# UCAT Practice Papers

## The Basics

### The UCAT consortium do not release past papers...

Well hopefully that is where this book comes in. It contains six unique mock papers written by expert Oxbridge medical tutors at *UniAdmissions*. Having successfully gained places at Oxbridge and other competitive medical schools, our tutors are intimately familiar with the UCAT and its associated admission procedures. So, the novel questions presented to you here are of the correct style and difficulty to continue your revision and stretch you to meet the demands of the UCAT.

## Mock Paper A

### Section A: Verbal Reasoning

### Passage 1

**Atomic Structure**

Although the existence of atoms has been suggested since ancient Greece, the modern understanding of atomic structure is the product of the hard work of many dedicated scientists. In the early 1800s, John Dalton's experiments with chemical reactions led him to theorise that matter is composed of tiny individual units. These individual units of matter were later understood to be what we call atoms. In 1897, the English Physicist J. J. Thomson discovered that atoms contain both positive and negative electrical charges by performing experiments with cathode ray tubes. Thomson visualised the negative charges as immersed within positively charged material. Although his model of atomic structure is now considered incorrect, it was the most accurate picture of an atom at that time.

In 1909, Ernest Rutherford, a physicist at the University of Manchester, performed his famous alpha particle experiment and concluded that atoms have a positively charged nucleus at their centre. Danish physicist Niels Bohr theorized in 1912 that negatively charged electrons orbit the positively charged nucleus in fixed paths, not unlike planets around the sun. In the 1920s, several scientists modified Bohr's ideas of the orbital paths of electrons by demonstrating that electrons do not behave like other particles and that their location as they orbit the nucleus is difficult to predict.

The rest of the 20th Century saw the discovery of neutrons, which carry a neutral charge, and quarks, which make up all protons, neutrons and electrons. By the 1990s, no less than six different types of quarks had been identified. New discoveries in atomic structure will surely be made in the future.

**1.** The existence of atoms:
A. is a recent idea.
B. is an old idea.
C. is an early 19th century idea.
D. is a late 19th century idea.

**2.** Which of the following statements is true according to the above passage:
A. John Dalton proved that matter is composed of tiny individual units.
B. J.J. Thomson proved atoms were made up of negative charges immersed within positively charged material.
C. Niels Bohr discovered that electrons orbit in fixed paths around the nucleus.
D. That atoms do not contain a negatively charged nucleus was discovered in the 20th century.

**3.** Which of the following statements about quarks is true:
A. There are over six types of quarks.
B. Quarks are made up of neutrons, electrons and protons.
C. The discovery of quarks has settled discussions on atomic structure.
D. Quarks are even smaller than atoms.

**4.** Which of the following statements is INCORRECT:
A. Electrons' behaviour is dissimilar to other particles' behaviour.
B. Electrons' behaviour is predictable.
C. Electrons contain quarks.
D. Electrons go around a nucleus.

## Passage 2

### The Space Race

After the Second World War, Western Europe and the United States found themselves at odds with the Soviet Union. Although they never went to war directly, the two sides were in a constant race to develop advanced weapons and other technology.

In 1957, the Soviets launched the first man-made satellite, Sputnik 1, into space. The successful launch and orbit of Sputnik 1 caused the United States to attempt a satellite launch two months later. The rocket carrying the American satellite failed to launch and exploded on the launch pad. Two months after that, the U.S. did successfully launch a satellite into earth's orbit, and the rivalry between the Soviet and American space programs began.

The next goal was to successfully launch a human into outer space, which the Soviets did first in April 1961 when Yuri Gagarin completed almost two hours orbiting the earth. A month later, an American astronaut was successfully launched into space, although not into orbit. U.S. President Kennedy then began campaigning for a space program aimed at reaching the moon faster than the Soviets.

The mid-1960s were spent with both the Americans and Soviets achieving multiple-day manned space flights, the manual manoeuvring of spacecraft, and spacewalks. In 1967, both sides began a series of manned space flights whose ultimate goal was to land on the moon.

The first humans to orbit the moon were American astronauts in December, 1968. The Soviets never achieved manned lunar orbit, as their space program was plagued with difficulties. In June of 1969 American astronaut Neil Armstrong became the first human to set foot on the moon, effectively defeating the rival Soviet lunar program.

After the race to the moon was over, both sides began to focus on developing space stations, as they would be less expensive than lunar programs and would provide valuable opportunities for research. The Soviets launched the first space station, Salyut 1, into orbit in 1971, followed by the American space station Skylab in 1973. In 1975, a joint space mission involving Soviet and American crews in cooperation was the symbolic end of the rivalry.

5. Which of the following statements is correct:
A. Rivalry throughout WWII between the US and the Soviet Union continued after the war's end.
B. The aftermath of WWII caused tensions between the Soviet Union and Western forces including the US and Western Europe.
C. The developments in each other's technology sparked fear and tension between the US and the Soviet Union.
D. The passage does not state the reasons for the US and the Soviet Union being at odds.

6. According to the passage:
A. The US's space programme was inferior to the Soviet Union's.
B. Developments in space technology fuels developments in weapons technology.
C. The Soviet Union was initially more successful in the Space Race.
D. The US won the Space Race.

7. Which of the following statements is supported by the above passage?
A. The Soviet Union's poverty crippled their attempts to achieve the landing of the first man on the moon.
B. The Soviet Union's civil unrest crippled their attempts to achieve the landing of the first man on the moon.
C. Neil Armstrong was the first man to achieve a spacewalk.
D. The moon-landing had political elements to it.

8. According to the above passage, the 1975 space mission was preceded by:
A. Multiple humans orbiting the moon.
B. Political truce between the Soviet Union and the US.
C. Multiple men on the moon.
D. Much valuable research had been achieved by the 1973 space mission.

## Passage 3

**Childcare**

Childcare is a very important service for most families, whether it be day care, preschool, primary school, secondary school, or simply babysitting. Parents generally cherish their children above all other things, so they do not normally hand their children over to just anyone. Parents need to trust that their children will be physically and emotionally safe while they are apart. Furthermore, if the childcare situation is at a school, parents need to trust that their children are receiving an appropriate education, or they may make other arrangements.

Childcare professionals, babysitters, teachers and school staff should make every effort to ensure a safe setting for the children in their care. This normally includes meeting the physical needs of children by providing clean nappies, bathrooms, food, water, shelter, and sleep if necessary. Children also have emotional and intellectual needs that should be met by adults speaking with them, allowing them to make decisions, helping them overcome challenges, giving them advice, allowing them to make friends, and making them feel respected.

People that care for children should also monitor them for signs of emotional and physical abuse. If a teacher, babysitter, or childcare professional were to observe bruises on a child or to notice the child acting unusually aggressive or depressed, he or she should consider that the child may be having serious problems at home. If a teacher, babysitter, or childcare professional confirms that a child is likely experiencing physical or emotional abuse, he or she should contact an appropriate authority to investigate the situation.

9. Parents:
A. All hold childcare as a very important service.
B. All cherish their children above most things, at all times.
C. May be discerning when it comes to childcare providers.
D. Above all, need to trust that their kids will be emotionally safe when apart from them.

10. Which of these is NOT stated as something to consider when caring for someone else's child:
A. Nutrition.
B. The child's feelings.
C. A tidy appearance.
D. The child's feeling respected.

11. People who care for children should know:
A. Bruises mean the child is experiencing serious problems at home.
B. Unusual aggression means the child is being abused.
C. Unusual depressions means the child is being abused.
D. There is a procedure to follow if they suspect child abuse.

12. Which of the following statements is NOT supported by the above passage:
A. People involved in child care include educators.
B. Childcare services include educational establishments, holiday camps and babysitting.
C. People who care for children should make sure the children in their care are getting water.
D. People who care for children should watch out for signs of abuse.

## Passage 4

**Australia**

The first European contact with Australia was apparently with Dutch explorers in the 17th Century, but the English were the first to explore and colonize the enormous island. English settlers arrived in Australia in 1770 and soon English became the dominant language, as opposed to the roughly 250 language groups found in the country before this immigration, and Christianity the dominant religion. Initial settling was through penal transportation, the moving of criminals to the Oceanian land. This practice was also used in the Victorian era, and the fictional character of Sweeney Todd is said to have been sent to this land 'on a trumped up charge'.

The 19th Century saw the development of the territory into a modern economic and political force, making it an important part of the British Empire. During the 20th Century, Australia gained independence from Great Britain and became a major world power.

Most Australians now have European ancestry and Native Australians, also known as Aboriginal Australians, currently make up just a small fraction of the Australian population. Australian society saw little variation for millennia, as the Aborigines inhabited it for at least 40,000 years, but in the last 250 years it has undergone sweeping changes.

**13.** Australians of European descent may well be able to trace their ancestry back to an 18th century criminal.
A. True.
B. False.
C. Can't tell.

**14.** Dutch is *not* the dominant language in Australia, because:
A. The English stole the land from them.
B. English is easier to learn than Dutch.
C. The Dutch had the first European contact with Australia, but did not settle there.
D. The natives hated the Dutch.

**15.** According to the above passage, Australian independence:
A. Improved the conditions of Aboriginal Australians.
B. Decreased the wealth of Great Britain.
C. Embarrassed the English.
D. Resulted in the creation of a new major world power.

**16.** Which of the following is true according to the passage:
A. Many were sent to Australia on trumped-up charges.
B. Natives have reproduced less since the advent of English immigration to Australia.
C. Immigrants to Australia have all reproduced to a great extent.
D. A quarter of a millennium can be enough time to change a country's demographic situation.

# Passage 5

**Louis Pasteur**

Louis Pasteur, a French scientist, is known as the father of microbiology. Pasteur's work demonstrated once and for all that microorganisms such as mould and bacteria, along with insect larvae, were not the product of spontaneous generation. Spontaneous generation was the ancient and medieval idea that certain types of life could appear on their own, without coming from a parental source, such as mould growing in standing water or maggots growing in uneaten food. Pasteur theorized that microorganisms were responsible for the appearance of these phenomena and proved himself correct in one of his most famous experiments. In 1859, he sterilized several containers and filled them with beef broth. In containers with long, curved necks, the beef broth remained uncontaminated because microbes could not reach the broth within. If a container were opened or turned so that microbes and other particles could reach the broth, its contents became contaminated with bacteria in a matter of hours.

The work of Pasteur and other biologists led to modern food preservation techniques. Canned food was a new development in Pasteur's day and his advancements in microbiology helped perfect and promote the process. Pasteur developed the practice of heating wine and beer to a temperature of 50 – 60 degrees Celsius to prevent spoilage. The practice was later expanded to include milk and other beverages. Boiled wine, beer or milk would be ruined, but if they were heated to this lower temperature, many of the microbes died and the structure of the beverage remained intact. This process was later termed "Pasteurization" after Louis Pasteur.

17. The idea of spontaneous generation:
A. Stated organisms could come into being from nothing.
B. Stated organisms could be utterly different from their parents, like maggots being born from uneaten parents.
C. Started in the middle ages.
D. Ended with the middle ages.

18. Which of the following is Pasteur NOT stated to be in the above passage:
A. European.
B. Male.
C. A genius.
D. A biologist

19. Pasteur's discoveries are stated to have helped modern food production because:
A. It made food more palatable, as micro-organisms are known to be foul-tasting.
B. It made food more attractive, as micro-organisms like mould are unsightly.
C. It stopped food from smelling unpleasant.
D. It helped to keep food from going off.

20. According to the passage, when treating milk, beer and wine through pasteurisation:
A. The fluid becomes ruined by heat.
B. The fluid becomes completely free of microbes.
C. The fluid maintains its structure.
D. The fluid is 100% guaranteed not to cause any sickness through consumption.

## Passage 6

**Agricultural Reform**

The 18th Century saw many advances in agriculture, which spurred Europe into the Industrial Revolution and spawned the modern societies now known by most of the world. Farming had been common in Europe for thousands of years, but few innovations had taken hold. When crops grow in a field, they remove the nutrients and fertilisers from the land. Ancient and Medieval farmers knew to leave fields fallow for a growing season or two to allow the soil to regain its fertility, and this practice remained largely unchanged. In the 1700s, however, British farmers found that if they grew other crops on their unused fields, nutrients returned to the soil faster than if the fields were left fallow.

Clover restores fields well; after growing clover in a field for a season, farmers could replant and grow on that field the next season with success. We now know that this is because clover absorbs nitrogen from the atmosphere and returns it to the soil as a natural fertilizer. Turnips were commonly planted in hitherto unused fields because they would also return fields to fertility. We now know that this is because the deep roots of turnips collect nutrients and bring them to the topsoil where they can be reached by the roots of other crops when the fields are replanted.

21. For thousands of years, farming in Europe was done in roughly the same way.
A.  True.
B.  False.
C.  Can't tell.

22. There was a link between agriculture and industry in 1700s Europe.
A.  True.
B.  False.
C.  Can't tell.

23. What did 18th Century British farmers know that Medieval ones did not:
A.  That crops sap nutrients from the land.
B.  That crops sap fertilisers from the land.
C.  Certain plants replenish nutrients.
D.  Leaving fields fallow allows them to recover.

24. According to the passage, turnips and clovers
A.  Improve topsoil.
B.  Collect nutrients from the atmosphere.
C.  Collect nutrients from the earth.
D.  Provide an alternative to leaving land fallow.

## Passage 7

### The Industrial Revolution

The increased production of food in the 18$^{th}$ Century allowed Europe to support a higher population than ever before. Advances in agricultural technology also allowed farms to be operated by fewer labourers than ever before, creating a surplus of labour. Many of these labourers found work in mills, mines and eventually factories, and their manpower helped drive the Industrial Revolution. The excess population in Europe also helped fuel European colonial empires, as a ready supply of colonists appeared to fill the New World.

The cities of Europe soon experienced overpopulation, which brought the problems of disease, poverty and crime. Orphanages and workhouses were common in the 19$^{th}$ Century, as many of the poor lived in squalor. Factories and mills were generally unsafe places to work and workplace accidents were common. The steady supply of labour meant that employers could overwork and underpay their workers. Churches and charities began caring for the poor and campaigning for better living and working conditions. Eventually, laws were enacted across the western world that limited work hours and child labour, promoted workplace safety and public health, and established the minimum wage.

25. Increased food production meant:
A. There were fewer jobs for farm labourers.
B. More people could be fed.
C. More people moved to the colonies.
D. Mills improved.

26. The Industrial revolution was predominately responsible for colonisation.
A. True.
B. False.
C. Can't tell.

27. The passage states:
A. The Industrial revolution was a positive event.
B. The Industrial revolution is an event to be regretted.
C. Things became a lot simpler with the advent of the Industrial Revolution.
D. Higher populations can come with problems.

28. Employers in the above passage are described as possibly:
A. Benevolent.
B. Anxious.
C. Exploitative.
D. Sadistic.

## Passage 8

### The Ice Age

For much of the last 100,000 years, Earth's climate was colder than it is now and enormous ice sheets covered large parts of North America, Europe and Asia. The Scandinavian Ice Sheet covered what is now Scotland and northern England, as well as what are now Scandinavia and northern Russia. What are now Canada and the northern United States were covered by the Laurentide Ice Sheet. Humans inhabited many of these areas before the ice sheets formed, but were forced out by the cooling climate. By around 12,000 years ago, much of this ice had melted and sea levels had risen to their present state.

As the Earth warmed, the ice sheets slowly receded, creating many of the landforms now present in North America, Europe and Asia. Sand, gravel and rocks of various sizes were all carried northward with the receding ice, and were re-deposited as melting ice formed new rivers and lakes. When melting ice flowed heavily from an ice sheet, a new river could be formed as the flowing water dug a trench through the earth. When a large piece of ice broke off from an ice sheet and was left behind to melt, a lake or pond could be formed. This is how many of the lakes in northern Europe and Canada were created, such as

Osterseen in Germany, Loch Fergus in Scotland, and Wilcox Lake in Canada.

As the ice sheets shrank, humans moved back into the newly inhabitable areas of the arctic. Asians crossed into the Americas, and sea levels rose to separate Siberia from Alaska and the British Isles from Europe.

**29.** For 100,000 years Earth's climate was colder than it is now.
A. True.
B. False.
C. Can't tell.

**30.** Which of the following is NOT true:
A. Scotland is covered by the Scandinavian Ice Sheet.
B. The same ice sheet covered what were northern Russia and Scotland.
C. Multiple ice sheets existed.
D. Ice sheets were very large.

**31.** Loch Fergus was created:
A. By heavy-flowing melting ice.
B. By sand, gravel and rocks being deposited by melting ice.
C. By non-flowing melting ice.
D. By medium-flowing melting ice.

**32.** The British Isles was once part of mainland Europe:
A. True.
B. False.
C. Can't tell.

## Passage 9

**Germany**

The Federal Republic of Germany (or the *Bundesrepublik Deutschland*) is the most populous country in the European Union and has Europe's largest economy. It also has the fourth largest economy in the world, giving it an influential role in geopolitics. The German language, also widely spoken in Switzerland and Austria, has over 100 million native speakers and some 80 million speakers who learned it as a foreign language. Many Europeans have migrated to Germany to take advantage of job opportunities that are available in its strong economy.

The European Union's Freedom of Movement for Workers principle (described in Treaty on European Union Article 39) means that anyone from an EU country (a state that is a member of the European Union) can seek and gain work in any other EU country, without experiencing discrimination due to their citizenship, excepting the people of Croatia. Accordingly, in 2014 many immigrants from Poland, Romania and Bulgaria came to Germany looking for employment. Croatian citizens also attempted to find paid work in the country, despite their exclusion from the above treaty. There were also those from the Middle East, who were refugees from ongoing conflicts in the region, who sought asylum within Germany's boarders.

**33.** Germany is a monarchy.
A. True.
B. False.
C. Can't tell.

**34.** According to the passage, the German language:
A. Is spoken as a mother tongue by over 100 million people.
B. Is spoken as a mother tongue by over 180 million people.
C. Is the dominant language in Austria and Switzerland.
D. Is the second most important language in geopolitics.

**35.** The German economy:
A. Is strong because of the influx of immigrant workers.
B. Ensures everyone in Germany is well-off.
C. Is in the top ten biggest global economies.
D. Ensures jobs for migrant workers.

**36.** According to the above passage, Croatians have more right to German jobs than Middle Eastern migrants.
A. True.
B. False.
C. Can't tell.

## Passage 10

**Thomas Hobbes**

Born in 1588 in Malmesbury, Wiltshire, with a clergyman father, Thomas Hobbes was an English political philosopher and political scientist. His birth was linked to acts of war: he was born prematurely, when his mother heard of the approaching Spanish Armada invasion. This instance led to him pithily saying his parent 'gave birth to twins: myself and fear.'

In 1651, he published the book *Leviathan*. The following is an excerpt from this text, which he wrote in France, and is in reference to the English Civil War and its effects on society:

"In such condition, there is no place for industry; because the fruit thereof is uncertain; and consequently no culture of the earth; no navigation, nor use of the commodities that may be imported by sea; no commodious building; no instruments of moving and removing such things as require much force; no knowledge of the face of the earth; no account of time; no arts; no letters
; no society; and which is worst of all, continual fear, and danger of violent death; and the life of man, solitary, poor, nasty, brutish, and short."

37. *Leviathan* considers biblical stances.
A. True.
B. False.
C. Can't tell.

38. Hobbes:
A. Hated the Spanish.
B. Hated war from birth.
C. Was born in a condition of stress.
D. Was born to be a clergyman.

39. The passage states that the seventeenth century:
A. Saw the birth of this great political mind.
B. Saw the birth of a great philosophical mind.
C. Saw the product of a political-philosophical mind.
D. Saw the depression of Thomas Hobbes.

40. Hobbes' speaks on:
A. The necessity of war.
B. The destruction of the enemy through war.
C. The shutting down of society.
D. The problems with the predominate illiteracy of the poor of his time.

## Passage 11

**Emily Davison**

The first-wave feminism movement saw many passionate women fighting for their cause, and sacrificing much in pursuit of equal rights for both sexes. An example of a feminist who paid much for her beliefs in Emily Davison, who campaigned in Britain and had experienced multiple run-ins with the law before her death.

On nine separate occasions she was arrested and thrown into jail. She continued protesting even from a cell, by refusing to eat. Feminist hunger strikes often ended in force-feeding, a horrible process where a tube is passed through the mouth (or, occasionally, the nose) into the stomach so food can be poured directly into the prisoner's body. The inmate would be held down whilst this happened. Davison endured this invasive treatment 49 times.

In 1913, at the Epsom Derby, she ran in front of King George's horse and ended up trampled. It has been debated what exactly her intentions were, with many arguing it was not a suicidal act. Some believe that analysis of the newsreel supports the notion that Davison was trying to attach a scarf to the King's horse's bridle, and that her behaviour was more a publicity stunt than a conscious sacrifice of her life. If this is so, then she paid the ultimate price for her beliefs and died the way she lived: campaigning for male and female equality.

**41.** Equal rights did not exist at all in the 20th century.
A. True.
B. False.
C. Can't tell.

**42.** According to the passage, feminists fought for:
A. Superior rights for women.
B. Equal rights for different sexualities.
C. The vote.
D. Men to have the same rights as women.

**43.** Hunger strikes:
A. Discredited the feminist cause.
B. Were a waste of time.
C. Were countered with awful treatment.
D. Eventually died out.

**44.** Emily Davison was:
A. Suicidal.
B. Willing to sacrifice personal comfort.
C. A genius.
D. A pre-eminent figure in first wave feminism.

**END OF SECTION**

## Section B: Decision Making

1.  Chocolates come in boxes of 6, 9 and 20. What is the largest number of chocolates you CANNOT buy using the above combinations?

    A.  19            B.  27            C.  35            D.  43            E.  52

2.  "It is best to start medical school aged 18."

    Which statement gives the best supporting reason for this statement?

    A.  Medical schools are unlikely to admit people under 18 years old.
    B.  At 18, students have reached the right level of maturity to enter medical school.
    C.  Students cannot live away from their parents before they are 18.
    D.  You must be an adult before starting medical school.

3.  Dr Smith is only able to prescribe drugs. All antidepressants are drugs. Carbamazepine is not an antidepressant. Most home remedies are drugs.  Place true and false next to the statements below.

    A.  Dr Smith can prescribe antidepressants.
    B.  Dr Smith can prescribe carbamazepine.
    C.  Carbamazepine is not a drug.
    D.  Dr Smith can prescribe all home remedies.
    E.  Most home remedies are antidepressants.

4.  The probability Lucas misses the bus to school on a sunny day is 0.3 and on a rainy day is 0.2. The probability he carries an umbrella on any day is 0.4. If he misses the bus, Lucas walks to school. Last week, it rained on the last three days of the school week. Lucas thinks that last week, he was more likely to walk to school in the rain without an umbrella than to walk in the sun with an umbrella. Is he correct?

    A.  Yes
    B.  No, there is an equal chance of both occurrences in the last week
    C.  No because the probability of getting the bus when it is raining is greater than catching the bus when it is sunny
    D.  No, because the probability that he carries an umbrella on any given day is 0.4

5.  All musicians play instruments. All oboe players are musicians. Oboes and pianos are instruments. Karen is a musician. Which statement is true?

    A.  Karen plays two instruments.
    B.  All musicians are oboe players.
    C.  All instruments are pianos or oboes.
    D.  Karen is an oboe player.
    E.  None of the above

6.  All of James's sons have brown eyes and all of his daughters have blue eyes. His wife has just become pregnant with a boy. Which statement is most likely to be correct?

    A.  The baby will have brown eyes.
    B.  James' wife has blue eyes.
    C.  Brown eyes are more likely than blue eyes.
    D.  Blue eyes are equally as likely as brown eyes.
    E.  None of the above.

7.  Millie and Ben play a game. There is a stack of pennies and each player takes it in turn to remove one, two or three pennies each turn. The person who takes the last penny wins. If Millie starts the games, how many pennies will she need to start the game with to guarantee a win?

    A.  4 pennies.            B.  8 pennies            C.  13 pennies.            D.  16 pennies.

**8.** "Obesity is a growing problem, therefore there should be a tax on high calorie foods." Which option is the best argument against the above statement?

A. Those from low income backgrounds will be hit hardest from this tax.
B. Cost does not affect choice of food.
C. You are more likely to be overweight if you are rich.
D. Many high calorie foods are healthy

**9.** B is right of A. C is left of B. D is in front of C. E is in front of B. Where is D is relation to E?

A. D is behind E.
B. E is behind D.
C. D is to the right of E.
D. D is to the left of E.
E. E is to the left of D.

**10.** Arnold, Carrie and Eric are arguing about the number of cars their father owns. Arnold says "Dad owns at least four cars", Carrie says "No, he owns less than four cars", and Eric says "he owns at least one car". If only one of them is tell the truth, how many cars does their father own?

A. 0              B. 1              C. 3              D. 4              E. 5

**11.** "Increased traffic is bad for your health." Which statement provides the best evidence for this conclusion?

A. Traffic congested increases carbon monoxide in the environment to harmful levels.
B. Sitting in traffic reduces the amount of time for people to exercise.
C. Towns with higher road tax have healthier people.
D. Pollution from cars causes acid rain.
E. Some traffic congestion is not hazardous to health

**12.** Fred has a drawer full of socks. There are 1 red, 2 green, 4 blue and 10 orange. In the dark, he cannot distinguish colours. What is the least number of socks he has to pick to ensure he has three matching pairs?

A. 10              B. 8              C. 3              D. 9              E. 11

**13.** Gabby is older than Maria. Maria's older sister Olivia is older than Gabby. Gabby wins more often than Olivia. Olivia's boyfriend Tom loses the most often. All four play cards. Which statement is true?

A. Maria is the youngest.
B. Olivia wins more than Maria.
C. Gabby hates playing cards.
D. Maria wins more than Tom.
E. Tom is the oldest.

**14.** Three rats are placed in a maize that is in the shape of an equilateral triangle. They pick a direction at random and walk along the side of a triangle. Sophie thinks they are less likely to collide than not. Is she correct?

A. Yes, mice naturally keep away from each other.
B. No. They are more likely to collide than not.
C. No. they are equally likely to collide than not collide.
D. Yes, the probability they collide is 0.25

**15.** Jane says, "Plums are not sweets. Some plums are sweet. All sweets are tasty." Which of the below statements is most in keeping with Jane's thoughts?

A. Some sweets are plums
B. Some plums are not tasty.
C. Some plums are tasty
D. No plum is tasty
E. Some plums are not sweet

**16.** In Leeds, a survey is done on a school. Strawberry ice cream is liked by 8 children, chocolate ice cream is liked by 5 children and vanilla ice cream is liked by 4 children. Three children like all flavours and no children like chocolate and strawberry, or vanilla and strawberry. Only one child likes chocolate and vanilla. Two children in the survey don't like ice cream. How many children took the survey?

A. 15            B. 12            C. 10            D. 19

**17.** In Newcastle, a survey is done on a school. 4 children like all types of ice cream. 4 children like only strawberry and vanilla, and 12 like chocolate. However, 4 like vanilla ice cream only. Only one child likes everything but strawberry. Which Venn diagram represents this information?

A.



B.



C.



D.
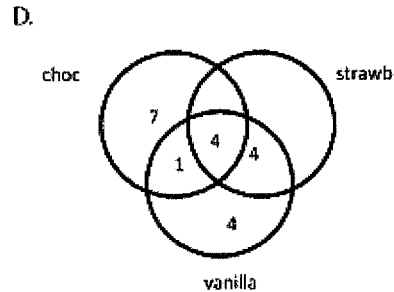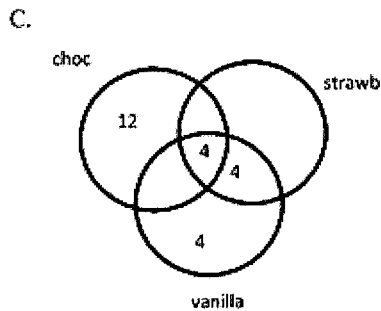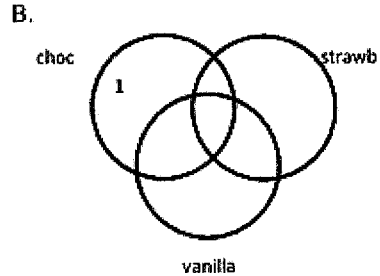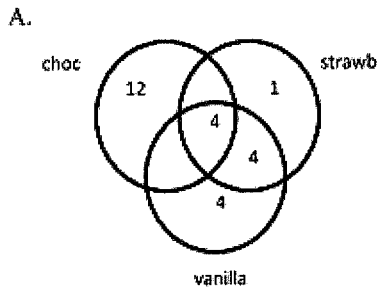


**18.** Tasha went shopping. She says that every dress she bought was blue and she bought every blue dress she saw. Which statement is true?

A. Blue dresses were the only dresses Tasha saw while shopping.
B. While Tasha was shopping, she bought only blue dresses.
C. In the area that Tasha shopped, there were only blue dresses being sold.
D. All of the dresses that Tasha saw she bought.
E. Tasha did not see any other dress while she was shopping.

**19.** In a game of kissing catch, everyone put their names in a hat. Each player takes turns to draw a name. If they pick their own name, it is placed back and they draw another. If the last person to pick draws their own name, everyone starts again. John, Kelly and Lisa play and pick in alphabetical order. Which statement is true?

A. Jon has a one in three chance of picking and kissing Lisa
B. Kelly is more likely to pick John than picking Lisa
C. John has an equal chance of kissing Lisa or Kelly
D. Lisa should reverse the order is she wants to increase her chances of kissing John

**20.** Mary is showing photos to her daughter. She points to a woman and says "her brother's father is the only son of my grandfather." How is the woman in the photo related to Mary's daughter?

A. Cousin       B. Mother       C. Sister       D. Daughter       E. Aunt

**21.** "If vaccinations are now compulsory because society has decided that they should be forced, then society should pay for them." Which of the following statements would weaken the argument?

A. Many people disagree that vaccinations should be compulsory.
B. The cost of vaccinations is too high to be funded locally.
C. Vaccinations are supported by many local communities and GPs.
D. Healthcare workers do not want vaccinations.

**22.** Tim is going to the doctor for a blood test today. He says that he knows he will be in pain today. What assumption has Tim made?

A. Using a needle will cause pain
B. The doctor will have a hard time finding Tim's vein.
C. He has had pain when he visited the doctor before so it must always happen
D. Tim will have a bruise after his blood is taken
E. The doctor will need repeated attempts to get blood

**23.** William, Xavier and Yolanda race in a 100m race. All of them run at a constant speed during the race. William beats Xavier by 20m. Xavier beats Yolanda by 20m. How many metres does William beat Yolanda?

A. 30m            B. 36m            C. 40m            D. 60m            E. 64m

**24.** Chris is shorter than Ellen. Jane is shorter than Mark who is shorter than Ellen. Ellen and Jane are shorter than Naomi. Who is the tallest?

A. Chris            B. Ellen            C. Jane            D. Mark            E. Naomi

**25.** Diane, Erica and Harry have Ferraris. Michael and Harry have Fords. Chris just bought an Audi. All the girls have Mercedes, except Lily who has a Volkswagen. Michael, Erica and Chris have BMWs. Who has the most cars?

A. Erica            B. Chris            C. Harry            D. Lily            E. Michael

**26.** Watermelon is 99% water. Penny has 100 grams of watermelon. After drying in the sun, the shrivelled watermelon is 98% water. What is the weight of the watermelon now?

A. 98g.            B. 75g            C. 68g            D. 50g            E. 49g

**27.** Jon, Emmanuel and Saigeet are in a Rubik's cube solving competition. They need to solve the cube in less than 30 seconds to qualify. Jon and Saigeet solve faster than Emmanuel. Emmanuel's best time is 32.1 seconds. Which statement must be correct?

A. Only Saigeet qualifies            C. Emmanuel doesn't qualify            E. Jon and Saigeet qualify
B. No one qualifies                  D. Only Jon Qualifies

**28.** All doctors are handsome. Some doctors are popular. Francis is handsome, and Oscar is popular. Choose a correct statement.

A. A doctor can be popular and handsome            D. Francis is a doctor
B. Oscar is handsome                               E. Oscar is popular with doctors.
C. Some popular people are handsome

**29.** There are four houses on a street. Lucy, Vicky and Shannon live in adjacent houses. Shannon has a black dog named Chrissie, Lucy has a white Persian cat and Vicky has a red parrot that shouts obscenities. The owner of a four legged pet has a blue door. Vicky has a neighbour with a red door. Either a cat or bird owner has a white door. Lucy lives opposite a green door. Vicky and Shannon are not neighbours. What colour is Lucy's door?

A. Green            C. White            E. Cannot tell
B. Red             D. Blue

**END OF SECTION**

## Section C: Quantitative Reasoning

## Data Set 1

The following graph describes the travel of a car and bike along a road. Study the graph, then answer the following six questions.
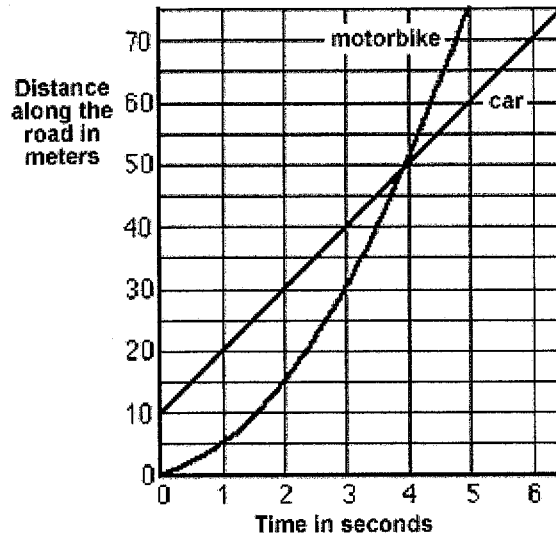


1.  After 1 second, what is the speed of the car, in metres per second?

| | | |
|---|---|---|
| A. 5 m/s | C. 12 m/s | E. 30 m/s |
| B. 10 m/s | D. 20 m/s | |

2.  Approximately, what is the highest speed the motorcycle reaches?

| | | |
|---|---|---|
| A. 20 m/s | C. 30 m/s | E. 100 m/s |
| B. 25 m/s | D. 50 m/s | |

3.  What is the peak acceleration of the car, in $m/s^2$?

| | | |
|---|---|---|
| A. $0 \ m/s^2$ | C. $2 \ m/s^2$ | E. $10 \ m/s^2$ |
| B. $1 \ m/s^2$ | D. $m/s^2$ | |

4.  The motorbike accelerates more quickly than the car

| | | |
|---|---|---|
| A. True | C. True – but not initially | E. Can't tell |
| B. False | D. True – but only initially | |

## Data Set 2

The following tables describe the cost of making international telephone calls. The cost of any given telephone call is calculated by adding together the connection charge, the duration charge plus a surcharge if applicable. The connection charge is only paid if the call is answered.

Connection charge between two countries (in UK pence):

|  | UK | France | USA | China | Australia |
|---|---|---|---|---|---|
| UK | - | 25 | 47 | 52 | 68 |
| France | 25 | - | 51 | 54 | 78 |
| USA | 47 | 51 | - | 43 | 56 |
| China | 52 | 54 | 43 | - | 45 |
| Australia | 68 | 78 | 56 | 45 | - |

Cost per minute for international calls (in UK pence). All calls are rounded up to the nearest minute for calculation purposes. Increasing the duration of the call does not make previous minutes cheaper – only those minutes above any threshold are subject to the lower rate.

|  | 1 – 10 mins | 11 – 20 mins | 21 – 60 mins | Over 60mins |
|---|---|---|---|---|
| Peak | 42 | 37 | 34 | 28 |
| Off-peak | 25 | 18 | 16 | 15 |

Peak time is recorded as between 0800 and 1800 in the country making the call.

A surcharge of 88 pence is payable on calls over an hour, off peak only. A different surcharge of 10 pence is placed on international calls from Europe to Australia if the phone isn't answered.

**5.** What is the total cost of a seven-minute peak time call from the UK to France?

A. £ 0.67       B. £ 2.94       C. £ 3.19       D. £ 3.29       E. £ 3.77

**6.** What is the cost of a call at 0930 local time from France to Australia, that rings for 63 seconds but is unanswered?

A. £ 0.00       B. £ 0.10       C. £ 0.58       D. £ 0.84       E. £ 1.62

**7.** What percentage of the overall cost of a call (of duration 463 seconds made at 1543 hours local time from USA to China) is represented by fixed (i.e. non-duration dependent) charges?

A. 0%       B. 8%       C. 11%       D. 13%       E. 15%

**8.** What is the total cost of a 75-minute call, from China to France at 1935 local time?

A. £ 11.79       B. £ 12.67       C. £ 13.49       D. £ 14.37       E. £ 21.45

**9.** What is the total cost of a 763 second call, from France to Australia at 1215 local time?

A. £ 5.31       B. £ 5.59       C. £ 6.09       D. £ 6.19       E. £ 7.19

## Data Set 3

The following graph describes the price of gold. The next two questions refer to this graph.
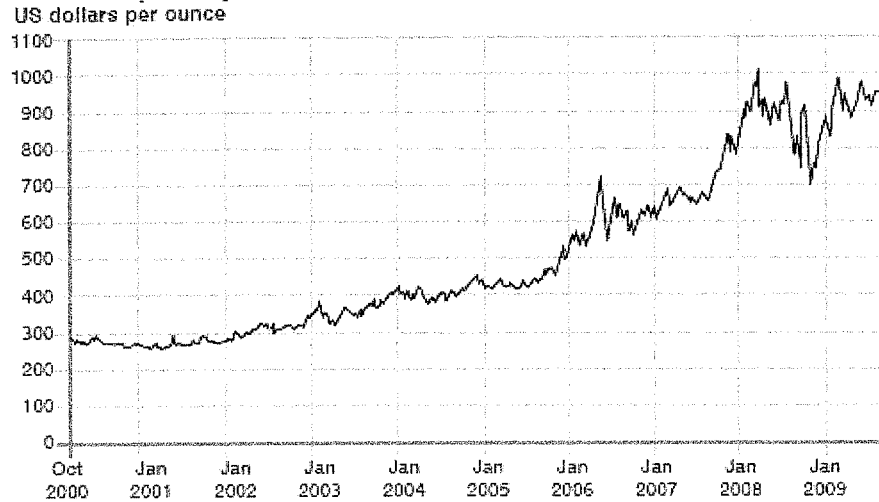


Assume where required that the current conversion rate is 1 USD = 0.68 GBP
One ounce is the equivalent of 28g

**10.** What is the approximate percentage change in gold value between January 2004 and January 2007?

A.  63%           B.  145%           C.  155%           D.  165%           E.  195%

**11.** What was the approximate total cost (in GBP) of 50g of gold in January 2004?

A.  £456         B.  £486          C.  £714          D.  £767          E.  £20,000

## Data Set 4

The following table shows the nutritional composition of three different single-portion pre-prepared meals. Read it, and then answer the following questions.

| Meal | Energy content / Kcal | Sugar content / g | Total mass / g |
|---|---|---|---|
| Lasagne | 427 | 19 | 450 |
| Chicken curry | 783 | 24 | 600 |
| Beef noodles | 722 | 35 | 475 |
| Ratatouille | 359 | 14 | 320 |

**12.** How much more sugar per unit mass does the Beef Noodle dish contain relative to the Lasagne?

A.  16.0 g/kg             C.  31.5 g/kg             E.  37.1 g/kg
B.  21.5 g/kg             D.  34.3 g/kg

**13.** Which dish has the least proportion of its energy content provided by sugar?

A.  Lasagne              C.  Beef Noodles           E.  More information required
B.  Chicken Curry        D.  Ratatouille

## Data Set 5

Five respondents were asked to estimate the value of three bottles of wine, in pounds sterling.

| Respondent | Wine 1 | Wine 2 | Wine 3 |
|---|---|---|---|
| 1 | 13 | 16 | 25 |
| 2 | 17 | 16 | 23 |
| 3 | 11 | 17 | 21 |
| 4 | 13 | 15 | 14 |
| 5 | 15 | 19 | 29 |
| Actual retail value | 8 | 25 | 23 |

14. What is the mean error margin in the guessing of the value of wine 1?
A.  £4.80          B.  £5.60          C.  £5.80          D.  £6.20          E.  £6.40

15. Which respondent guessed most accurately on average?
A.  Respondent 1          C.  Respondent 3          E.  Respondent 5
B.  Respondent 2          D.  Respondent 4


## Data Set 6

A sweet shop stocks a range of different products. A new popular product is released, which the shopkeeper is keen to stock. However in order to do this, he must discontinue one of his current lines to create shelf space. The amount of shelf space required for this is 0.2m. The data below show sales figures for four different products currently stocked.

| Product | Gobstopper | Bubblegum | Everton mints | Jelly beans |
|---|---|---|---|---|
| Cost per unit | 22p | 35p | 45p | 50p |
| Sale price | 40p | 50p | 90p | 65p |
| Number sold per week | 150 | 180 | 300 | 420 |
| Shelf space taken | 0.2m | 0.1m | 0.2m | 0.2m |

16. What is the total weekly profit from these four items?

A.  £ 189.00          C.  £ 252.00          E.  £ 472.50
B.  £ 225.00          D.  £ 295.50

17. What is the total value of sales for Gobstoppers and Everton mints combined, minus the total purchase price of one week's supply of Bubblegum?

A.  £ 99.00           C.  £ 267.00          E.  £ 330.00
B.  £ 162.00          D.  £ 290.00

18. Based on the information available to you, which of these items would you recommend the shopkeeper replace with the new product?

A.  Gobstopper          C.  Everton mints          E.  Gobstopper and Bubblegum
B.  Bubblegum          D.  Jelly beans

## Data Set 7

The population of Country A is 40% greater than the population of Country B.
The population of Country C is 30% less than the population of Country D (which is has a population 20% greater than Country B).

**19.** Given that the population of Country A is 45 million, what is the population of country D?

A. 32.1 million people
B. 35.8 million people

C. 36.6 million people
D. 38.6 million people

E. 39.0 million people

**20.** The population of Country A is still 45 million. If Country B introduced a new health initiative costing $ 45 per capita, what would be the total cost?

A. $ 1.35 bn
B. $ 1.45 bn

C. $ 1.50 bn
D. $ 1.55 bn

E. $ 1.65 bn

**21.** The population of Country C now changes to 25 million. The ratios are still preserved. Assuming that 52% of the population are female and 28% of the population are aged under 18, how many adult men are there in Country D?

A. 8.6 million
B. 10.3 million

C. 12.3 million
D. 17.1 million

E. 25.7 million

## Data Set 8

The table below displays the costs associated with recruiting skilled workers in different industries in euros.

| Training sector | Trade and industry | Civil service | Liberal professions | Crafts and skilled trades | Agri-culture |
|---|---|---|---|---|---|
| Application process | 1,525 | 1,168 | 1,157 | 664 | 536 |
| This includes: | | | | | |
| Advertising costs | 576 | 502 | 337 | 231 | 183 |
| Application process (personnel costs) | 568 | 640 | 562 | 395 | 352 |
| External consultants | 381 | 26 | 258 | 38 | 0 |
| Continuing training during the familiarisation period | 1,048 | 1,029 | 183 | 329 | 376 |
| This includes: | | | | | |
| Lost working hours during continuing training | 447 | 431 | 75 | 139 | 168 |
| Cost of continuing training courses | 600 | 598 | 107 | 190 | 208 |
| Difference in productivity during the familiarisation period | 2,798 | 2,183 | 1,660 | 1,902 | 1,399 |
| Total personnel recruitment costs | 5,370 | 4,380 | 3,001 | 2,895 | 2,311 |

**22.** What is the difference in advertising costs per position between the most expensive and least expensive?
What is the difference between the most expensive and the least expensive advertising cost?

A. €271
B. €288
C. €319
D. €363
E. €393

**23.** In which industry is there the greatest cost due to lost working hours relative to the total overall recruitment cost?

A. Trade and industry
B. Civil service

C. Liberal professions
D. Crafts and skilled trades

E. Agriculture

## Data Set 9

The table below shows crime data for some types of crime from the town of Westwich over a three-year period.

| Crime code | 2011 | 2012 | 2013 |
|------------|------|------|------|
| X632 | 2,350 | 2,453 | 2,670 |
| X652 | 3,821 | 3,663 | 3,231 |
| Y321 | 230 | 210 | ? |
| Y632 | 456 | 490 | 432 |
| Y115 | 321 | ? | 431 |
| Y230 | 763 | 754 | 714 |

24. Data for offence Y321 is missing for 2013, however you are told that the rate is 10% lower than in 2011. What is the rate of crime for Y321 in 2013?

A.  189          B.  195          C.  199          D.  207          E.  210

25. Data for offence Y115 is missing for 2012. You are informed that of the four "Y code" crimes recorded here, there were less than 1,837 in 2012. How many Y115 offences were committed?

A.  373          B.  383          C.  388          D.  393          E.  399

26. Which crime experienced the biggest percentage reduction from 2012 to 2013?

A.  X632          B.  X652          C.  Y321          D.  Y632          E.  Y230

## Data Set 10

This is a bus timetable taken from a route in Southern England. Use the data in the table to answer the following questions.

**Mondays to Fridays**

| | | Sch | | | | | | | Sch | | Saturdays | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Petersfield Tesco | -- | -- | 0625 | 1025 | 1225 | 1425 | 1525 | 1620 | 1810 | | -- | 1025 | 1325 | 1625 |
| Petersfield Square | 0700 | 0735 | 0630 | 1030 | 1230 | 1430 | 1530 | 1625 | 1815 | | 0730 | 1030 | 1330 | 1630 |
| Petersfield Station | 0702 | 0737 | 0632 | 1032 | 1232 | 1432 | 1532 | 1627 | 1817 | | 0732 | 1032 | 1332 | 1632 |
| Stroud The Seven Stars | 0707 | 0742 | 0637 | 1037 | 1237 | 1437 | 1537 | 1632 | 1822 | | 0737 | 1037 | 1337 | 1637 |
| East Meon All Saints Church | 0717 | 0752 | 0847 | 1047 | 1247 | 1447 | 1547 | 1642 | 1832 | | 0747 | 1047 | 1347 | 1647 |
| West Meon The Thomas Lord | 0723 | 0758 | 0853 | 1053 | 1253 | 1453 | 1553 | 1648 | 1838 | | 0753 | 1053 | 1353 | 1653 |
| Bramdean The Fox Inn | 0730 | 0805 | 0900 | 1100 | 1300 | 1500 | 1600 | -- | 1845 | | 0800 | 1100 | 1400 | 1700 |
| Cheriton Cheriton Hall | 0736 | 0811 | 0906 | 1106 | 1306 | 1506 | 1606 | -- | 1851 | | 0806 | 1106 | 1406 | 1706 |
| New Alresford Perins School | 0744 | 0819 | 0914 | 1114 | 1314 | 1514 | 1614 | -- | 1859 | | 0814 | 1114 | 1414 | 1714 |
| Itchen Abbas Trout Inn | 0755 | -- | 0925 | 1125 | 1325 | -- | 1525 | -- | -- | | 0825 | 1125 | 1425 | 1725 |
| Kings Worthy Cart and Horses | 0802 | -- | 0932 | 1132 | 1332 | -- | 1632 | -- | -- | | 0832 | 1132 | 1432 | 1732 |
| Winchester City Road | 0808 | -- | 0938 | 1138 | 1338 | -- | 1638 | -- | -- | | 0838 | 1138 | 1438 | 1738 |
| Winchester Bus Station | 0811 | -- | 0941 | 1141 | 1341 | -- | 1641 | -- | -- | | 0841 | 1141 | 1441 | 1741 |

No service on Sundays or Public Holidays

**Mondays to Fridays**

| | | Sch | SH | | | | | | Sch | | Saturdays | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Winchester Bus Station | -- | -- | 0900 | 1100 | 1300 | 1400 | -- | 1650 | 1750 | | 0900 | 1200 | 1500 | 1750 |
| Winchester City Road | -- | -- | 0904 | 1104 | 1304 | 1404 | -- | 1654 | 1754 | | 0904 | 1204 | 1504 | 1754 |
| Kings Worthy Cart and Horses | -- | -- | 0911 | 1111 | 1311 | 1411 | -- | 1701 | 1801 | | 0911 | 1211 | 1511 | 1801 |
| Itchen Abbas Trout Inn | -- | -- | 0918 | 1118 | 1318 | 1418 | -- | 1708 | 1808 | | 0918 | 1218 | 1518 | 1808 |
| New Alresford Perins School | 0727 | 0729 | 0929 | 1129 | 1329 | 1429 | 1529 | 1719 | 1819 | | 0929 | 1229 | 1529 | 1819 |
| Cheriton Cheriton Hall | 0735 | 0737 | 0937 | 1137 | 1337 | 1437 | 1537 | 1727 | 1827 | | 0937 | 1237 | 1537 | 1837 |
| Bramdean The Fox Inn | 0741 | 0743 | 0943 | 1143 | 1343 | 1443 | 1543 | 1733 | 1833 | | 0943 | 1243 | 1543 | 1833 |
| West Meon The Thomas Lord | 0748 | 0750 | 0950 | 1150 | 1350 | 1450 | 1550 | 1740 | 1840 | | 0950 | 1250 | 1550 | 1840 |
| East Meon All Saints Church | 0755 | 0757 | 0957 | 1157 | 1357 | 1457 | 1557 | 1747 | 1847 | | 0957 | 1257 | 1557 | 1847 |
| East Meon Primary School | 0757 | -- | -- | -- | -- | -- | -- | -- | -- | | -- | -- | -- | -- |
| Stroud The Seven Stars | 0807 | 0807 | 1007 | 1207 | 1407 | 1507 | 1607 | 1757 | 1857 | | 1007 | 1307 | 1607 | 1857 |
| Petersfield Station | 0812 | 0812 | 1012 | 1212 | 1412 | 1512 | 1612 | 1802 | 1902 | | 1012 | 1312 | 1612 | 1902 |
| Petersfield Square | 0814 | 0814 | 1014 | 1214 | 1414 | 1514 | 1614 | 1804 | 1904 | | 1014 | 1314 | 1614 | 1904 |
| Petersfield Tesco | 0817 | 0817 | 1017 | 1217 | 1417 | 1517 | 1617 | 1807 | -- | | 1017 | 1317 | 1617 | -- |

Liable to change from 11 June 2012

27. On a Monday, how long does the 1225 to Winchester Bus Station take to travel between East Moon All Saints Church and Itchen Abbas Trout Inn?

A. 13 minutes     C. 38 minutes     E. 60 minutes
B. 25 minutes     D. 47 minutes

28. If you were at Cheriton, Cheriton Hall at 1321 on a Tuesday, how long would you have to wait until the next bus to Winchester City Road?

A. 45 minutes     C. 105 minutes     E. 165 minutes
B. 65 minutes     D. 145 minutes

## Data Set 11

**Tables 1** and **3** show data relating to the cultivation of corn grain. Interpret the tables and answer the subsequent questions. (A hectare is the equivalent of 10000m².).

**Table 1. Monthly precipitation during the growing season, 1985-1989.**

|  | Precipitatiion (mm) | | | | | |
|---|---|---|---|---|---|---|
|  | 1985 | 1986 | 1987 | 1988 | 1989 | Long-Term Average |
| May | 69 | 89 | 38 | 15 | 124 | 66 |
| June | 56 | 119 | 64 | 5 | 84 | 89 |
| July | 51 | 71 | 66 | 61 | 46 | 71 |
| August | 104 | 99 | 127 | 97 | 175 | 76 |
| September | 89 | 203 | 102 | 94 | 150 | 64 |
| Total | 369 | 581 | 397 | 272 | 579 | 366 |

**Table 3. Corn grain yield, seed moisture content, and stand count at harvest for three erosion classes of Marlette soils.**

| Degree of Erosion | 1985 | 1986 | 1987 | 1988 | 1989 | Mean |
|---|---|---|---|---|---|---|
|  |  |  | Yield (kg/ha) | | | |
| Slight | 6,770a | 8,150a | 8,400a | 3,510a | 9,910a | 7,340a |
| Moderate | 5,580ab | 7,340a | 8,590a | 3,820a | 9,910a | 7,090a |
| Severe | 5,080b | 5,960b | 6,840b | 1,820b | 9,280a | 5,830b |
|  |  |  | Seed moisture content (%) | | | |
| Slight | 22.6a | 22.7a | 26.5ab | 26.0a | 31.6a | 25.9a |
| Moderate | 24.8b | 26.0a | 25.9a | 25.1a | 30.4a | 26.4ab |
| Severe | 24.7b | 25.9a | 27.2b | 31.3b | 31.6a | 28.2b |
|  |  |  | Stand count (plants/ha) | | | |
| Slight | 43,600a | 59,400a | 52,000ab | 53,600a | 57,500a | 53,200a |
| Moderate | 33,900a | 48,800b | 54,500a | 46,800ab | 57,700a | 48,400ab |
| Severe | 33,700a | 32,800c | 49,000b | 34,700b | 56,500a | 41,300b |

**29.** What is the percentage difference between the July 1987 precipitation levels and the long-term average for the month?

A. 5%          B. 6%          C. 7%          D. 8%          E. 9%

**30.** In what year was the overall mean seed moisture content the lowest?

A. 1985          B. 1986          C. 1987          D. 1988          E. 198

**31.** What was the difference in corn grain yield between slightly eroded Marlette soil in 1986 and moderately eroded Marlette soil in 1989, expressed in kg/hectare?

A.

B. 0          C. 1330          D. 1640          E. 1760          F. 1920

**32.** In what month was there the highest average precipitation, taking the years 1985 – 1987 inclusive?

A. May          B. June          C. July          D. August          E. September

**33.** What sized area of ground did each plant occupy, in lightly eroded Marlette soil in 1986?

A. 1262 cm²          C. 1684 cm²          E. 2012 cm²
B. 1384 cm²          D. 1836 cm²

# Data Set 12

The following graph plots a child's length and weight up to the age of 36 months.



**Birth to 36 months: Girls**
**Length-for-age and Weight-for-age percentiles**
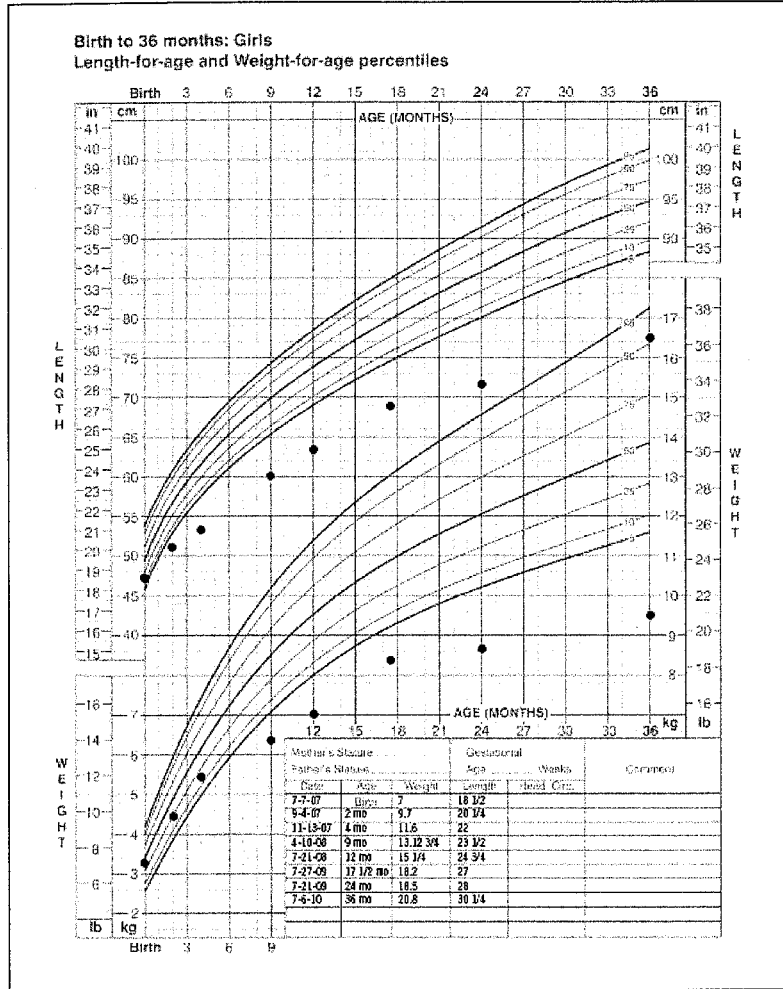
Figure 1 – The patient's weight and length from birth to age 36 months are shown. A deceleration of growth is apparent at age 9 months.

**34.** After two months, on which centile did the child's weight fall?

A. 75<sup>th</sup>          B. 5<sup>th</sup>          C. 10<sup>th</sup>          D. 25<sup>th</sup>          E. 50<sup>th</sup>

**35.** At the 24 month check, what was the child's actual length, in cm?

A. 38.5          B. 70.5          C. 71.5          D. 72.5          E. 73.5

**36.** What is the mean weight, in pounds (lbs.), of the final three measurements recorded on the chart?

A. 8.5 lbs          B. 9.5 lbs          C. 18.6 lbs          D. 19.2 lbs          E. 21.2 lbs

**END OF SECTION**

## Section D: Abstract Reasoning

For each question, decide whether each test shape fits best with Set A, Set B or with neither.

For each question, work through the test shapes from left to right as you see them on the page. Make your decision and fill it into the answer sheet.

**Answer as follows:**
A = Set A
B = Set B
C = Neither

Set 1:              Set A                                                    Set B
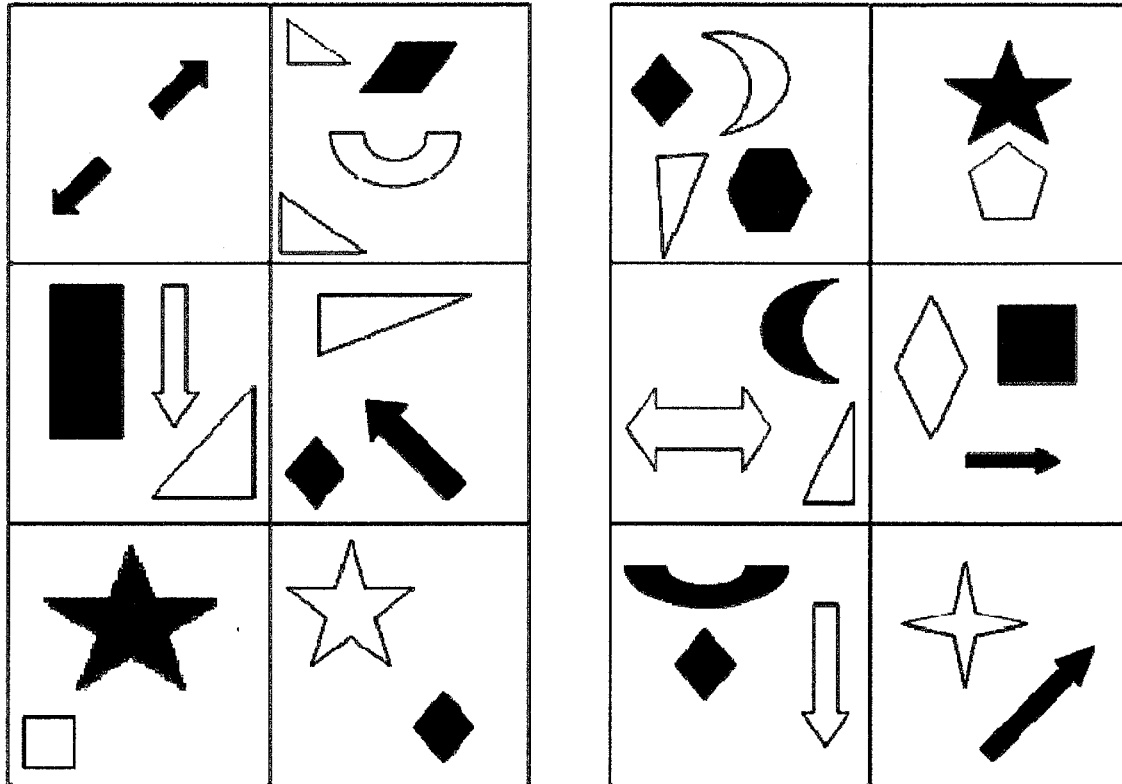


Questions 1-5:
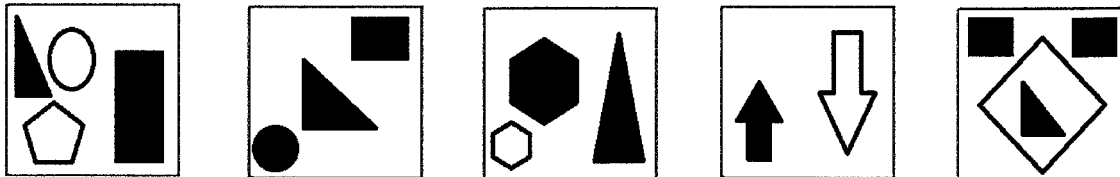
**Set 2:**          Set A          Set B
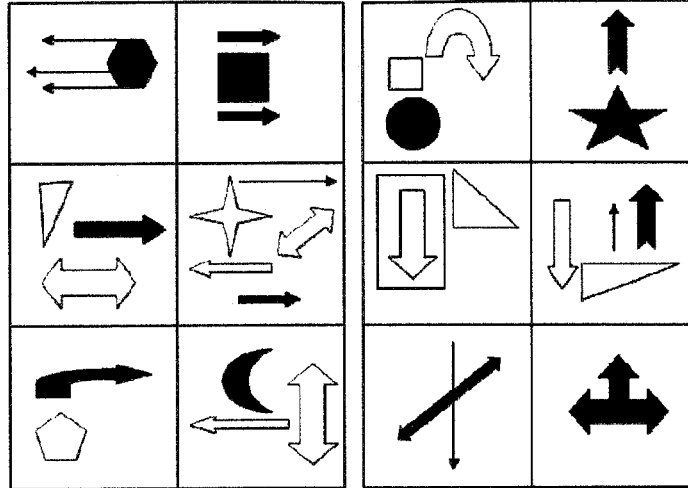


**Questions 6-10:**
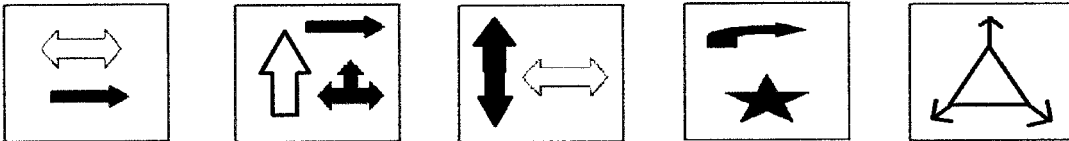


**Set 3:**          Set A          Set B
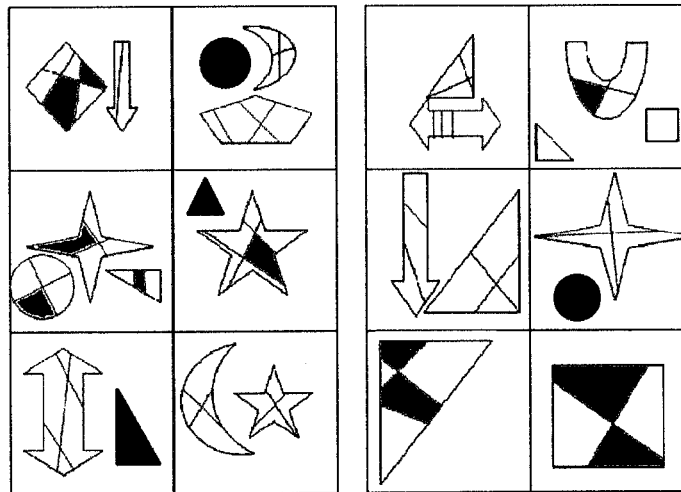


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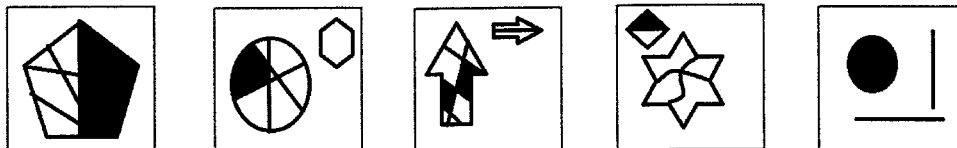
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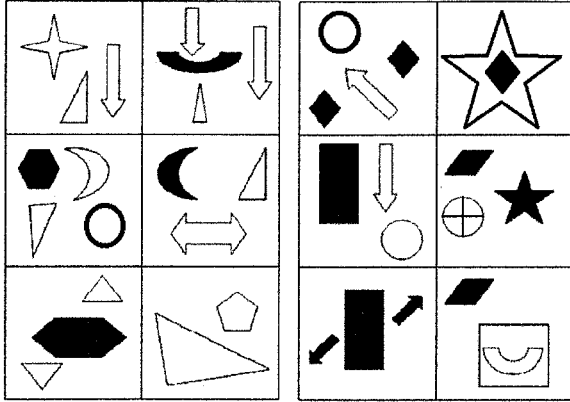


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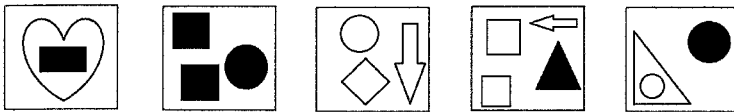


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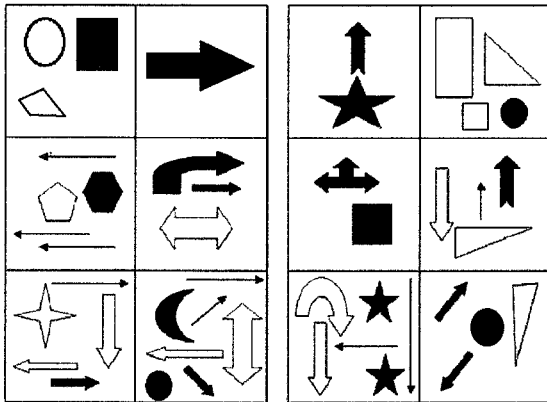


Questions 21-25:

Set 6:                    Set A                    Set B
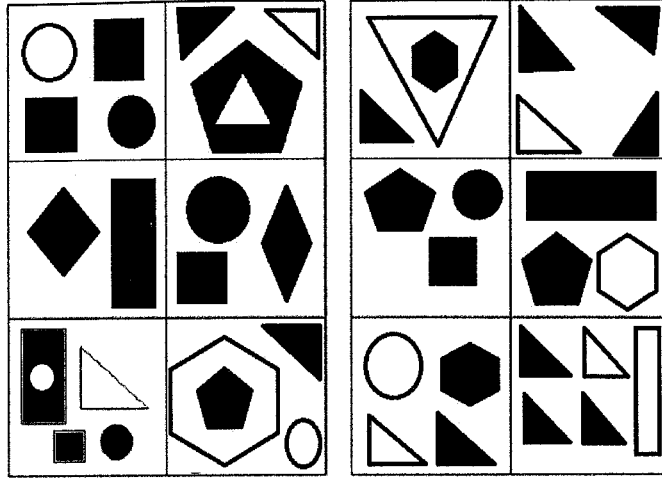


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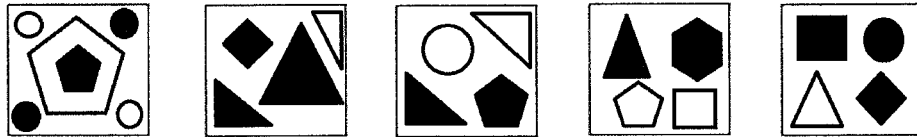


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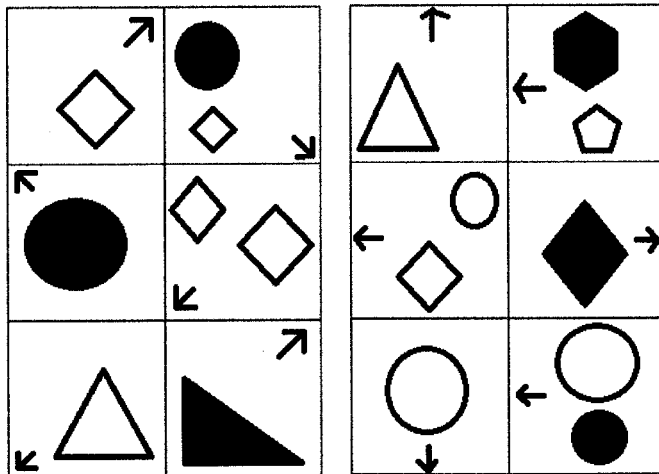


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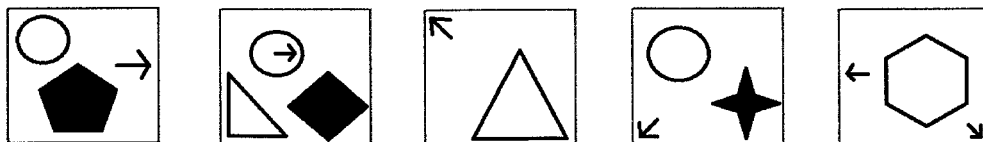
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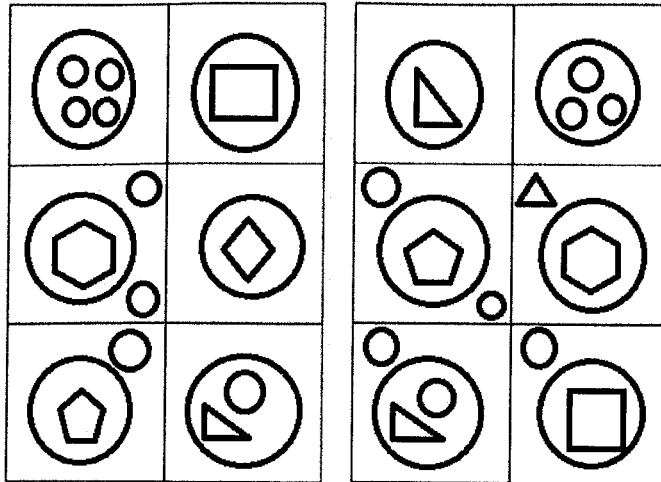
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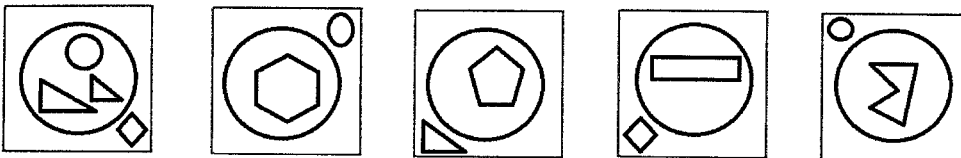
**Set 9:**

Which answer completes the series?

**Question 41:**                                      **Question 42:**

A)          B)                                         A)          B)

C)          D)                                         C)          D)
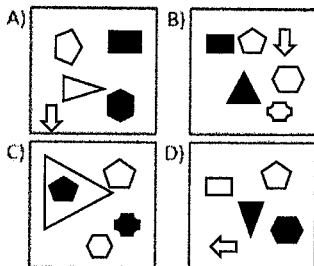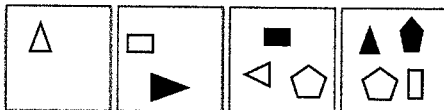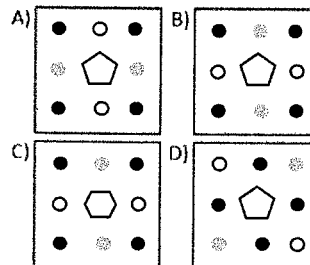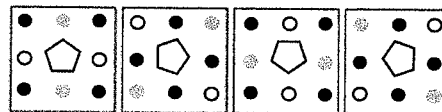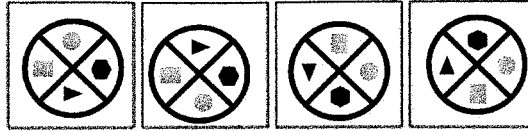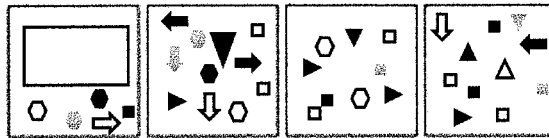
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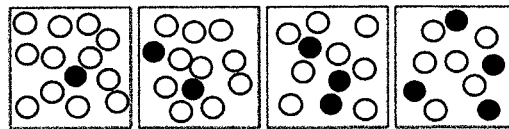
**Question 44:**

**Question 45:**

**Set 10:**

Which answer completes the statement?

**Question 46:**
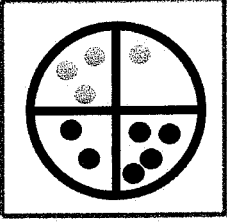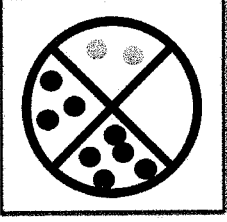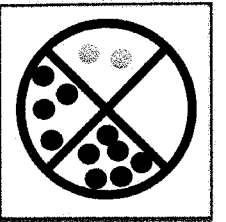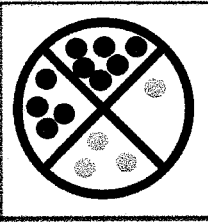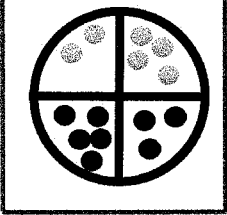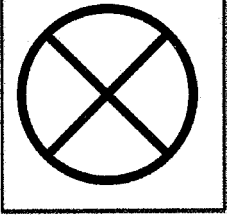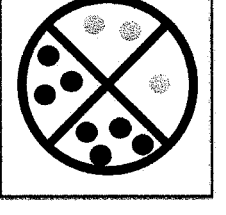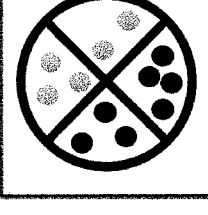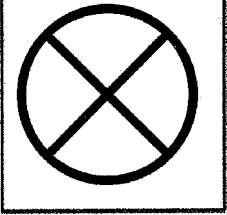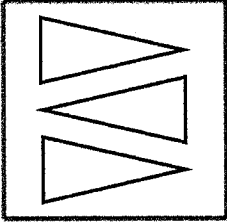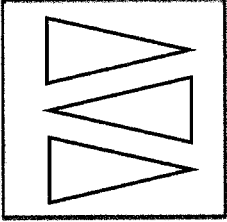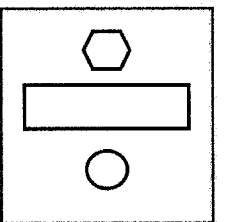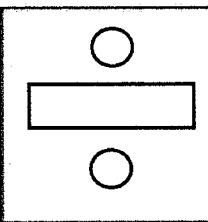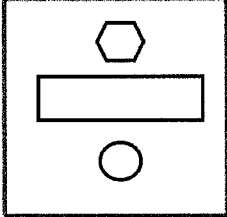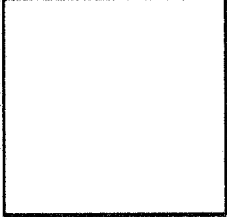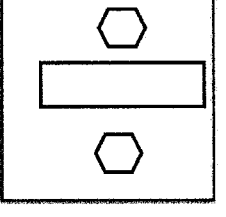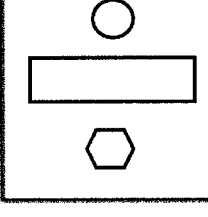


**Question 47:**



**Question 48:**

**Question 49:**



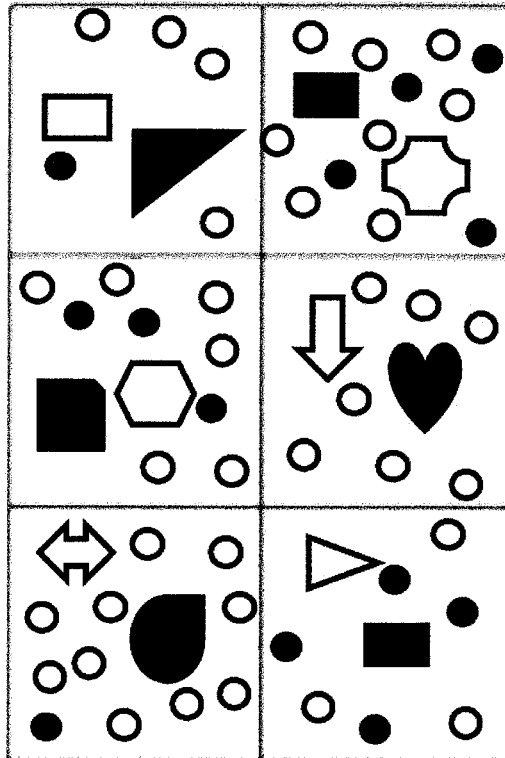**Question 50:**

## Set 11:

Which of the four response options belongs to either set A or set B?



Set A
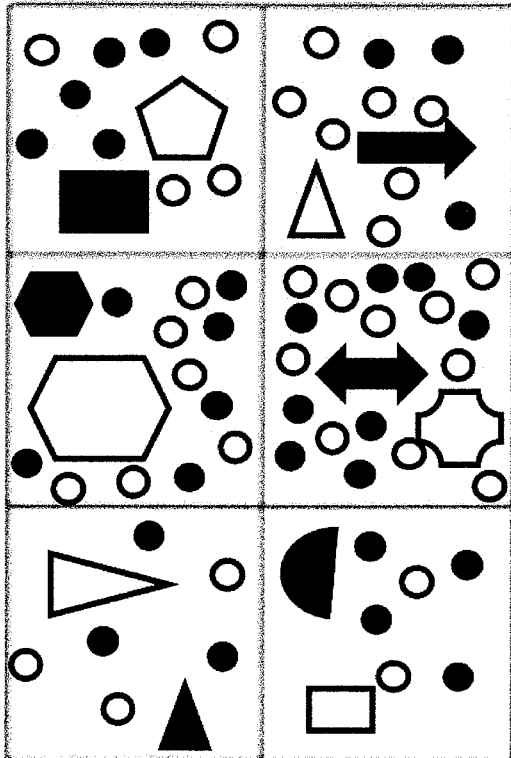


Set B

**Question 51:**
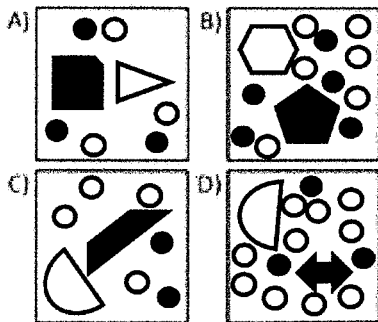
**Question 52:**
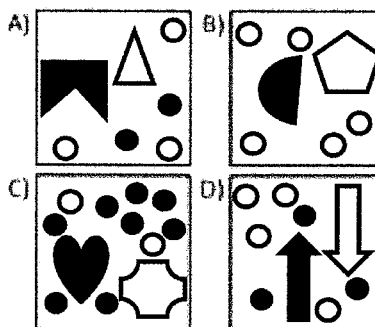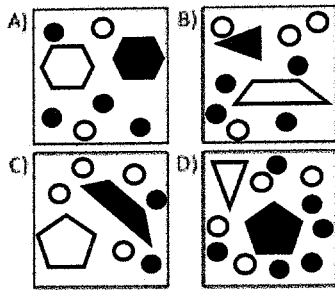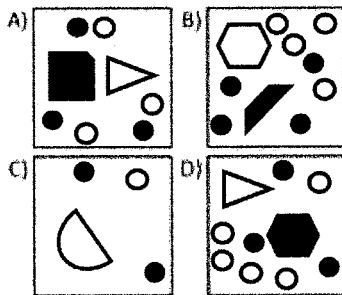
Set A?

Set B?

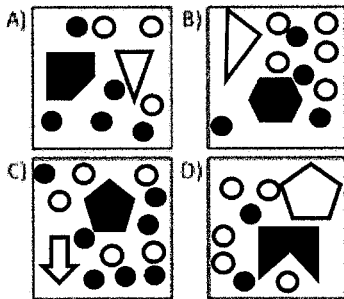**Question 53:**

Set A?



**Question 54:**

Set B?



**Question 55:**

Set B?



**END OF SECTION**

## Section E: Situational Judgement Test

Read each scenario. Each question refers to the scenario directly above. For each question, select one of these four options. Select whichever you feel is the option that best represents your view on each suggested action.

**For questions 1 – 30, choose one of the following options:**

A    A highly appropriate action
B    Appropriate, but not ideal
C    Inappropriate, but not awful
D    A highly inappropriate action

### Scenario 1

Emily is a third year medical student. She has been looking forward to the summer holidays for a long time because she has booked a once-in-a-lifetime trip to Tanzania with a group of her best friends from her course. She extended her overdraft to be able to pay for this trip, and has spent a lot of time planning it. Unfortunately, the end-of-year exam results have just come out, and she has only passed 2 out of 3 exams. She only failed by 2%, but must re-sit this final exam in order to continue with her studies. The re-sit is scheduled to be only two days after her return from Tanzania.

How appropriate are the following responses to Emily's dilemma?
1.    Go on her trip and cram her revision into the two days before the exam – she only just failed anyway.
2.    Cancel the entire trip and let her friends go without her.
3.    Ask her friends if they can all reschedule for the following year.
4.    Take revision with her to Tanzania – it'll be an active holiday but maybe she can study in her free time.
5.    Go for part of the trip but return early to ensure sufficient time for revision.

### Scenario 2

Sanjay is a first year medical student who has recently joined the university football team. The word has just got out that this year's sports tour will be abroad. Sanjay is desperate to go as he has heard this is the best week of the academic year, and he wants to have a more active role within the football club. Regrettably, tour will be especially expensive this year and Sanjay is short on funds, having already spent most of his student loan and increased his overdraft.

How appropriate are the following actions to Steve's problem?
6.    Ask his other football friends to chip in as they all want him to be there too.
7.    Further increase his overdraft to the limit (this would be difficult to pay back).
8.    Ask his parents to contribute, despite their own financial hardships.
9.    ·Forget about tour this year – there is always next year when it is likely to be cheaper.
10.    Get a part-time job to pay for the tour, even though this will mean sacrificing some of his medical studies.

### Scenario 3

Ade is heading into his second year at university. He lived at home with his parents throughout his first year, as the proximity of his home to the university meant that he was not eligible for student accommodation. He struggled to make close friends in his first year and often felt isolated from the other students who all lived together. He has recently seen an advertisement on the year group Facebook page, where several members of his year are looking for another flatmate. He is keen to apply, but is unsure whether his parents would be able to provide financial aid.

How appropriate are the following responses by Ade?
11.    Apply to the advertisement without telling his parents.
12.    Continue living at home but find other ways to enjoy the student experience – e.g. joining a society.
13.    Carry on exactly as he is.
14.    Demand his parents pay for him to move out as they are denying him the real student experience.
15.    Discuss his concerns with his parents and come up with a financial solution together – e.g. getting a part-time job.

## Scenario 4

Gillian has recently been attending communication classes, and has learnt about the importance of having a good manner when talking to patients. That afternoon, she attends a clinic and is shocked to observe the doctor's rude and indifferent manner towards several patients. These patients leave feeling ignored and upset.

How appropriate are the following actions from Gillian?

16. Tell the doctor what she thinks of his rude manner.
17. Inform her supervisor and get their advice on what to do.
18. Do nothing.
19. Talk to the patients and direct them on how to make a complaint.
20. Report the doctor to the dean of education.

## Scenario 5

Ethel is a 3rd year medical student observing a prostate cancer clinic. She witnesses her consultant break the bad news of a terminal prognosis to a patient, who clearly struggles to comprehend his situation. Suddenly, the consultant receives a phone call and leaves the room, leaving Ethel alone with the upset patient.

How appropriate are each of the following responses by Ethel in this situation?
21. Say nothing. Leave the patient to his thoughts.
22. Offer words of consolation and support.
23. Leave the room and the patient alone in order to look for the consultant.
24. Share what little information about prostate cancer she knows.
25. Tell the patient everything will be Okay.
26. Ask the patient if he has any questions or concerns.

## Scenario 6

Larissa is a third year medical student in her second term of clinical training. Whilst observing in A&E, she is asked by a nurse to perform an ABG (Arterial blood gas). Although she has learnt many of the clinical skills expected at her stage of training, an ABG is a fourth year skill and she has never attempted one before. However, the patient needs the procedure done as soon as possible and no other members of staff are immediately available. She is keen to learn and help out.

How appropriate are the following actions by Larissa in this situation?
27. Refuse to carry out the procedure. It is not worth putting the patient at risk.
28. Wait until a member of staff is available to assist.
29. Go ahead and do the procedure. She has learnt similar skills such as taking blood – how different can it really be?
30. Inform the patient that this would be her first time doing an ABG, and only proceed if they consent.
31. Avoid the embarrassment of telling the nurse she can't do it, and rush off pretending to go to a lecture.

**For questions 31 – 69, decide how important each statement is when deciding how to respond to the situation?**

A    Very important
B    important
C    Of minor importance
D    Not important at all

## Scenario 7

Romario is a final year medical student. He and his friends have carefully planned a trip to the Caribbean – their last hurrah before graduation. However, his consultant has just offered him a chance to participate in a study that is very likely to be published. Romario has been concerned as he is yet to have any publications to his name, but all of his friends have several. Unfortunately, the study will be carried out at the same time as the Caribbean trip.

How important are the following factors for Romario's decision?
32. The likelihood of the study resulting in a publication – there is no guarantee.
33. This is his last year as a student and a publication will help him when it comes to job applications.
34. This is his last year as a student and the last chance to go away with his university friends.
35. Rejecting the offer may look bad to his consultant.
36. Cancelling the holiday may be letting his friends down.

### Scenario 8

Mahood has been offered a one-off teaching session with a senior consultant on the High Dependency Unit (HDU) for respiratory patients. He is very keen to attend as this is a great opportunity to see lots of interesting cases. However, in the preceding days, Mahood comes down with the flu. Whilst he feels able to continue with his day, he is unsure whether to attend the teaching as it could put the patients at risk. He has been told to stay at home if he is unwell, but he is very eager to attend this prestigious teaching.

How important are the following factors for Mahood in deciding what to do?

37.    He only has the flu and it seems quite mild to him.
38.    This is a one-off teaching session with a top doctor.
39.    He has been told to stay at home if he is unwell.
40.    This is his only chance to see the interesting cases on HDU.
41.    This unit is clearly for very sick patients.

### Scenario 9

Theodore is a third year medical student who is captain of his university rugby team. It is his first term on a clinical placement and he is keen to impress his consultant, who will be responsible for his final grade for the year. However, Theodore has noticed that his consultant teaching sessions will always be on a Wednesday afternoon, which clashes with his rugby matches.

How important are the following factors for Theodore in deciding on what to do?

42.    He is the team captain – they need him to be present at the matches.
43.    His consultant will determine his final grade.
44.    His final grade will determine whether he can progress to fourth year.
45.    Wednesday afternoons are the only time the consultant can make teaching.
46.    His rugby team have the chance to win the championships this year.

### Scenario 10

Malaika, a fourth year medical student, has been invited to attend an extra clinic with a senior doctor in a field she is interested in pursuing as a career. Unfortunately, she has not yet finished an important essay that is due in the next day.

How important are the following factors for Malaika to consider in deciding on what to do?

47.    How long it will take her to finish the essay.
48.    The importance of the essay towards her final mark.
49.    She might not learn that much in the clinic.
50.    Her reputation with the doctor.
51.    Whether or not Malaika will be able to attend another clinic with the doctor.

### Scenario 11

Jean and Franklin are medical students and clinical partners. Jean notices that Franklin frequently arrives looking very untidy, and some of their doctors have started to comment on his unprofessional appearance. However, Jean is worried that Franklin would take it personally and get offended if she mentioned something to him.

How important are the following factors for Jean in deciding on what to do?

52.    Their reputation with the doctors.
53.    Jean's friendship with Franklin.
54.    Mentioning his appearance may hurt Franklin's feelings.
55.    Their daily contact with patients.
56.    Franklin's appearance may reflect badly on Jean as they are clinical partners.

**Scenario 12**

Rory and Priya have been working on a project together based on an interesting patient they have seen. They divided the work between them so each is responsible for different sections. Rory has been going into the hospital early every day in order to look at the patient's notes and construct his part of the project. However, he notices that Priya has been secretly taking sections of the patient's notes home with her each evening and bringing them back the next morning.

How important are the following factors to Rory's situation?
57.     The project must be completed on time.
58.     It risks breaking confidentiality for Priya to take identifiable patient notes home.
59.     The overnight staff may not be able to access the patient's notes if Priya has taken them home.
60.     A member of staff might find out.
61.     Rory and Priya will receive a joint mark for their project.
62.     Rory has no responsibility towards how Priya works on her part of the project.

**Scenario 13**

Horatio and Nelson are medical students on a surgical placement. They have been invited to observe an interesting operation, but have been advised to stand back and not to touch any of the sterile equipment. Horatio sees Nelson accidently touch the sterile trolley out of the corner of his eye. Nelson does not say anything, and the procedure is about to begin.

How important are the following factors for Horatio in deciding what he should do?
63.     Nelson would be very embarrassed if Horatio told on him.
64.     The risk to the patient being operated on with unsterile equipment
65.     Nelson only very briefly touched the trolley.
66.     The inconvenience for all of the surgical staff if they have to bring out a new sterile trolley.
67.     They may be asked to leave the theatre.
68.     The procedure may not be able to be carried out if the equipment is contaminated.
69.     Nelson is scrubbed in a sterile surgical gown.

**END OF PAPER**