass of the substances in each of the question below, if
    a. 0.1 mole of calcium hypochlorite has a mass of 14.3g
    b. 3.8 moles of ethylene has a mass of 42g
    c. the mass of 0.4 moles of ethane is 3g
8. Find the number of moles of calcium ions in 0.4 moles of calcium hydroxide.
9. Find the number of iron II and sulphate ions in 0.1 mole of iron II sulphate
10. Find the number of moles of nitrogen, hydrogen, carbon and oxygen atoms in 0.5 moles of ammonium carbonate
11. Determine the number of moles of:
    a. sulphur in 6.4g sulphur dioxide
    b. carbon in 6.4g methane
    c. nitrate ions in 60g ammonium nitrate
12. Calculate the mass of
    a. calcium in 0.1 mole calcium hydroxide
    b. iron in 0.7 mole iron III carbonate
    c. oxygen in 0.15 mole zinc hydrogensulphate
13. Find the percentage composition by mass of the elements listed in each of the following compounds:
    a. oxygen in carbon monoxide
    b. oxygen in chromium VI oxide
    c. sulphate in aluminium sulphate
14. Use your solubility tables to complete and balance the following reactions where precipitates are formed, if there is no reaction then write no reaction and don't complete the reaction – know you stuff!
    a. Calcium chloride and sodium carbonate
    b. Sodium hydroxide and calcium chloride
    c. Potassium nitrate and lead acetate
    d. Iron III sulphate and potassium carbonate
    e. Sodium nitrate and sodium chloride
    f. Magnesium nitrate and sodium carbonate
15. complete and balance the following general reactions:
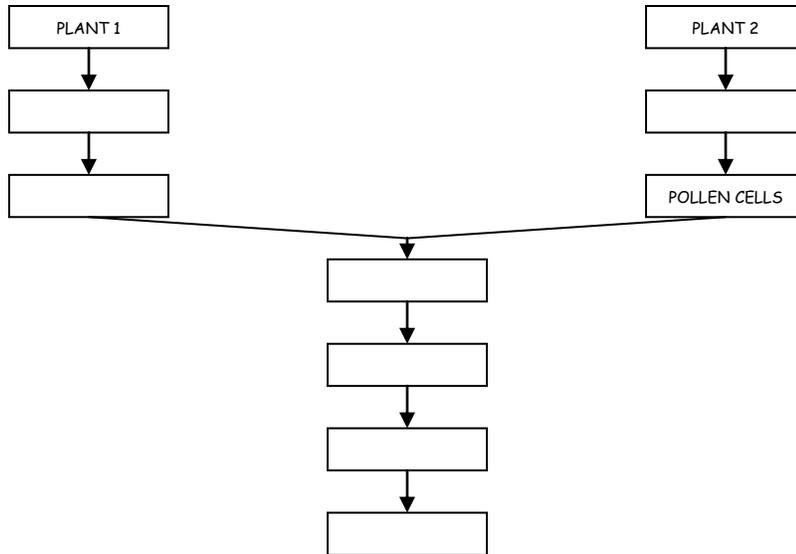   a. hydrochloric acid and sodium hydroxide
    b. sulphuric acid and iron IV oxide
    c. phosphoric acid and calcium carbonate
    d. nitric acid and magnesium bicarbonate
    e. $SO_3 + H_2O$
    f. $P_4O_{10} + H_2O$
    g. Sulphuric acid and aluminium
    h. Acetic acid and aluminium
    i. Phosphoric acid and calcium
    j. Potassium and water
    k. Calcium and water
    l. Aluminium and oxygen
    m. Burning magnesium
    n. Oxidation of tin to tin II oxide
    o. Sulphur (S_8) burnt in oxygen gas
    p. Phosphorus (P_4) burnt in oxygen gas
    q. Calcium carbonate heated
   r. Calcium hydrogen carbonate heated

16.

    a. Determine the number of moles of chlorine gas required to react with 0.42 moles of sodium to produce sodium chloride

    b. Determine the number of moles of hydrochloric acid required to react with 0.1 mole zinc metal

    c. Determine the number off moles of hydrogen gas liberated when 15g of calcium reacts with excess water

    d. Determine the number of moles of sulphur dioxide gas produced when 0.36 moles of sulphur (S_8) are burnt in excess oxygen gas.

    e. 0.018 mole of copper II oxide remains when a sample of copper (II) carbonate is heated. Determine the mass of:

        i. Copper II carbonate required, and

        ii. Carbon dioxide produced

    f. Calculate the number of moles of aluminium hydroxide required to neutralize 12.25g of sulphuric acid.

    g. Determine the mass of calcium sulphate produced when 2.8g of calcium oxide is neutralized by sulphuric acid.

    h. What mass of water is produced when 28.1g of aluminium carbonate reacts with excess sulphuric acid?

BIOLOGY

1. The onion plant has 14 chromosomes in the nuclei of its cells. Using this information and the following words correctly fill in the diagram. (DIPLOID, MITOSIS, FERTILIZATION, HAPLOID, NEW INDIVIDUAL, MEIOSIS, ZYGOTE, EGG)

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   ┌──────────────┐                    ┌──────────────┐
   │   PLANT 1    │                    │   PLANT 2    │
   └──────┬───────┘                    └──────┬───────┘
          │                                   │
   ┌──────▼───────┐                    ┌──────▼───────┐
   │              │                    │              │
   └──────┬───────┘                    └──────┬───────┘
          │                                   │
   ┌──────▼───────┐                    ┌──────▼───────┐
   │              │                    │ POLLEN CELLS │
   └──────┐       └───────┐    ┌────────┘──────────────┘
          └───────────────┼────┘
                   ┌───────▼──────┐
                   │              │
                   └───────┬──────┘
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                   └───────┬──────┘
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                   └──────────────┘
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2.   Use the following family tree for astigmatism to answer question 2.
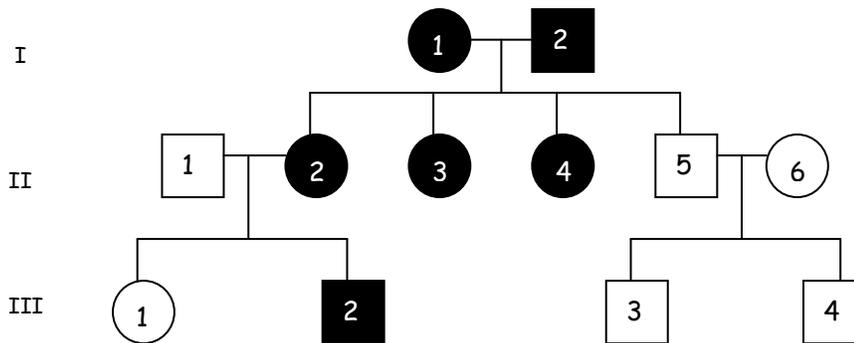
3. Is the condition dominant or recessive? Give the evidence for your answer.
4. Write down the genotypes for each individual.
5. Name the individuals for which we do not know their genotype?
6. If both individuals III 1 and III 2 married individuals that were heterozygotic for astigmatism, and each couple had one child, what chances would the respective couples have in producing a child with astigmatism?
7. Four O'clock plants' flowers can be red, white and pink. If a red and a white flowered plant were crossed, what would be the result of the first (F1) and second (F2) generations of offspring?
8. Give as much information as you can for the following diagram. Give the proper names and sizes for the various 'bits' that make up the structures shown.
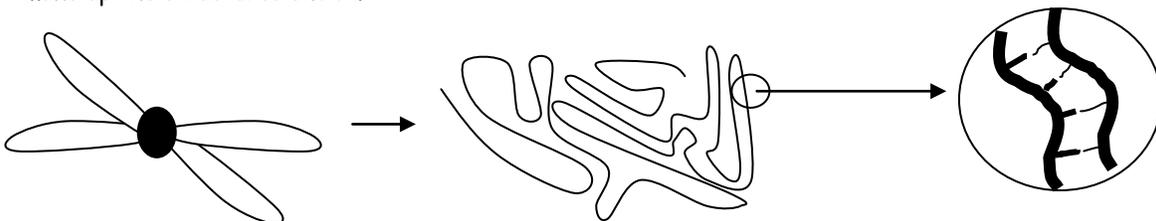
9. The following list has the steps in natural selection jumbled. Un-jumble them into the correct order.

i. The environment changes
ii. A greater proportion of the population now contain the beneficial genes
iii. Mutation
iv. If the environment changes in the same way in the future as it did in the past then less individuals of the population will die out
v. A few individuals contain beneficial genes that help them survive the environmental change
vi. Variation
vii. 'Survival of the fittest'
viii. The individuals that are benefited by their beneficial genes survive to a reproductive age.
ix. The beneficial genes are passed on to the next generation.

10. Draw a labeled stick diagram to show how;
   i. Dolly was formed.
   ii. Human insulin is formed
11. What are the differences and similarities between gene slicing and gene splicing?
12. What are two ways that useful genes can be inserted into a crop plant? How does this compare to the "old way' of incorporating new genes into a crop?