

QUESTION	ANSWER	EXPLANATION
1	B	All living organisms consist of cells. The nucleus and nucleolus are organelles in cells. A zygote is a fertilised ovum.
2	A	The blackbird is a predator because he hunts, kills and eats the ladybird in the food chain. The rose is the producer and the greenfly is the herbivore and primary consumer.
3	A	If all the greenflies were removed, the ladybird population will decrease because there will not be enough food /no greenflies for them.
4	B	An ebb current cause the level of water along the shore to fall back/move away and not rise, fluctuate or be unchanged. A flood current cause the level of water along the shore to rise.
5	A	Radiating heat from the capillaries in the pinna and flapping of the pinna to generate cooling air currents, cools the body down in elephants. All other options wrong.
6	A	I, II and IV destroy habitats. Reforestation III and conservation V help to sustain habitats So any option with III and V in is wrong.
7	A	Transgenic plants have genes of other organisms in them. All other options wrong.
8	A	Mitosis is a type of cell division that results in two daughter cells, each having the same number and k chromosomes as the parent nucleus,
9	C	Read from the graph that at 30% carbon-14 remaining, the age of the fossil is $1 \times 10\ 000$ years which is then 10 000 years. All other options are not illustrated by graph
10	D	When you bend your arm while lifting food from a plate, the biceps contract and the triceps relax. All other choices not true.
11	D	It's a way to help reduce power demand by turning the power off to some customers to help prevent longer outages. .
12	D	The Blue Crane is South Africa's national bird, the galjoen the national fish, the springbok the national animal/mammal and the protea the national flower while the rose is the national flower of England.
13	C	Sand has the largest airspaces, holds the least water, followed by loam with medium air spaces and clay has the smallest airspaces and holds the most water.
14	C	Mycocide is the most effective and Fungicide is the least effective because: Mycocide has the largest clear area around it of no yeast growth [kills most yeast], Fungiclear has the second largest clear area around it of no yeast growth [kills second most yeast], Mycoban has the third largest clear area around it of no yeast growth [kills third most yeast] and Fungisan has no clear area around it [kills no yeast].
15	C	During photosynthesis sunlight/radiant energy is converted into chemical energy and stored in glucose. All other options are wrong.
16	A	Rickets in children is due a lack of calcium and vitamin D in the diet. Milk has lots of calcium and fish lots of vitamin D in it. All other options either don't have calcium or Vitamin D in it.
17	D	All organs of the mouse [skin W and tail X] and plant [leaves Z and roots Y are alive and must respire. They must break down fuel molecules to gradually release energy for life processes during respiration.
18	A	Contraceptives prevent pregnancy in females. The ideal contraceptive for Jenny which is a young female with no children, must be easily available, user-friendly and effective

		with the least side-effects. If she decides to have children then an irreversible contraceptive will not allow her to have children.
19	C	Simple maths. 1 cup = 250ml, so 750ml/ 250ml = 3 cups of blood.
20	C	Skeletal muscles work hardest during exercise and need more oxygen [from more blood] to break down more glucose for more energy. All other options do not refer to skeletal muscles.
21	C	A population is a group of similar organisms living in the same area at the same time and can interbreed. Termites in a termite nest are similar organisms living in the same area at the same time and can interbreed. All other options are different organisms.
22	B	As the age increases the amount of growth hormone decreases. All other options are not illustrated by graph.
23	B	The variable that is manipulated (changed) during the investigation is the independent variable (amount of water drunk). The variable that is measured (amount of urine produced) is the dependent variable.
24	D	Futhi the cow is the first cloned animal that was born in Africa. Got the fighting bull was born in Spain, Snuppy the dog was born in South Korea and Dolly the sheep was the first cloned mammal to be born in Scotland.
25	D	Protein is the most common food digested in the stomach due to the presence of protein digesting enzymes
26	C	Hypothesis is not supported/rejected by the results. Increase in light intensity increase the which is contrary to the hypothesis
27	C	The time taken for a bubble to be released indicates the rate of photosynthesis which can be determined by counting the bubbles produced.
28	A	Calculation of difference in increase from 1 to 2 divided by original amount multiply by 100
29	C	Option C includes all the bones in the arm. Option A has the fibula, tibia, tarsals and metatarsals, which are bones in the leg. Option B has the fibula, tarsals and metatarsals which are bones in the leg. Option D has the tibia, which is a bone in the leg.
30	B	Calculation to get ratio is 4.5 : 90 so 90/4.5 = 20 so ratio is 1:20
31	B	As the age of the women increases the chance of having a miscarriage also increases. All other options are not illustrated in the table.
32	B	Calculation 24/100 x 25 500 = 6120 women
33	A	Monomers of starch are glucose, monomers of lipids are fatty acids and glycerol, monomers of haemoglobin which is a protein, are amino acids.
34	C	Stem cells are undifferentiated cells that can form any cell in the body. All other options are wrong.
35	C	Lots of dead leaves at the bottom of the pyramid followed by lots of worms feeding on it, followed by one sparrow feeding on the worms and lots of fleas feeding on the one sparrow.
36	D	The graph illustrates changes in the levels of chlorine and ozone concentrations from 1950 to 1990. All the other options do not include that.
37	C	Between 1970 and 1980 the ozone depletion dropped 0.7pppv [3.0-2.3], between 1950 and 1960 it dropped 0.5pppv [3.7-3.2], between 1960 and 1970 it dropped 0.2pppv [3.2-3.0], between 1980 and 1990 it dropped 0.3pppv [2.3-2.0]
38	D	Deforestation is chopping down plants which means less photosynthesis occurs and less CO <sub>2</sub> is removed from atmosphere hence increase in CO <sub>2</sub> in the atmosphere. Reuse and recycling of plastic bags decrease CO <sub>2</sub> in atmosphere because there is no need to produce more which will release more CO <sub>2</sub> in the atmosphere. Using public transport or bicycles release less CO <sub>2</sub> in atmosphere cause public transport transports a

		lot of people [less cars on the road to produce CO <sub>2</sub> ] and bicycles release no CO <sub>2</sub> . Saving electricity means less coal needs to be burned and less CO <sub>2</sub> released into the atmosphere.
39	A	Atmosphere is the layer of gases around the earth, lithosphere is the layer of rocks around earth and stratosphere is part of the atmosphere.
40	A	Hoodia is used in slimming products. It was used by the San people as an appetite suppressant and thirst quencher. All other options was not functions of Hoodia for the San people.
41	A	I, III and IV will sustain our indigenous plants while II, V and VI will over-exploit our indigenous plants. So any option with II, V or VI in will be wrong.
42	B	A hypothesis is a predictive statement that you make before the investigation regarding the aim of the investigation. Option A is the investigative question, Option B is the hypothesis, Option C is part of the method and Option D is the conclusion of the investigation.
43	C	A decrease in recycling will lead to a reduction in available resources because more energy/resources are needed to make more products [that could have been recycled]. Option A is an increase in the human population will increase water usage. Option B is a decrease in the use of pesticides will not cause erosion of rock in soil. Option D is an increase in housing developments will decrease air quality.
44	D	Nuclear energy produces highly toxic radioactive waste which is not a benefit of nuclear energy. Options A, B and C are all benefits of nuclear energy.
45	D	Seed-bearing plants are the gymnosperms and angiosperms. If you read from the graph then the seed-bearing plants evolved 350mya.
46	B	Letter A represents fruit because Angiosperms have fruit and gymnosperms as well as all other plant groups have no fruit. B represents cones, C represents seeds, E represent body divisions.
47	C	White blood cells produce antibodies specific to the antigen that stimulated their production. So Kyra's body produced more white blood cells and antibodies after her vaccination. Hence option C which includes A and C.
48	B	Luminosity refers to the amount of light emitted by an object in a unit of time. Radiation refers to the energy that comes from a source and travels through space at the speed of light. Convection is the process by which heat is transferred by movement of a heated fluid such as air or water. Starlight refers to the light that comes from stars.
49	D	Photosynthetic bacteria was first on earth because they could respire anaerobically [without oxygen]. They could then photosynthesise to produce oxygen in the atmosphere. Then eukaryotes and after that mammals evolved. That is the reason why option D is correct because it starts with II.
50	A	When we read the graph we can see that as the temperature of the water increases [known as thermal pollution], the dissolved oxygen in the water decreases. All other options are not illustrated by graph.
51	C	Spotfish and worms require minimum 1-2 mg/L oxygen respectively according to the table. At a temperature of 30°C the dissolved oxygen in the water is around 1mg/L when you read it from the graph. All other options are not illustrated by the graph or table.
52	D	P is the enzyme, Q is the substrate, R is the enzyme-substrate complex and T is the products respectively.
53	A	All options are planning steps for Thorn's investigation.
54	B	Option B is incorrect because there is a cell membrane in animal cells. In animal cells there is no cell wall and chloroplasts. Animal cells also have small or no vacuoles.
55	B	Option B is correct because transcription is part of protein synthesis. Replication is when DNA makes an identical copy of itself. Genetic engineering is the transfer of genes between organisms.
56	B	Teenage boys are still growing and needs amino acids for muscle development. Kwashiorkor is a disease in children due to a lack of protein in the diet. Glucose is the

		main fuel for cellular respiration and proteins do not prevent bone damage in boys.
57	A	Mercury is the smallest planet. Mars is the second smallest planet, earth is the fifth largest planet and Jupiter is the largest planet in the solar system.
58	D	Cardiac Cycle: Oxygenated blood flows from the left ventricle 3 into the aorta, then to the rest of the body 5, then from there deoxygenated blood flows into the right atrium 1, then the right ventricle 2, from there the blood flows into the pulmonary artery which takes the deoxygenated blood to the lungs 6 to become oxygenated. From there oxygenated blood flows into the left atrium 4.
59	B	Emphysema is the correct answer. Asthma is a condition when the airways narrows and swell and produce extra mucous, Bronchitis is inflammation of the mucous membranes in the bronchioli tubes. Asbestosis is a lung disease cause by breathing in particles of asbestos which cause scarring and permanent damage of lung tissue.
60	D	Thick waxy cuticles III, hairy leaves IV and small or no leaves V prevent water loss in desert plants. Large broad leaves I and thin cuticles II increase water loss by plants. So any option with I or II in will be wrong.
61	C	Boy frightened by snake. His level of blood glucose increase because he needs more energy to run away which is option C. His heartbeat increases, blood pressure increases blood flow to the skin decreases.
62	A	Diabetes is treated with insulin and not osteoporosis, hypertension or osteonecrosis. Osteoporosis is treated with bisphosphonates, hypertension is treated with ACE inhibitors and osteonecrosis can be treated with any non-steroidal anti-inflammatory medication.
63	B	Correct sequence to produce insulin starts with the bacterial plasmid which is cut, then insulin gene removed from cell in human pancreas, then insulin gene is placed into plasmid and into new bacterium. After that the bacteria make clones of them and produce insulin.
64	A	Blood and meat stains are protein in nature which can be removed by proteases. Proteases are enzymes that break down proteins into amino acids. The washing powder functions best in cold, alkaline water and will not increase the activation energy of the process.
65	B	There is less oxygen at higher altitudes to bind to haemoglobin. There is not less haemoglobin and atmospheric pressure at higher altitudes. Haemoglobin also doesn't have a higher affinity for oxygen at higher altitudes.
66	A	Rabbits are mammals which have mechanisms in place to maintain a constant body temperature irrespective of the environmental temperature.
67	D	At 7h00 it was 2.5 <sup>0</sup> C and at 9h00 it was 35 <sup>0</sup> C. Calculation 35 <sup>0</sup> C - 2.5 <sup>0</sup> C = 32.5 <sup>0</sup> C
68	A	It makes its skin darker in colour to absorb more heat by basking in the sun early morning. When the environmental temperature is too high the lizard will make its skin lighter to reflect more heat.
69	D	The sequence in mitosis is PMAT, Prophase, Metaphase, Anaphase and Telophase.
70	D	To determine the age of a tree we can count the annual rings [which are rings of secondary xylem which are formed every year in a stem]
71	C	II and IV are advantages of sexual reproduction. I and III are advantages of asexual reproduction. So any option with I and III in is wrong.
72	C	Environmentalists are concerned because harmful chemicals are used during fracking which might pollute air, soil and water sources. Other options are incorrect.
73	C	Hypertension or high blood pressure occurs when the systolic pressure is more than 140mmHg and the diastolic pressure is more than 90mmHg. Any blood pressure less than those numbers are either normal or low blood pressure.
74	B	The Sino Atrial node is known as the pacemaker. Leukemia is cancer of the body's blood forming tissues and Haemophilia is a disorder where the blood fails to clot. Osteoporosis is a disorder that weakens bones making them fragile due to a deficiency in calcium and osteomalacia is a disorder that softens bones due to a deficiency in Vitamin D [which

		helps to absorb calcium into the blood]. Arthritis is the tenderness and swelling of joints and arteriosclerosis is the build-up of plaque in and on artery walls.
75	D	Radiation does more damage to cancer cells than normal cells because cancer cells undergo rapid cell division. Cancer cells have access to nutrition and they have strong cellular structures. The radiation kills the cancer cells it does not prevent cancer cells from
76	B	Antibiotic resistant means that the bacteria in Siphon's body [not his body] became resistant to the antibiotics. Viruses can't be killed by antibiotics. His antibodies can't become resistant to the antibiotics.
77	B	The kidneys get rid of most nitrogenous waste in the blood. Oxygenated blood with lots of nitrogenous waste enters the kidneys and Deoxygenated blood with little nitrogenous waste leaves the kidneys. Deoxygenated blood has little oxygen and lots of carbon dioxide in it. Oxygenated blood has lots of oxygen and little carbon dioxide in it. During cellular respiration in the kidneys oxygen is used and carbon dioxide produced. So the blood that leaves the kidneys has less nitrogenous waste, less oxygen and more carbon dioxide in it.
78	C	Global warming resulted in frequent flooding and prolonged droughts. It causes a rise in sea levels and coastal flooding, decreased biodiversity and decreased the production of different type of foods.
79	A	Fish species spawning at different times of the year does not promote genetic diversity. There is however less crowding of young, less competition for food and different foods available at different times of the year.
80	D	Hydrogen is not very safe to burn because it burns with a nearly invisible flame and requires special flame or heat detectors. All other options are correct about the use of hydrogen as a fuel.
81	A	Sunflowers with a greater fruit weight will provide more seeds. It will not improve the chance for fertilisation [because fruit is a product of fertilisation], will not have any influence on genetic variation [which has numerous causes] and will not allow the plant to grow taller [plant growth hormones responsible for growth of plant organs].
82	C	Options I, II and III are the reasons why each characteristic was selected according to the table. Number of branches IV has a zero in the table meaning it was not selected. So any option with IV in is wrong.
83	B	Bacteria R is more resistant to antibiotic P than Q because antibiotic Q kills more bacteria R than antibiotic P. So there is more bacteria R present according to the graph when antibiotic P was used and less bacteria R present when antibiotic Q was used. All other options are incorrect. Bacteria S is more resistant to antibiotic Q than P because antibiotic P kills more bacteria S than antibiotic Q. So antibiotic P is not equally effective on bacteria R and S.
84	A	The ant can only be cut along the central axis to get two identical halves, has three germ layers with a body cavity and a skeleton on the outside of the body.
85	D	Reliability is how many times you repeat the experiment and come to similar res
86	D	Group O has no antigen that could cause coagulation in any recipient's blood
87	B	All proteas are found in the Southern Hemisphere [South America, bottom half of Africa, Australia and lower part of Asia]. All proteas belong to different species, are not extinct and are not equally distributed on all continents.
88	C	Calculation: $BMI = 85kg/1.7 \times 1.7m^2 = 85kg/2.89m^2 = 29.41$ Benjy has a BMI of 29.41 according to the information given. He is overweight
89	B	All fossil fuels contain carbon. All fossil fuels were not formed in marine environments

		and do not represent the remains of one living organism. They have undergone different geological processes during their formation.
90	D	Domestic animals include dogs and cats. They can hear higher frequencies than humans according to the graph. Dogs can hear frequencies as high as 50 000Hz and cats can hear frequencies as high as 70 000Hz whereas humans can only hear frequencies as high as 25 000Hz.
91	C	Artificial, passive immunity is acquired by the injection containing specific antibodies made by someone else. These antibodies neutralise the pathogens in the usual way but the protection lasts only a few weeks because the antibodies gradually break down and are not replaced. Active immunity is when our body produce its own antibodies in response to the presence of an antigen in our bodies. Natural immunity is the antibody protection your body creates against a pathogen once you have been infected with.
92	C	Options I, III and IV are most favourable for the formation of fossils. Micro-organisms must not be present because they can decompose soft bodied animals before it can fossilise. So any option with II in is wrong.
93	D	Identify Y as the liver. One of the functions of the liver is detoxification. So the liver will break down alcohol and heroin. X is the gallbladder which stores bile. Z is the pancreas which secretes enzymes and hormones. W is the duodenum/small intestine which helps with digestion and absorption.
94	A	As the size of organism increases the surface area to volume ratio decreases
95	A	7 hours after exposure to the HI virus the PEP drugs will be 100% effective according to the data in the table.
96	D	4 days [ 96hours] after exposure to the HI virus the PEP drugs will be 0% effective according to the data in the table.
97	D	Pollination takes place on the stigma [E] and fertilisation takes place in the ovary [C] which is option 3 and D. B is the anther which produce and store the pollen. A is the filament which supports the stigma and help to disperse pollen. F is the petals which attracts insects and birds for pollination. D is the sepals which protects the flower in the bud stage.
98	B	In wind pollinated flowers the filaments are long and hang outside the flower and it has large, feathery stigmas. Both flowers have small, non-feathery stigmas with large petals. filaments are short and inside the flower.
99	B	Using living donors is only done as a last resort when there is no other suitable way to procure a needed tissue or organ. All healthy people irrespective of age can be organ donors. You are not allowed to pay to be ranked in a higher position on the organ transplant list and doctors will work hard to save all people's lives irrespective whether they are organ donors or not.
100	A	Endorphins are called 'feel good' hormones which are released during exercise. It can relieve pain and give a feeling of well-being. Steroids are the man-made version of hormones produced by the adrenal glands. When taken in doses higher than the amount your body normally produces, steroids reduce redness and swelling [inflammation]. Leptins are hormones released by your adipose tissue [body fat] that helps your body maintain your normal weight on a long term basis. It does this by regulating hunger by providing the sensation of satiety [feeling full]. Prostaglandins are hormone-like substances that affect several bodily functions including inflammation, pain and uterine contractions.

*end*