Surname	Initial(s)
Signature	

Paper Reference(s)

5005 5025

Edexcel GCSE

Science (5005)

Biology (5025)

B1a – Topics 1 and 2

Foundation and Higher Tier

Friday 20 June 2008 – Morning

Time: 20 minutes

Materials required for examination
Multiple Choice Answer Sheet
HB pencil, eraser and calculator

Items included with question papers
Nil

Instructions to Candidates

Use an HB pencil. Do not open this booklet until you are told to do so.
Mark your answers on the separate answer sheet.

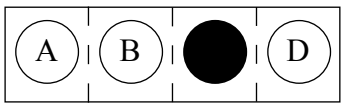
Foundation tier candidates: answer questions 1 – 24.
Higher tier candidates: answer questions 17 – 40.
All candidates are to answer questions 17 – 24.

Before the test begins:

Check that the answer sheet is for the correct test and that it contains your candidate details.

How to answer the test:

For each question, choose the right answer, A, B, C or D and mark it in HB pencil on the answer sheet.
For example, the answer C would be marked as shown.



Mark only **one** answer for each question. If you change your mind about an answer, rub out the first mark **thoroughly**, then mark your new answer.

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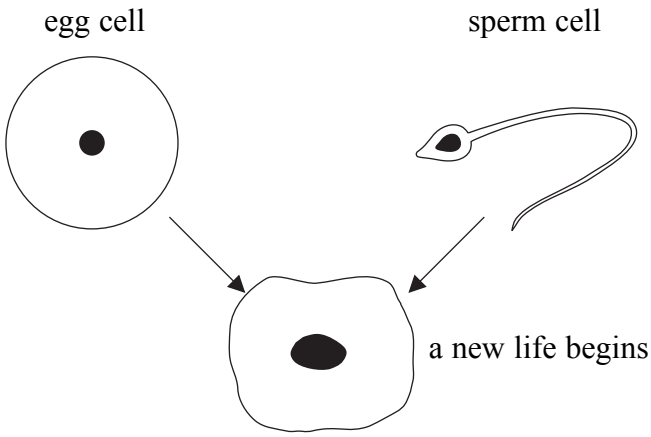
Questions 1 to 16 must be answered by Foundation tier candidates only.
Higher tier candidates start at question 17.

Pass it On!



A new life begins when a sperm cell from the father joins with an egg cell from the mother.

1. The name given to the process in which the sperm cell joins with an egg cell is

A fertilisation
B competition
C asexual reproduction
D selection

2. When a sperm cell joins with an egg cell the new individual will have

A genes from the father only
B genes from the mother only
C genes from both parents
D no genes from either parent

3. The genes in the egg and sperm cells are found in the

A cytoplasm
B nucleus
C chloroplast
D cell membrane

4. Genes give instructions for features such as blood group and eye colour.
We say that these features are

A borrowed
B inherited
C transplanted
D transferred

Maggots

When Justin goes fishing he uses maggots as bait (maggots are the early stage of the life cycle of a fly). Later, he takes the fish he caught home for his dinner.
The food chain for this is

maggots ⟶ fish ⟶ Justin

5. This food chain is incomplete.
What would be found at the start of this food chain?

A a producer such as a green plant
B a consumer such as a rabbit
C a herbivore such as a green plant
D a carnivore such as a rabbit

6. What is the top consumer in this food chain?

A fish
B maggots
C Justin
D there is no top consumer in this food chain

7. Maggots feed on dead meat.
What is the correct statement about maggots?

A maggots are predators of dead meat
B maggots are prey to the dead meat
C maggots are consumers
D maggots are producers

8. There are many different colours of maggots.
Why would Justin use brighter coloured maggots in murky water?

A The maggots would be more camouflaged
B The maggots would be less easily seen by Justin
C The maggots would be more easily seen by the fish
D Coloured maggots are not eaten by fish

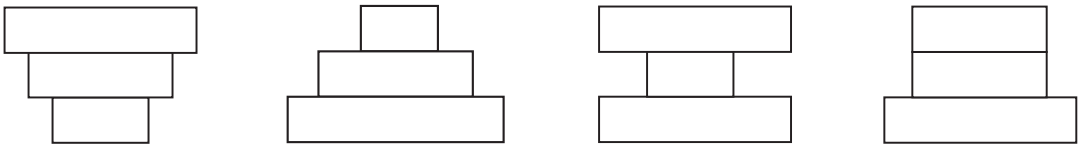
Hybrids

Different species cannot usually interbreed but sometimes a hybrid is produced.
A zedonk is a hybrid. It is a cross between a zebra and a donkey.

9. Both zebras and donkeys belong to the class

A animals
B arthropods
C chordates
D mammals

10. Zedonks eat grass and they are eaten by lions.
Which is a pyramid of biomass for this food chain?



A **B** **C** **D**

11. Zedonks compete with each other for food.
What name is given to this type of competition?

A interspecific
B exterspecific
C intraspecific
D extraspecific

12. For which other resources are zedonks most likely to compete with each other?

A water, space and light
B water, space and mineral salts
C water, shelter and light
D water, shelter and mates

Pet Cloning

Rainbow

Rainbow the cat was the first pet to be cloned. On 22nd December 2001, Copy Cat was born. Copy Cat was a clone of Rainbow.

13. Which picture shows Copy Cat?

A

B

C

D

14. Copy Cat is a clone of Rainbow because she contains

A genes from different cats
B genes from her mother and father
C genes from her father only
D genes from Rainbow only

15. Copy Cat was bred with a grey cat called Smokey. In September 2006, Copy Cat gave birth to three healthy kittens. Two of the kittens looked similar to Copy Cat whereas the third kitten looked similar to Smokey.
Copy Cat's kittens are not identical to their mother or their father because they were produced by

A natural selection
B asexual reproduction
C sexual reproduction
D evolution

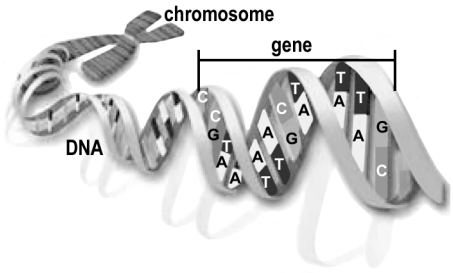
16. Cloning could be used to make new body organs for humans.
An advantage of using cloned organs instead of donated organs would be that

A cloned organs are less likely to be rejected
B cloned organs are easier to obtain
C donated organs get damaged less easily
D donated organs are too big for humans to use

Higher tier candidates start at question 17 and answer questions 17 to 40.
Questions 17 to 24 must be answered by all candidates: Foundation tier and Higher tier.

Working out the Code

In 1990, scientists from all over the world began work on the Human Genome Project (HGP). This project took 13 years to complete and the information collected was stored on a central computer.



17. The aim of the HGP was to

A find out if our genes were made of DNA
B find out if all of our cells contain genes
C identify all of the genes on our chromosomes
D identify how many chromosomes each of our cells contained.

18. Some people are concerned about how the information collected from HGP will be used. Information collected as a result of the HGP may be used:

1 by employers to decide who gets a job
2 by scientists to design new medicines
3 to match donor organs to recipients

Which statements are likely to cause concern?

A 1 only
B 2 only
C 1 and 2
D 1, 2 and 3

19. The HGP will allow scientists to find out whether an unborn child is likely to have a genetic disease.
Which of the following is a disadvantage of having this information?

A the disease could be cured before the child is born
B new drugs can be developed to treat the disease
C parents can decide whether or not to have another child
D some tests are unable to confirm that the child will develop the disease

20. The table shows two diseases.
Which row of the table correctly shows which of the diseases are genetic?

	haemophilia	**sickle cell anaemia**
A	yes	yes
B	yes	no
C	no	yes
D	no	no

Organic Farming

Many farmers in Britain today are changing their farming methods to those backed by the Soil Association as being acceptable to produce organic crops.

21. Which of the following is **not** a technique used by farmers to produce organic crops?

A use of crop rotation to maintain nitrates in the soil
B obeying the strict rules about the use of pesticides
C use of chemical fertilisers to maintain nitrates in the soil
D a ban on the use of genetically modified crops

22. The most likely reason for farmers to produce an organic crop is

A to increase shelf life
B to increase profit margin
C to decrease crop yield
D to decrease biodiversity

23. Why are farmers likely to get a higher yield from planting cereal crops rather than breeding cattle?

A crops are at the first trophic level and gain the most energy
B crops do not require any special conditions to grow
C all animals take longer to grow than crops
D animals use less energy for respiration than crop plants

24. Which method would be acceptable to produce organically farmed beef from cattle?

A genetic modification of cattle
B selective breeding of cattle
C use of steroids to increase muscle mass
D injecting cattle with antibiotics to prevent infection

TOTAL FOR FOUNDATION TIER PAPER: 24 MARKS

Foundation tier candidates do not answer any more questions after question 24.

Questions 25 to 40 must be answered by Higher tier candidates only.
Foundation tier candidates do not answer questions 25 to 40.

Cystic Fibrosis (CF)

In 2005 there were 50 million people living in the UK.
Of these, 2 million people were carriers of the faulty allele that causes CF and 7,500 people suffered from CF.
Although there is no cure for CF, gene therapy is being trialled to treat the symptoms of the disease. Some CF sufferers receive successful lung transplants to replace their damaged lungs. These people must continue to take medication for the rest of their lives.

25. What percentage of the UK population suffered from CF in 2005?

A 0.015%
B 0.15%
C 0.38%
D 0.75%

26. A carrier of CF shows

A symptoms of the disease and cannot pass it to their children
B symptoms of the disease and can pass it to their children
C no symptoms of the disease and cannot pass it to their children
D no symptoms of the disease and can pass it to their children

27. The table shows the number of sufferers and the number of carriers of CF in different groups of people in America.

Group of People	Number of People with CF	Number of Carriers of CF
Caucasians	1 in 3300	1 in 29
Hispanics	1 in 8500	1 in 46
African Americans	1 in 15300	1 in 63
Asian Americans	1 in 32100	1 in 90

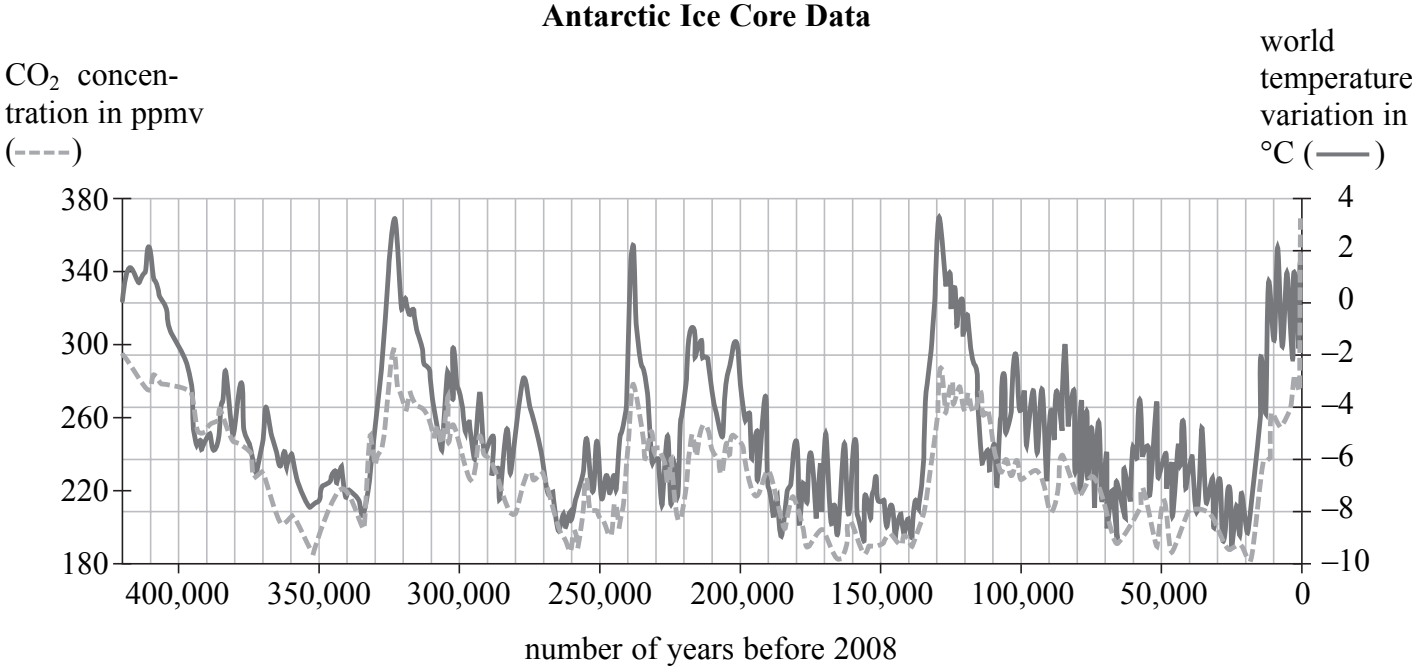
The group of people least likely to have CF is

A Caucasians
B Hispanics
C African Americans
D Asian Americans

28. Gene therapy is being trialled to replace faulty CF alleles.
Non-CF alleles can be delivered to cells in the lungs by

A bacteria
B hormones
C liposomes
D lysozymes

Antarctic Ice Core Data



The graph shows the variation in world temperature and the concentration of CO_2 present in ice cores over the past 400,000 years.

29. Which statement is correct about this graph?

A the world temperature has only varied by 2 °C over the past 400,000 years
B the variation in temperature is less than the variation in carbon dioxide concentration
C carbon dioxide concentration has remained stable over the past 400,000 years
D there is a correlation between carbon dioxide concentration and world temperature.

30. Based on the evidence in the graph what effect would you expect on world temperature if the carbon dioxide concentration doubled from 350 ppmv to 700 ppmv?

A the world temperature would double from –2 °C to –4 °C
B the world temperature would continue to fall
C the world temperature would rise above the levels now
D the world temperature would decrease below –2 °C

31. Scientists have linked the size of the human population with carbon dioxide concentrations. Which statement is the most likely to be true about how these are linked?

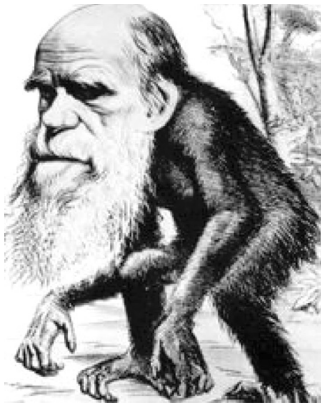
A human population has decreased and carbon dioxide concentrations have increased
B human population has increased and carbon dioxide concentrations have increased
C human population has decreased and carbon dioxide concentrations have stayed the same
D human population has increased and carbon dioxide concentrations have stayed the same

32. Which row of the table is correct for the conditions most likely to cause an increase in carbon dioxide concentrations in the atmosphere?

	human population	**type of society**	**energy use**
A	decreasing	industrial	low
B	increasing	rural	high
C	increasing	industrial	high
D	decreasing	rural	low

Evolution

When Charles Darwin put forward the theory of natural selection, the following cartoon appeared in several newspapers.



33. What was it about Darwin's theory that caused this cartoon to be drawn?

A the theory stated that humans evolved from apes
B the theory stated that apes were a form of human
C the theory stated that humans and apes had a common ancestor
D the theory stated that apes will evolve into humans

34. Which row of the table is correct for the order, family and genus of human beings?

	order	**family**	**genus**
A	primates	hominids	homo
B	hominids	homo	sapiens
C	hominids	primates	sapiens
D	primates	sapiens	homo

35. The following two statements are about Darwin's theory of natural selection.

1 Individuals within a species can have characteristics which promote successful reproduction.
2 Individuals within a species that are well adapted for a changing environment will become extinct.

Which of the statements are true?

A 1 only
B 2 only
C both 1 and 2
D neither 1 or 2

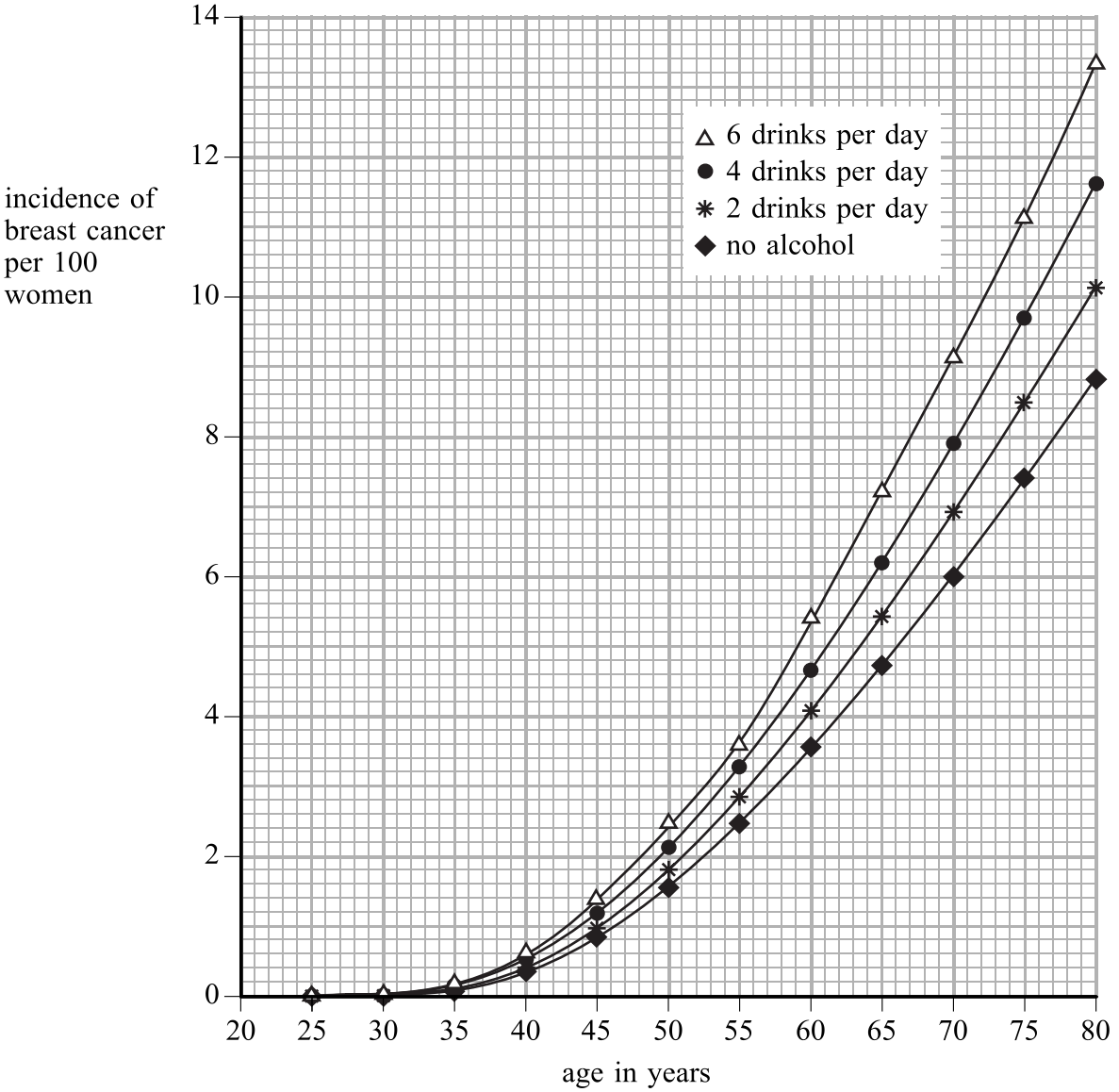
36. Humans can now alter the natural selection process by introducing crops which are genetically modified.
Which is **not** a reason for the genetic modification of plants?

A to enable crops to grow in deserts
B to make crops resistant to herbicides
C to increase crop yield
D to decrease biodiversity

Breast Cancer

In 2003, 10 500 women died from breast cancer in England. Although scientists have evidence to prove that there is a genetic link, there are other factors that increase the risk of developing breast cancer.

37. The graph shows how age and alcohol consumption alter the risk of developing breast cancer.



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Evidence from the graph shows that

A alcohol consumption has no effect on the incidence of breast cancer

B alcohol consumption has a greater effect on the incidence of breast cancer than age alone

C the incidence of breast cancer is not affected by age

D a 65 year old woman is twice as likely as a 55 year old woman to develop breast cancer if they each consume 6 drinks per day

38. Gene therapy could reduce the number of deaths from breast cancer because

A it identifies the faulty alleles
B once the faulty alleles are identified they could be replaced
C drugs can be used to prevent women developing breast cancer
D it causes the faulty alleles to mutate

39. One form of breast cancer is caused by a faulty allele of a gene known as BRCA1.
BRCA1 is a gene found on chromosome 17.
The faulty allele of BRCA1 is dominant to the normal allele.
Mary and David want to have a child.
David carries the normal alleles for BRCA1 but Mary is heterozygous.
She is concerned that the faulty allele will be passed to her child.
The chance of Mary passing this allele to her child is

A 25%
B 50%
C 75%
D 100%

40. A person carrying the faulty allele may not develop breast cancer but Mary and David decide that they don't want to risk their child inheriting the faulty BRCA1 allele. They want to produce a 'designer baby' that contains only the normal alleles.
Their embryos must be screened to identify if they contain the faulty BRCA1 allele.
Producing a 'designer baby' that does **not** contain the faulty allele presents an ethical problem because

A all of the embryos will contain the faulty allele
B embryos carrying the faulty allele will develop breast cancer later in life
C the genes in the embryos carrying the normal allele will mutate
D embryos carrying the faulty allele are destroyed even though they may not develop breast cancer later in life

TOTAL FOR HIGHER TIER PAPER: 24 MARKS

END