Admissions Testing Service

ADMISSION TEST FOR THE DEGREE COURSE IN MEDICINE AND SURGERY

Academic Year 2015/2016

General Knowledge and Logical Reasoning

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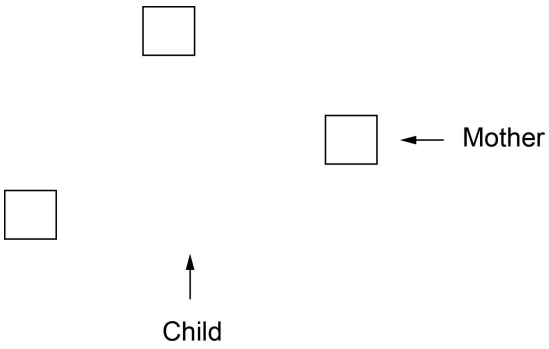
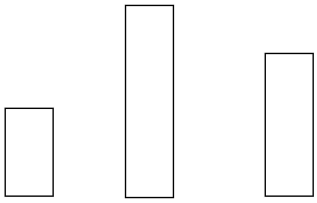
1 A child is building some towers using bricks. He has set them out on a mat as shown on the diagram below.

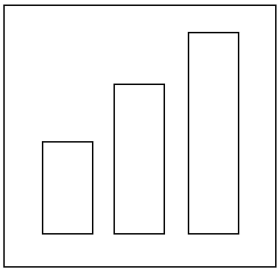


The view the child has from his side of the mat is shown below:



What would the view from the mother's position look like?

A



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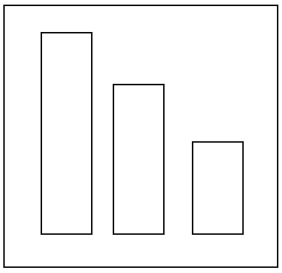
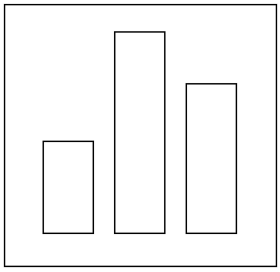
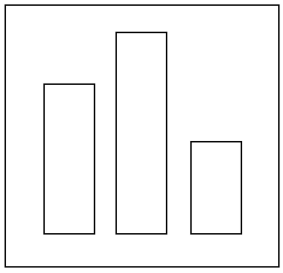


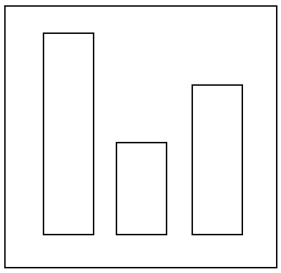
C



D



E



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2 Suppose that a democratically elected government suppressed the opinions of those who disagree with its policies only with the full support of the majority of its citizens. Even then, it has no right to do so. Such action is as bad when done in accordance with public opinion as in opposition to it. The particular evil of silencing disagreement is that it robs the human race; future as well as present generations. If the opinion is right, people are deprived of the opportunity to exchange truth for error. If the opinion is wrong, they lose the chance to see the truth more clearly by contrast with error.

Which one of the following best expresses the main conclusion of the above argument?

A It is not right for a democratic government to suppress disagreement even with majority support.

B It is right for a democratically elected government to suppress the opinions of those who disagree with its policies because it is elected.

C It is not right for a democratically elected government to suppress disagreement, unless its action has the full support of the majority.

D It is right for a democratically elected government to silence disagreement, but only if the opinions are obviously false.

E A democratic government need not fear those who disagree with its policies, because it has the support of the majority.

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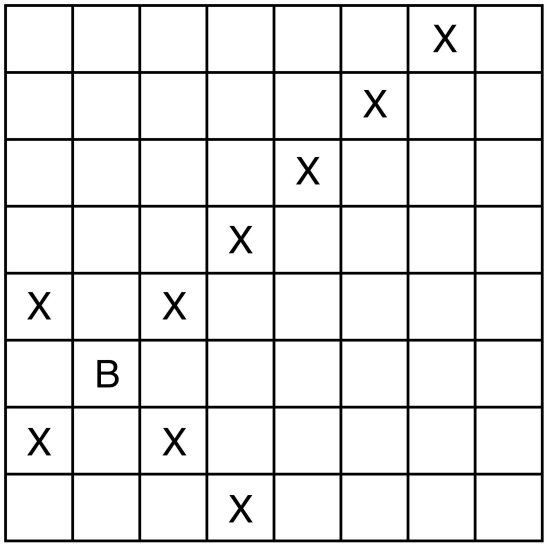
3 Chess is played on an 8 by 8 board of squares. A bishop standing on any square can be moved any distance along a diagonal: for example, the bishop at B in the diagram can move to any of the squares marked X, so nine possible moves are open to him.



How many moves are open to him if he stands on a square which gives him the fewest possible moves?

A 7

B 6

C 8

D 9

E 13

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4 During everyday conversations, most people make eye contact from time to time. Because failure to make eye contact is seen as abnormal, we think that someone who does not do this is rude. We may even think that they are bored, or have something to hide, or their minds are elsewhere. But recent research on teaching children has shown that the children absorbed more facts if they did not look at the person addressing them than if they did. This is thought to be because looking at someone requires the processing of unnecessary information. Other research has shown that some people who are lying gaze directly at others in order to convince them that they are open and honest. Police interrogators often take this as a sign of dishonesty.

Which one of the following can be drawn as a conclusion from the above passage?

A Eye contact during conversation is not a reliable indicator of either honesty or engagement with the speaker.

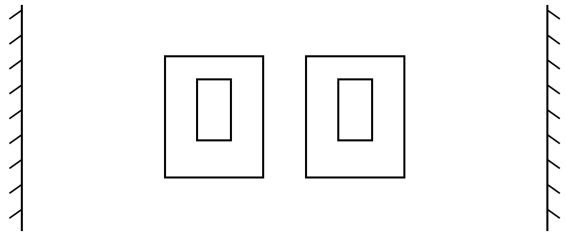
B Gazing directly at others when speaking is reliable evidence of dishonesty.

C Failing to make eye contact with their teachers is a sign that children are rude.

D Someone who looks away when spoken to is trying to concentrate on what is said.

E Failure to make eye contact during conversation is a reliable sign of lack of interest.

5 I am hanging pictures with identical sized frames in a space between two walls. Each picture is 18 cm wide by 24 cm high. The distance between the walls is 64 cm. I think they look best if they are centred in the space and the distance between the pictures is 6 cm. The hooks are to go behind the pictures, so I must mark their positions on the wall by careful measuring.



If the hooks are at the centres of the picture frames, how far should each hook be from the nearest wall?

A 20 cm

B 11 cm

C 12 cm

D 22 cm

E 31 cm

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6 In future, people are going to need to work beyond the current retirement age because pensions are not holding their value. Therefore, it is going to be more difficult for young people to find employment.

Which one of the following, if true, would weaken the above argument?

A Employers prefer to take on younger staff as they are less expensive.

B Young people have not developed the skill sets that older people have.

C Many young people go to university simply because they cannot find jobs.

D Research has shown that people who work longer generally stay healthier.

E In a recession there are likely to be fewer jobs in total.

7 In a quiz the following method is used for scoring: 3 points are given for a correct answer, 1 point is taken away for an incorrect answer and 0 points are awarded for an unanswered question. The quiz consists of 10 questions. Addition of the scores was incorrectly done in one case and an impossible result was announced.

Which team has an impossible result?

A	Brown Bears	25
B	Red Lions	–5
C	Green Dragons	10
D	Blue Birds	18
E	White Horses	26

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8 Organ donation from the recently deceased should be mandatory rather than optional. This is because harvesting organs can save lives by transplanting a variety of organs from one donor to several different patients. It is immoral to expect to receive a donor organ unless you are willing to donate one. Cremating or burying bodies with healthy organs in them contradicts the medical care given to that body while it was alive.

Which one of the following illustrates the principle used in the above argument?

A By accepting a blood transfusion you have an obligation to give blood.

B Patients who die of disease should not have their organs harvested.

C Non-essential healthy organs should be taken from terminal patients while they are still alive.

D Cremations and burials should be made illegal, to help maximise organ donation.

E Donors who leave money to medical research after their death should be spared mandatory organ donation.

9 The ticket machines for the Hong Kong Mass Transit Railway do not give change, but they will credit any surplus money towards the next ticket if I buy more than one.

I have only two $5 coins and two $2 coins.

Which one of the following collections of tickets can I buy without wasting any money?

A Three $3 tickets

B One $4 and one $7 ticket

C Three $2 tickets

D One $11 ticket

E Two $9 tickets

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10 I only receive post from my uncle when it is my birthday or he is abroad. This letter is from him; it's not my birthday so he must be abroad again.

Which one of the following most closely parallels the reasoning used in the above argument?

A Politicians only talk about their children if they are publishing their memoires or before a general election. The leaders of both parties have spoken about their children in interviews and have not written books, so you can be sure that there will be an election soon.

B In order to make plans for a holiday it is first important to decide whether you want to go abroad or stay in the country. It is expensive to go abroad therefore you should consider staying in the country.

C Many people find it difficult to decide whether or not to take a gap year before going to university. Taking a gap year can give you a chance to think more carefully about what you want to study, therefore students who take gap years are often more prepared for university.

D At the current rate we will run out of landfill sites in the next two decades. Recycling would reduce the amount sent to landfill sites, therefore we should support recycling schemes.

E Most modern electrical goods have warranties, therefore you do not need to worry about repair costs if your new washing machine breaks.

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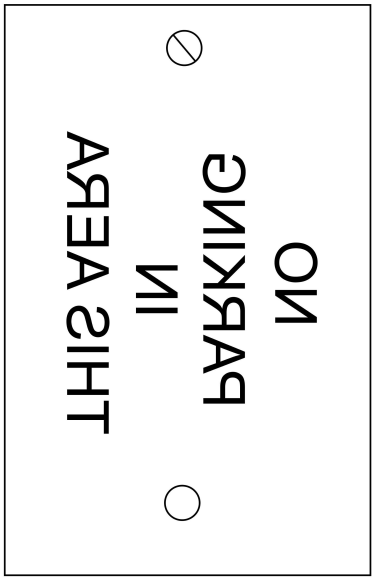
11 When reversing my car into what I thought was a parking space, I looked through my rear view mirror and saw the following sign. It was hanging from the wall by one screw.



Despite the awkward orientation, I realised that one of the words had been printed incorrectly.

Which word is incorrectly printed?

A AREA

B NO

C PARKING

D IN

E THIS

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12 In order to reduce their dependence on fossil fuels and promote renewable energy, many governments are spending billions of euros subsidising biofuel crops. But using maize and wheat to make biofuels significantly reduces the amount available to eat. Actually, it does not help the environment much either; many types of bio-fuels cause more greenhouse gas emissions than fossil fuels. Heavy use of fertiliser to produce sufficient crops releases damaging amounts of nitrous oxide, while demand for new land for biofuel plants causes forests to be torn down, resulting in more carbon going into the atmosphere. Experts say if global biofuel use increases as predicted, 600 million more people will be driven into hunger by 2020.

Which one of the following can be drawn as a conclusion from the above passage?

A Using crops for biofuels causes more problems than it solves.

B Farmers currently use fertilisers far more extensively than they should.

C World governments are wasting their money by subsidising biofuels.

D We need to make more land available to grow foodstuffs.

E We should be preserving forests, not tearing them down.

13 Four boys are helping to clear bricks from some wasteland so that a playground can be made. They will be rewarded based on the number of bricks they manage to find. They can carry 12 bricks at a time in a special holder. In the final round of collecting, three of the boys have filled their holders but the fourth hasn't found enough bricks to do this. In order that they all receive the same reward, the first three boys each give two bricks to the fourth boy.

How many bricks did the fourth boy have in his holder before the others gave him some of theirs?

A 4

B 2

C 6

D 8

E 10

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14 The camel now has a bright future in India. The rising cost of oil is making it much more expensive for Indian farmers to run tractors whereas the camel is cheap to feed.

Which one of the following, if true, would strengthen the above argument?

A Camels can live and work for 70 years with very little maintenance.

B The cost of buying a camel has risen 50% in a decade.

C Shrinking grazing areas and lack of food threaten substantial camel revival.

D Though camel slaughter is banned, illegal export of camel meat is increasing.

E Camels were traditionally highly prized as the 'ships of the desert'.

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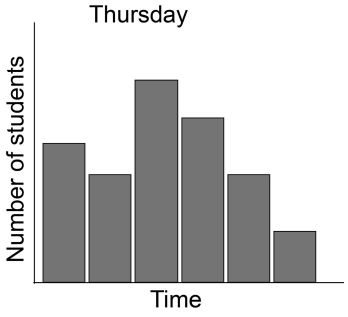
15 The table below shows the number of students visiting a college cafeteria at different times on a particular weekday.

Time	*Number of students*
10:00-11:00	43
11:00-12:00	35
12:00-13:00	63
13:00-14:00	54
14:00-15:00	34
15:00-16:00	17

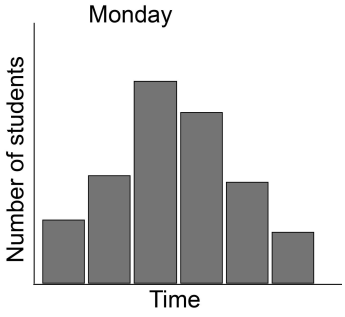
The following bar charts show the number of students in the cafe for all five days in a given week.

Which day of the week does the data in the table above represent?

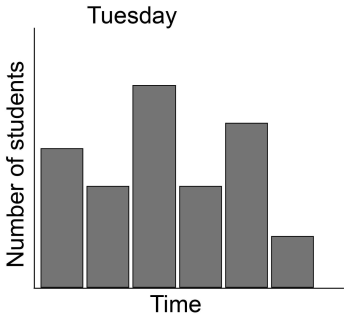
A



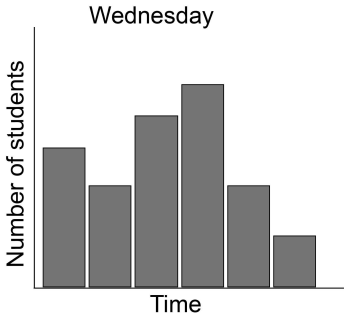
B



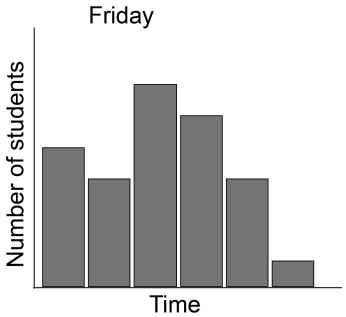
C



D



E



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16 The death rate in car accidents involving drivers in the first year after passing their test is far higher than that of older drivers. Analysis of those caught on camera who are exceeding the speed limit shows that new drivers generally drive faster than any other category of motorist. The government should pass a law placing a limiter on cars belonging to new drivers so that they cannot exceed 80 km/h for the first two years after their test. This would mean that there would be a dramatic reduction in the number of deaths of young drivers.

Which one of the following is an underlying assumption of the argument above?

A A large percentage of deaths of young drivers is caused by speeding.

B The reaction times of younger drivers are better than those of older drivers.

C Older drivers have developed more driving skills than younger drivers.

D The police target young road users when trying to catch speeding motorists.

E Younger drivers tend to drive cars with more powerful engines.

17 I want to provide hot soup at a meeting that involves 35 people. I am only going to make one flavour of soup so that we do not waste time deciding who would like what flavour if I were to provide a choice. Some of the group are vegetarian, so I must remember this when I buy the soup. The following table shows the packs on sale at my local shop.

Flavour of soup	*Number of servings per box*	*Price per box*
Tomato	4	€1.00
Mushroom	10	€2.20
Chicken and vegetable	12	€2.10
Vegetable	12	€2.60

What is the least amount that I need to pay for the soup?

A €7.80

B €6.30

C €6.60

D €8.80

E €9.00

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18 Sometimes, smoking is actually better for the health than non-smoking. A study by the University of Melbourne has shown that smoking can lead to a diminished appetite. So those patients who quit smoking are at increased risk of gaining weight, which is particularly dangerous for patients with heart disease. In addition, nicotine plays an important role as a digestion stimulant. A study by the University of London has shown that 17% of patients have constipation problems when trying to quit cigarettes. In addition, psychologists suggest that some of their patients experience increased levels of stress while trying to quit smoking, which can be dangerous for people with high blood pressure. Therefore, one may conclude that in some situations smoking is better than non-smoking.

Which one of the following is the best statement of the flaw in the above argument?

A Continuing smoking may be riskier than quitting.

B Only a very small number of patients who quit smoking might face serious problems.

C Smoking may help diminish appetite, improve digestion and relieve stress.

D Some smokers may not gain weight after they quit smoking.

E If people were more careful with their diet and stress they would have fewer problems with quitting smoking.

19 Barbara needs to decide which one of her staff to award a bonus to this year. She has decided that the bonus should not go to anyone who has been late to work more than three times or who has failed to complete a task by the deadline set more than twice. She will give the bonus to whichever of the remaining staff has completed the most tasks. The data for her staff is given below:

Staff member	*Days sick*	*Days late*	*Performance*		*Number of years working with the company*
			Tasks completed	*Tasks completed by deadline*	
Alex	3	2	54	50	4
Brian	2	3	57	54	2
Cynthia	5	1	48	47	6
Daphne	1	5	59	59	5
Edward	2	2	53	52	3

Which member of staff should receive the bonus?

A Edward

B Alex

C Brian

D Cynthia

E Daphne

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20 Toys are big business. Many of our homes are filled with complex and elaborate toys, but do they really suit children's needs? Overly designed toys are often easily broken. Also, children can be discouraged from using their imagination by playing with toys that perform various functions like moving or talking. Many of these complicated toys can also be very age-specific. This suits manufacturers but means children can outgrow toys very quickly. Psychologists have also shown that simple toys provide children with more opportunities for learning and development than more complicated toys.

Which one of the following can be drawn as a conclusion from the passage above?

A Parents should buy simple toys for their children.

B Modern toys are more suitable for today's children.

C Toy manufacturers are interested only in generating profits.

D Traditional toys are less interactive than modern toys.

E Toys should never be age-specific.

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21 Jane is ordering desks for the new office building. The desks are to be ordered from a catalogue which offers a modular system. The prices of the components are shown below:

Desk top and back panel	**Grey finish**	**Wood effect finish**
1800 mm wide	€100	€120
1500 mm wide	€80	€95
1200 mm wide	€60	€70
800 mm wide	€50	€55
Legs (sets)		
Cantilever steel	€30	€30
Wood effect panel	€30	€35
Pedestal & accessories		
Pedestal with one drawer and one filing draw	€60	€70

The desks for the accounts clerks are to be:

- 1500 mm wide
- wood effect finish
- cantilever steel legs
- with a fixed one drawer and filing drawer pedestal.

How much will one of these desks cost?

A €195

B €170

C €190

D €200

E €220

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22 Many countries compel their citizens to carry identity (ID) cards and many other countries are introducing them. One reason in favour of ID cards is that they can assist with law enforcement. However, the opposite argument is more likely to be the case. A consequence of providing a one-stop form of identity check is that it can encourage identity thefts. The more an ID card needs to be used, the greater its value to criminals. This is a persuasive reason for not introducing ID cards.

Which one of the following is an underlying assumption of the above argument?

A ID cards cannot be made secure and unfalsifiable.

B Most countries will introduce ID cards.

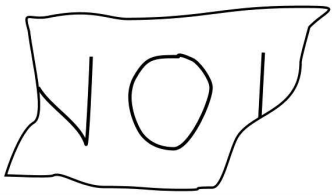
C ID cards cannot be falsified or counterfeited.

D ID cards will be used to gain entry to all public examinations.

E Criminals are in favour of the introduction of ID cards.

23 Whenever I complete a level on my computer game I am given a five-letter password which I must enter next time I play the game so that I can bypass levels previously completed.

Late last night I hastily wrote down the latest password on a piece of scrap paper that was lying around. This morning I found that someone had tidied up. I cannot remember the password, and, sifting through the waste-paper basket, all I can find is this piece:



Which one of the following words **cannot** be the password?

A PLONK

B KNOLL

C LIONS

D NOISE

E ONION

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24 Which one of the following statements is NOT true of Marie Curie?

A She was the first person to discover X-rays.

B She conducted pioneering research on radioactivity with her husband Pierre.

C She was awarded the Nobel prize in Physics in 1903 and in Chemistry in 1911.

D She was the first woman to win a Nobel prize.

E She discovered the chemical elements polonium and radium.

25 Which one of the following pairs of artist/work of art is NOT correct?

A Klimt – The Blue Rider

B Picasso – Les Demoiselles d'Avignon

C Raphael – The School of Athens

D Michelangelo – Rondanini Pietà

E Manet – Luncheon on the Grass

26 Which one of the following events is commonly considered to mark the outbreak of the First World War?

A The assassination of Archduke Franz Ferdinand of Austria in Sarajevo.

B The invasion of Alsace and Lorraine by France.

C The assassination of the King of Italy Umberto I in Monza.

D The invasion of Poland by Germany.

E The assassination of the Emperor of Russia Alexander II in Saint Petersburg.

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27 Which one of these countries has twice rejected joining the European Union in a referendum?

A Norway

B Sweden

C Hungary

D Poland

E Cyprus

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28 What can the addition of fatty acids to an alcohol directly produce?

A a lipid

B an amino acid

C ethanoic acid

D ascorbic acid

E glycoprotein

29 Which of the following molecules contain only carbon, hydrogen and oxygen?

1. cellulose
2. haemoglobin
3. amylase
4. a triglyceride
5. DNA

A 1 and 4 only

B 2 and 5 only

C 3 and 5 only

D 1 and 3 only

E 2 and 4 only

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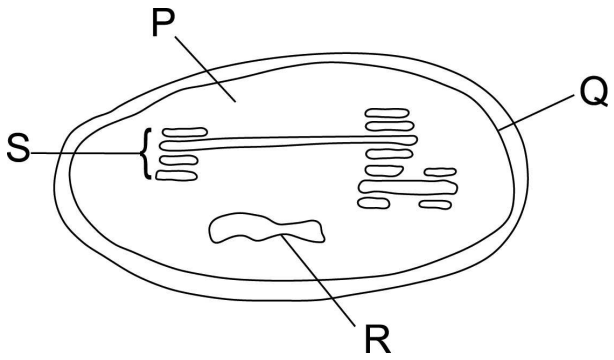
30 The diagram below shows a chloroplast.



Which row of the table correctly identifies the site of light-dependent reaction and the site of light -independent reaction?

row	*Site of light-dependent reaction*	*Site of light-independent reaction*
1	S	P
2	P	Q
3	S	R
4	Q	S
5	R	P

A row 1

B row 2

C row 3

D row 4

E row 5

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31 Which two of the following are final products of glycolysis?

1. phosphorylated triose
2. ATP
3. NAD
4. pyruvate

A 2 and 4

B 1 and 3

C 2 and 3

D 1 and 4

E 3 and 4

32 In which of the following stages can chromatids be present?

1. the start of mitosis
2. the start of meiosis I
3. the end of cytokinesis

A 1 and 2 only

B 1, 2 and 3

C 1 and 3 only

D 2 and 3 only

E 3 only

33 A restriction enzyme cuts DNA. It makes a sticky end of CTGAT.

How many hydrogen bonds are broken to make this sticky end?

A 12

B 13

C 15

D 10

E 26

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34 In a large population with twice as many human males as females, what is the closest approximation to the ratio of the number of X chromosomes to the number of Y chromosomes?

A 2:1

B 1:1

C 1:2

D 3:1

E 1:3

35 A double stranded fragment of human DNA contains only the sequence for one gene. This is used in transcription to produce an mRNA transcript of that gene.

The DNA fragment and mRNA only contain adenine, cytosine, guanine and thymine, which only pair according to the principles described by Watson and Crick.

Which of the following statements are ALWAYS correct?

1. The mRNA transcript must contain equal percentages of guanine and cytosine.
2. The mRNA transcript will have an identical sugar-phosphate backbone to the DNA that it was transcribed from.
3. 50% of the bases in the DNA fragment will be adenine and thymine.
4. In the DNA fragment there will be equal amounts of guanine and cytosine.

A 4 only

B 1 and 4 only

C 1 and 2 only

D 2 and 3 only

E 2, 3 and 4 only

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36 The following shows the transfer RNA triplet with its associated amino acid:

tRNA triplet	*amino acid*	*tRNA triplet*	*amino acid*
GGC	◇	GAA	▽
AAG	○	AUC	⊡
CUA	□	CGG	⊙

Which DNA sequence listed can make a protein containing the sequence of amino acids ⊡–○–□–▽ ?

A ATCAAGCTAGAA

B UAGUUCGAUCUU

C TAGTTCGATCTT

D CGACCTAGCTCC

E AAGATCCTTGTA

37 A particular species of cactus has a range of spine density. Cacti with a low spine density are being eaten and damaged by a particular type of mammal. Cacti with a high spine density are being destroyed by the larvae of parasitic insects.

What type of selection is happening to this species of cactus?

A stabilising

B artificial

C directional

D divergent

E sexual

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38 In which of the following blood vessels would squamous epithelial tissues be found?

1. aorta
2. vena cava
3. capillary

A 1, 2 and 3

B 1 and 3 only

C 2 and 3 only

D 3 only

E 1 and 2 only

39 An area of a neuron's axon is initially at its resting potential. An action potential then arrives.

Which option correctly lists the order of some events observed (from earliest to latest), when the action potential arrives?

1. The potassium voltage-gated channels open.
2. Sodium ions diffuse into the axon.
3. The axon becomes hyperpolarised.
4. The inside of the axon has a more positive charge than the outside.
5. The sodium voltage-gated channels close.

A 2, 4, 5, 1, 3

B 2, 3, 1, 4, 5

C 5, 3, 4, 1, 2

D 1, 5, 2, 3, 4

E 5, 1, 3, 2, 4

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40 Which of the following can form part of the human non-specific immune response?

1. production of interferons
2. raised temperature in the location of infection
3. increased permeability of capillaries

A 1, 2 and 3

B 1 and 2 only

C 2 and 3 only

D 1 and 3 only

E 1 only

41 Which row correctly identifies both a site of vasopressin (ADH) secretion and a site of action?

row	*Site of ADH secretion*	*Site of ADH action*
1	pituitary gland	nephron
2	adrenal gland	cardiac muscle
3	pancreas	liver
4	ovary	placenta
5	pituitary gland	bladder

A row 1

B row 2

C row 3

D row 4

E row 5

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42 Which of the following is/are the correct location(s) of the large ribosomes in typical eukaryotic cells, e.g. a human white blood cell?

1. attached to the outside of the endoplasmic reticulum
2. attached to the inside of the endoplasmic reticulum
3. free in the cytoplasm

A 1 and 3 only

B 1, 2 and 3

C 1 and 2 only

D 2 and 3 only

E 1 only

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43 For the reaction:

$$2\ H_2S(g) + 3\ O_2(g) \rightarrow 2\ SO_2(g) + 2\ H_2O(g)$$

when 600 cm^3 of hydrogen sulfide completely reacts with precisely the required volume of oxygen, what is the combined volume of the two products?

[Assume all gases are ideal and have the same temperature and pressure.]

A 1200 cm^3

B 600 cm^3

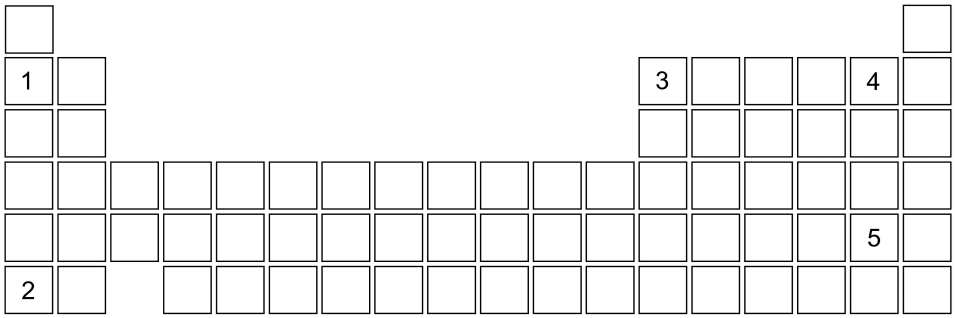
C 800 cm^3

D 1600 cm^3

E 1800 cm^3

44 The diagram shows the position of five elements (1–5) on the periodic table.

Which one of the five elements has the most exothermic first electron affinity?



A 4

B 1

C 2

D 3

E 5

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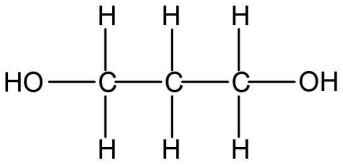
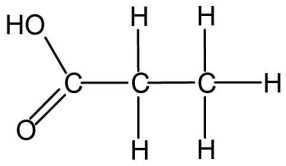
45 Which of the structures shown is a structural isomer of propane-1,2-diol?

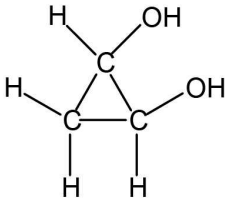
1



2



3



A 1 only

B 2 only

C 1 and 3 only

D 2 and 3 only

E 1, 2 and 3

46 For the equation:

$$CuCl_2 + Zn \rightarrow ZnCl_2 + Cu$$

which is the correct statement about the reaction it represents?

A Two electrons are transferred from zinc to copper.

B $CuCl_2$ is the reducing agent.

C Zn is the oxidising agent.

D Zn is reduced.

E Two electrons are transferred from copper to zinc.

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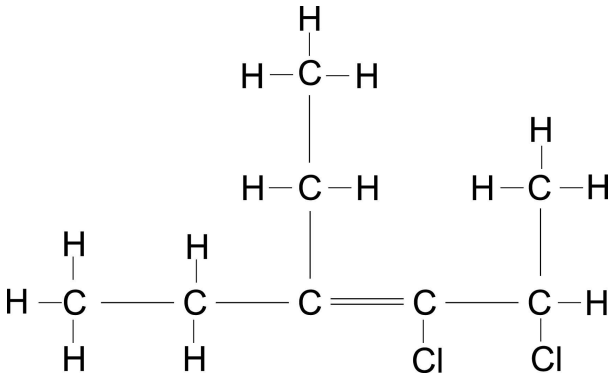
47 Identify the correct IUPAC name for the following organic structure:



A 2,3-dichloro-4-ethylhex-3-ene

B 1,2-dichloro-4-ethyl-1-methylpent-2-ene

C 1-chloro-2-chloro-3-ethyl-1-methylpent-2-ene

D 4,5-dichloro-3-ethyl-5-methylpent-3-ene

E 2,3-dichloro-4,4-diethylhex-3-ene

48 Consider the following dynamic equilibrium:

$$CO(g) + 2H_2(g) \rightleftharpoons CH_3OH(g) \qquad \Delta H = -90 \text{ kJmol}^{-1}$$

Which of the following changes to conditions would cause an increase in the yield of methanol?

1. increase in temperature
2. add a catalyst
3. remove some H_2
4. increase in pressure
5. add more CO

A 4 and 5 only

B 1 and 4 only

C 1 and 3 only

D 2, 4 and 5 only

E 1, 2 and 3 only

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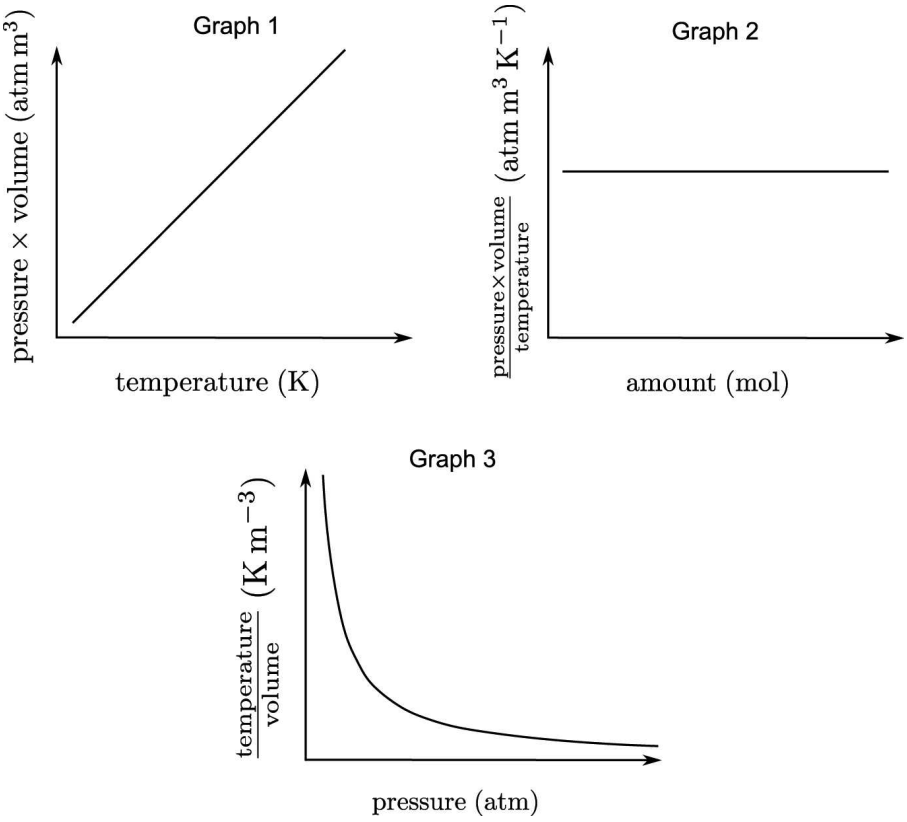
49 Three graphs are given below:



Assuming in each case that all other variables remain constant, which of the graphs could describe the behaviour of an ideal gas?

A Graph 1 only

B Graph 2 only

C Graph 3 only

D Graphs 1 and 2 only

E Graphs 2 and 3 only

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50 Which four of the following oxides give acidic aqueous solutions?

CO, CO_2, SO_2, SO_3, NO, NO_2

A CO_2, SO_2, SO_3, NO_2

B CO, CO_2, SO_2, SO_3

C CO, CO_2, NO, NO_2

D CO_2, SO_3, NO, NO_2

E SO_2, SO_3, NO, NO_2

51 By using standard techniques to balance chemical equations and ensuring that the net charge is equal on both sides, find the correct value for '***c***' in the balanced equation below:

$Cr_2O_7^{2-}(aq) + \boldsymbol{a}H_2S(g) + \boldsymbol{b}H^+(aq) \rightarrow \boldsymbol{c}S(s) + \boldsymbol{d}Cr^{3+}(aq) + \boldsymbol{e}H_2O(l)$

A 3

B 1

C 2

D 4

E 6

52 Across the periodic table for period 3 (Na to Cl) which of the following trends is/are correct?

1. Electronegativity values only increase
2. First ionisation energies only decrease
3. Atomic radii only increase

A 1 only

B 2 only

C 3 only

D 1 and 3 only

E 2 and 3 only

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53 Which one of the following is equivalent to

$$\frac{3}{\sqrt{5}+\sqrt{2}}$$

A $\sqrt{5}-\sqrt{2}$

B $3\sqrt{5}+3\sqrt{2}$

C $\sqrt{5}+\sqrt{2}$

D $3\sqrt{5}-3\sqrt{2}$

E $\frac{\sqrt{5}+\sqrt{2}}{3}$

54 The closest number to 777 that is a multiple of 15 is 780.

What is the closest number to 7777 that is a multiple of 15?

A 7770

B 7765

C 7775

D 7780

E 7785

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55 Given that x is a real number, what is the complete solution of: $10x - 3x^2 < 7$?

A $x < 1 \text{ or } x > \frac{7}{3}$

B $x > \frac{10}{3}$

C $-\frac{7}{3} < x < -1$

D $1 < x < \frac{7}{3}$

E $x < -\frac{7}{3} \text{ or } x > -1$

56 Two unbiased coins are tossed and an unbiased die (with faces numbered 1 to 6) is rolled.

What is the probability that this results in two heads and a number less than 5?

A $\frac{1}{6}$

B $\frac{1}{12}$

C $\frac{5}{24}$

D $\frac{1}{3}$

E $\frac{2}{3}$

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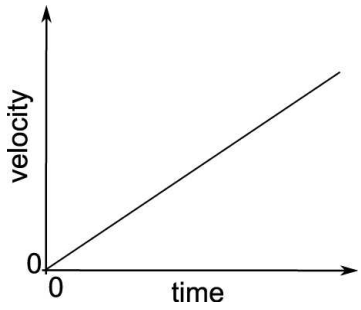
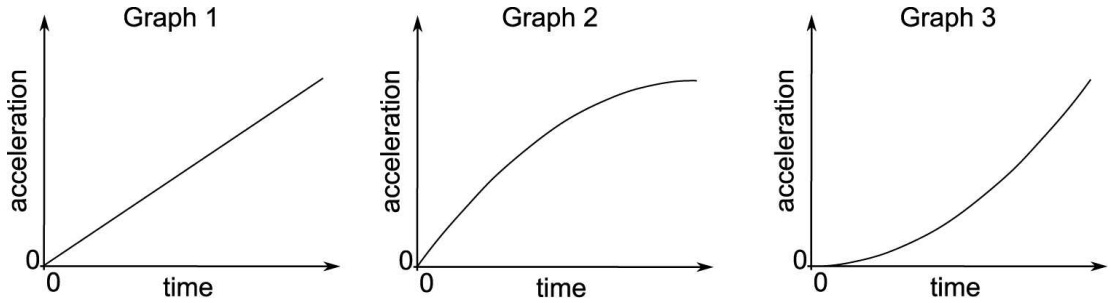
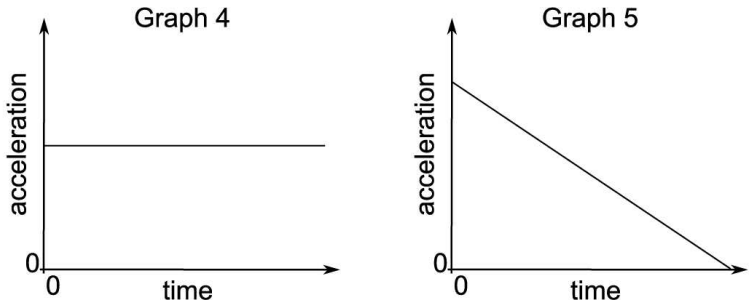
57 The velocity-time graph for a car moving along a straight road is shown below.



Which graph is the corresponding acceleration-time graph for the car?

[All scales are linear.]





A Graph 4

B Graph 2

C Graph 3

D Graph 1

E Graph 5

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58 A fixed mass of an ideal gas is subjected to an adiabatic transformation.

Which one of the following changes would cause this transformation?

A Work is done on the gas, the internal energy increases and the energy transferred by heating is zero.

B Work is done on the gas, the internal energy decreases and the energy transferred by heating is zero.

C No work is done on or by the gas, the internal energy increases and energy is transferred to the gas by heating.

D Work is done by the gas, the internal energy remains constant and energy is transferred to the gas by heating.

E No work is done on or by the gas, the internal energy decreases and energy is transferred from the gas by heating.

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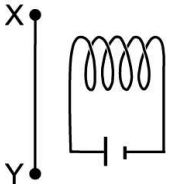
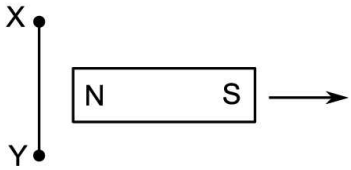
59 In which of the following situations will an emf (voltage) NOT be induced in the wire between points X and Y on the diagrams?

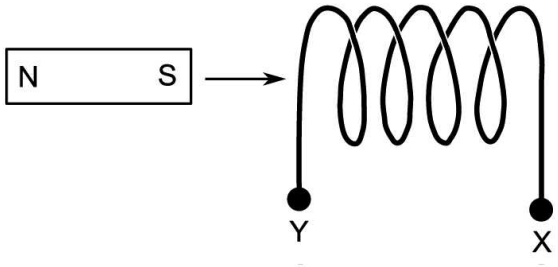
A A straight wire which is fixed next to a coil of wire carrying a constant direct current.



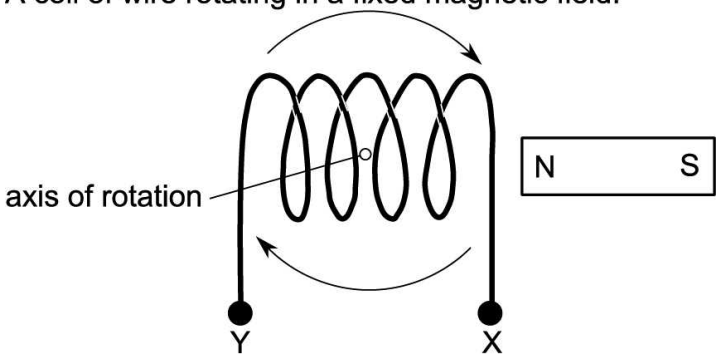
B A straight wire near a moving magnet.



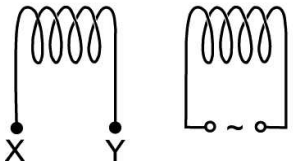
C A fixed coil of wire into which a magnet moves.



D A coil of wire rotating in a fixed magnetic field.



E A coil of wire held close to another coil carrying an alternating current.



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60 A student uses the formula $\rho = \frac{R\pi r^2}{l}$ to calculate the resistivity of a cylindrical wire.

The student uses a value for R that is in kΩ, a value for l that is in m, and a value for r that is in mm.

In which unit will the student's value of ρ be calculated?

A mΩm

B μΩm

C kΩm

D MΩm

E GΩm

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