

REAL TEST 15

Questions 1-4

- (A) Hair
- (B) Epidermis
- (C) Cuticle
- (D) Guard cell
- (E) Sweat gland

permits gas exchange and transpiration in leaves.

layer that restricts evaporation in humans.

layer that restricts evaporation in plants

important thermoregulatory structure in humans.

Questions 5-8

- (A) DNA
- (B) tRNA
- (C) mRNA
- (D) rRNA
- (E) RNA polymerase

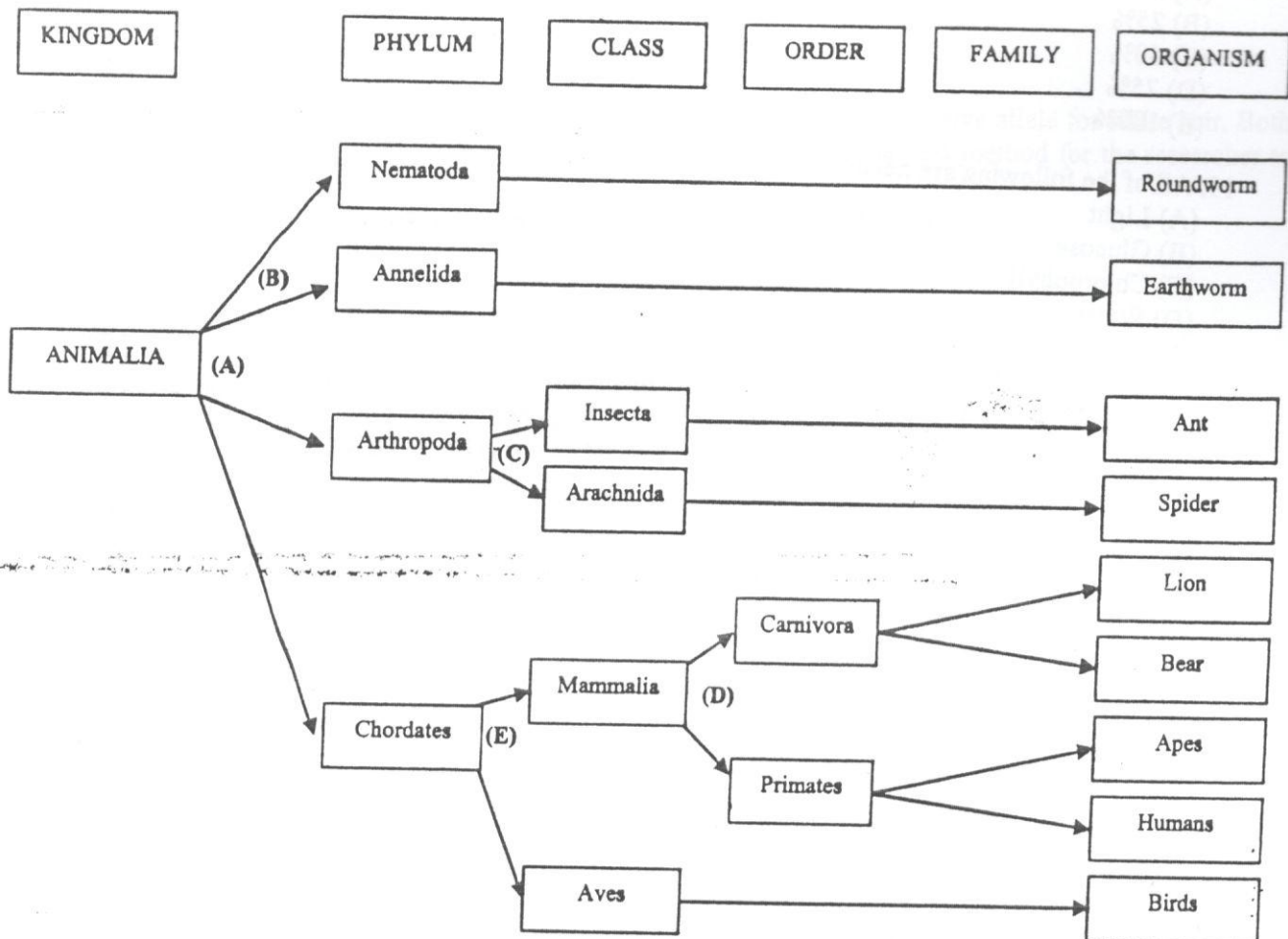
translated to synthesize protein.

transports amino acids during protein synthesis.

passed on to progeny cells during cell division.

includes a structure known as the "anticodon."

Questions 9 - 12



separates animals with nails from animals with claws.

separates segmented worms from worms with no segmentation.

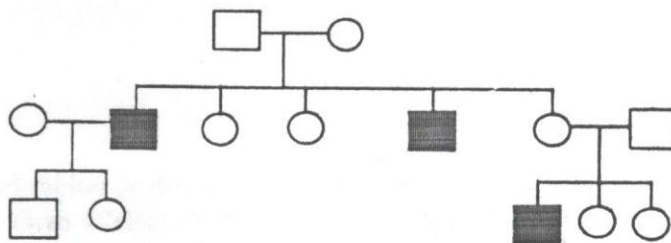
separates animals with feathers from animals with hair.

Questions 13-16

- (A) Predation
 - (B) Commensalism
 - (C) Interspecific competition
 - (D) Mutualism
 - (E) Parasitism
13. An albino plant with vascular connections to a green plant of the same species that drains food from the green plant.
14. Algae that grows on the shell of a turtle; the turtle is not harmed.
15. A tapeworm in the intestine of a human.
16. A population that prevents other populations from using a particular limited resource.
17. Which biome contains maples, squirrels, and black bears?
- (A) Tundra
 - (B) Tropical rain forest
 - (C) Temperate grasslands
 - (D) Taiga
 - (E) Deciduous forest
18. A man who is colorblind marries a normal woman, and together they have a daughter who is not colorblind. If the daughter marries a man with normal vision, what is the probability of their first born child being a son who is colorblind?
- (A) 0 %
 - (B) 25%
 - (C) 50%
 - (D) 75%
 - (E) 100%
19. All of the following are needed for photosynthesis EXCEPT
- (A) Light
 - (B) Glucose
 - (C) Chlorophyll
 - (D) Water
 - (E) Carbon dioxide
20. Black coat color in horses is caused by a dominant allele, while white coat color is due to the recessive allele. Two black horses produce a foal with a white coat. If they were to produce a second foal, what would be the probability of the second foal having a black coat?
- (A) 0
 - (B) $\frac{1}{4}$
 - (C) $\frac{1}{2}$
 - (D) $\frac{3}{4}$
 - (E) 1
21. If one ribose molecule was bonded to one adenine molecule and one phosphate molecule, we would have a
- (A) Ribosome
 - (B) Nucleotide
 - (C) Nucleic acid
 - (D) ATP
 - (E) ADP

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Consider this pedigree, the allele causing the disorder (shaded individuals are affected) can best be described as



- (A) Autosomal dominant
- (B) Autosomal recessive
- (C) X-linked dominant
- (D) X-linked recessive
- (E) Not enough information to determine

Which of the following is/ are true for a resting human?

- I. Systolic blood pressure of 180 mm Hg
- II. Heart rate of 60-80 beats per minute
- III. Body temperature of 37 °C

- (A) I only
- (B) II only
- (C) I and II
- (D) II and III only
- (E) I, II, and III

A researcher has a black guinea pig and wishes to determine if it carries a recessive allele for white hair. Both of the guinea pigs parents are black. Which of the following would be the best method for the researcher to use?

- (A) Mate the guinea pig with another black guinea pig and look for white offspring.
- (B) Look for white hairs on the guinea pig.
- (C) Mate the guinea pig with a white guinea pig and look for white offspring.
- (D) Observe the chromosomes of a hair cell from a black hair.
- (E) See if the guinea pig has any white siblings.

A community includes seven different populations with various degrees of interbreeding. Population 1 shares genes only with Population 2. Population 2 shares genes only with Population 1. Population 3 has no gene flow with other populations. Population 4 shares genes only with Population 5. Population 5 shares genes with Population 4, Population 6, and Population 7. Population 6 shares genes with Population 5 and Population 7. Population 7 shares genes with Population 5 and Population 6. Which population(s) is (are) most likely to evolve after a change in its environment?

- (A) Populations 1 and 2
- (B) Population 3
- (C) Population 4
- (D) Population 5
- (E) Populations 6 and 7

Which of the following could be reasons for infertility in a woman who is ovulating normally?

- Blocked uterine tube
- Incompatibility of vaginal pH with sperm survival
- I. Large amounts of LH released just prior to ovulation

- (A) I only
- (B) II only
- (C) I and II only
- (D) II and III only
- (E) I, II, and III

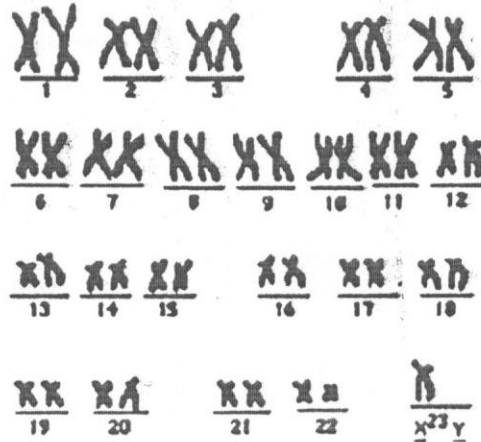
27. Convert 65.0 nm to μm .

- (A) 650.
- (B) 6.500.
- (C) 65.000.
- (D) 0.065
- (E) 0.65

28. Human ABO blood typing is determined by the proteins present on red blood cells. The gene that codes for these proteins has three alleles: I^A , I^B , and i . I^A codes for protein type A, I^B codes for protein type B, and i codes for the absence of protein. I^A and I^B are co-dominant and i is recessive to both I^A and I^B . A woman with blood type A and a man with blood type AB marry and produce children. Which of the following blood types is NOT possible in their children?

- (A) Type A
- (B) Type B
- (C) Type O
- (D) Type AB
- (E) All blood types are possible in their children

29. Which is true about the karyotype below?



- (A) It shows a normal female.
- (B) It shows a normal male.
- (C) It shows a person who suffers from Down syndrome.
- (D) It shows a person who suffers from a gene mutation.
- (E) It shows a person who suffers from a condition that results from non-disjunction.

30. Which of the following organelles would be present in a eukaryote but NOT in a prokaryote?

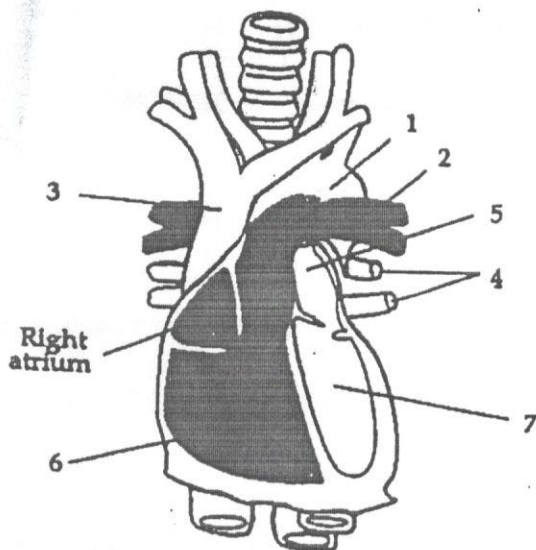
I. Nucleus

II. Mitochondria

III. Ribosome

- (A) I only
- (B) II only
- (C) I and II only
- (D) II and III only
- (E) I, II, and III

Questions 31-33 refer to the following diagram of a human heart.



Which of the following represents the correct sequence of heart structures that blood would pass through when traveling from the right atrium to the lungs and then to the left ventricle?

- A) 3, 2, 4, 5, 7
- B) 6, 2, 1, 4, 5
- C) 3, 2, 1, 5, 7
- D) 6, 2, 3, 4, 5
- E) 6, 2, 4, 5, 7

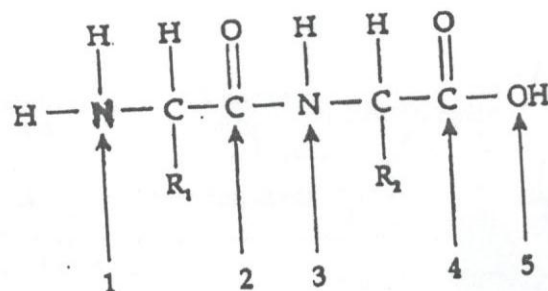
Which structures carry blood rich in oxygen?

- A) 2, 3, 4
- B) 3, 5, 7
- C) 4, 5, 6
- D) 1, 5, 7
- E) 2, 4, 5

Which structure returns blood poor in oxygen to the heart?

- A) 1
- B) 2
- C) 3
- D) 4
- E) 5

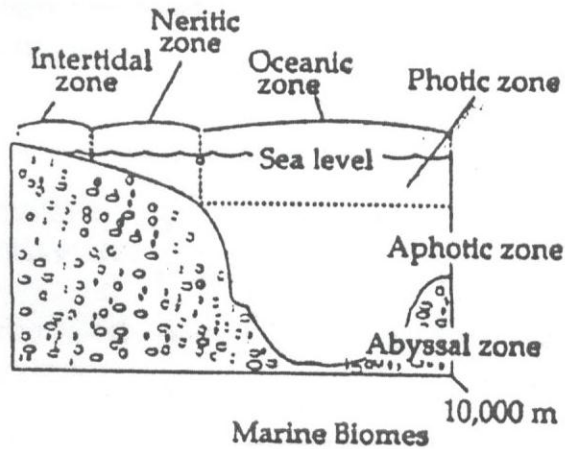
Questions 34-36 refer to the following diagram



34. What type of molecule is depicted in the drawing above?
- (A) Protein
 - (B) Carbohydrate
 - (C) Lipid
 - (D) Nucleic acid
 - (E) Starch
35. If we were to continue adding to this molecule to increase its size, to which atom would the next portion be bonded?
- (A) 1
 - (B) 2
 - (C) 3
 - (D) 4
 - (E) 5
36. The synthesis of this molecule also results in the production of
- (A) Carbon dioxide
 - (B) Water
 - (C) Lipid
 - (D) ATP
 - (E) NaOH

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Questions 37-39 refer to the following diagram of marine biomes.



Which of the following is the area of least productivity?

- (A) Intertidal zone
- (B) Oceanic zone
- (C) Photic zone
- (D) Aphotic zone
- (E) Neritic zone

Organisms that live in the abyssal zone would need all of the following adaptations EXCEPT

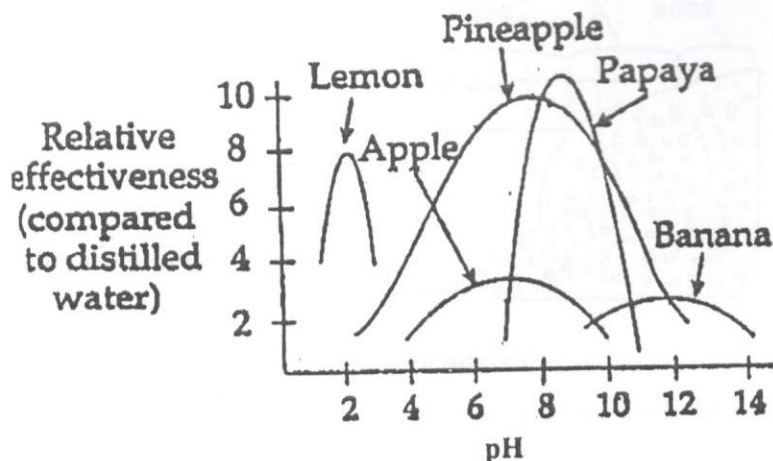
- (A) Ability to withstand extreme pressures
- (B) Well-developed eyes
- (C) Tolerance of cold temperatures
- (D) Ability to survive in areas of low nutrient density
- (E) Ability to utilize limited resources

Organisms that live in the intertidal zone might have which of the following characteristics?

- . Ability to conduct photosynthesis
 - I. Tolerance of periodic drought
 - II. Tolerance of a wide range of temperatures
- A) I only
 - B) II only
 - C) I and- III only
 - D) II and III only
 - E) I, II, and III

Questions 40-43

Because some fruits contain enzymes that act as proteases, various fruit extracts were tested for use as possible meat tenderizers. The extracts were tested over a range of pH values. Below is a graph of relative effectiveness (compared to distilled water) vs. pH.



40. Which fruit extract operates over the broadest pH range?
 - (A) Lemon
 - (B) Pineapple
 - (C) Papaya
 - (D) Apple
 - (E) Banana
41. Over which pH range does pineapple extract operate at least 50% of its maximum effectiveness?
 - (A) pH 4 to pH 10
 - (B) pH 2 to pH 12
 - (C) pH 6 to pH 8
 - (D) pH 7 to pH 11
 - (E) pH 10 to pH 14
42. Which fruit extract is most effective at a neutral pH?
 - (A) Lemon
 - (B) Banana
 - (C) Papaya
 - (D) Pineapple
 - (E) Apple
43. What does it mean when a fruit extract has a relative effectiveness of 1?
 - (A) It is 100% more effective than water.
 - (B) It is 10% as effective as water.
 - (C) It is 1% as effective as water.
 - (D) It is equally as effective as water.
 - (E) It is equally concentrated as water.

Questions 44 - 47

A self-pollinating plant with orange flowers and alternating leaf arrangement produces 47 plants with red flowers and alternating leaves, 103 plants with orange flowers and alternating leaves, and 51 plants with yellow flowers and alternating leaves.

The allele for yellow flower color is

- a) Recessive
- b) Dominant
- c) Incompletely dominant
- d) Incompletely recessive
- e) Co-dominant

If a yellow-flowered offspring were self-pollinated, what would the resulting plants' flowers look like?

- a) 100% yellow
- b) 100% red
- c) 100% orange
- d) 50% yellow, 50% red
- e) 70% red, 25% yellow

The genotype of the original parent plant is

- a) Heterozygous for both flower color and leaf arrangement
- b) Homozygous for both flower color and leaf arrangement
- c) Homozygous for flower color and heterozygous for leaf arrangement
- d) Heterozygous for flower color and homozygous for leaf arrangement
- e) Heterozygous for flower color but unable to determine genotype for leaf arrangement

Suppose the original parent plant is cross pollinated with a plant that has red flowers and non-alternating leaves. All of the resulting offspring have non-alternating leaves. Which of the following is/ are true?

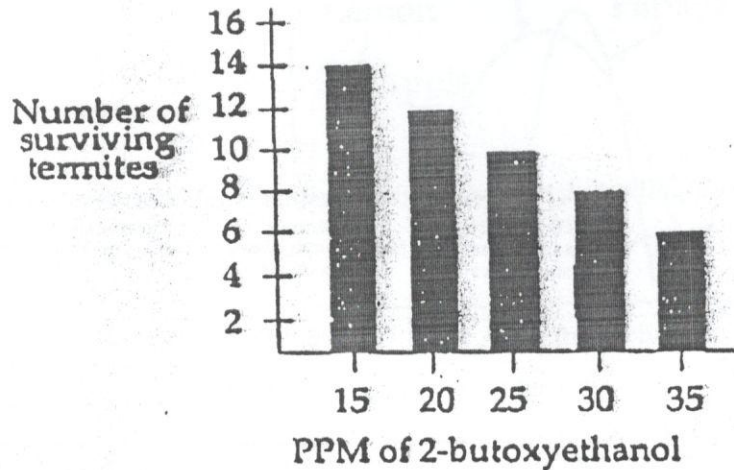
- I. None of the offspring have orange flowers
- II. The allele for alternating leaves is recessive
- III. Approximately half of the offspring have red flowers

- a) I only
- b) II only
- c) III only
- d) I and III only
- e) II and III only

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Questions 48-50

2-Butoxyethanol, a substance found in a general household cleaner, was tested for toxicity to termites. Solutions were made that contained various parts per million (PPM) of 2-butoxyethanol, and 15 ml of each of these diluted solutions was mixed with 150 g of wood chips. Twenty mature termites were added to the wood chips, and the number surviving after 24 hours was determined and recorded. The graph below presents the results.



48. At which dose does 50% of the termite population survive?

- (A) 15 PPM
- (B) 20 PPM
- (C) 25 PPM
- (D) 30 PPM
- (E) 35 PPM

49. How is this substance toxic to termites?

- (A) It paralyzes their jaws so they are unable to eat.
- (B) It prevents digestion of wood.
- (C) It kills the microorganisms in the termites' digestive tracks that digest wood.
- (D) At 40 PPM only 20% of the termites survive.
- (E) There is no information given that describes the mechanism of toxicity.

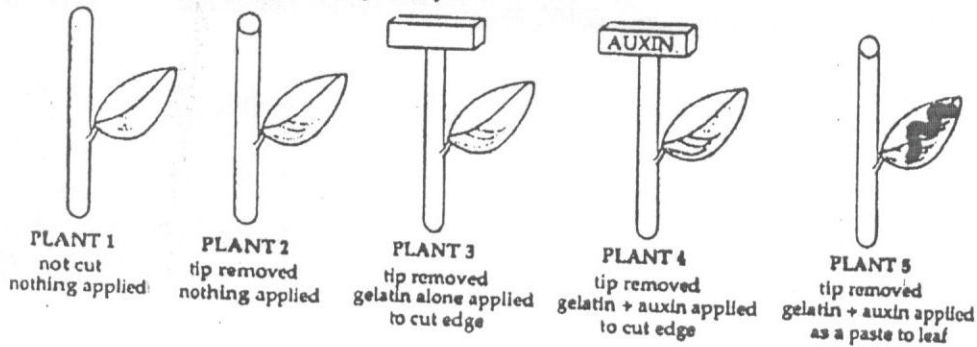
50. Based on the data for 20 PPM 2-butoxyethanol, what concentration of solution would be required to kill the entire 20-member termite population?

- (A) 40 PPM
- (B) 50 PPM
- (C) 60 PPM
- (D) 70 PPM
- (E) 80 PPM

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Questions 51-54

The following experiment was performed to test the effect of an auxin on plant growth. The auxin was dissolved in an agar block; gelatin does not affect the biological activity of the auxin. Several plant seedlings were prepared as shown below and growth was measured every 5 days.



Plant	Growth after 5 days	Growth after 10 days
1	15mm	29mm
2	4mm	9mm
3	5mm	10mm
4	14mm	31mm
5	8mm	20mm

Based on the results of the experiment, one can conclude that the tip of the plant contains

- I Gelatin
- II Water
- III Auxin
- IV Paste
- V Nothing significant

Which plants in the experiment acted as controls?

- I Plant 1
- II Plants 2 and 3
- III Plant 5
- IV I only
- V II only
- VI III only
- VII I and II only
- VIII I, II, and III

What proves that auxin is necessary for plant growth?

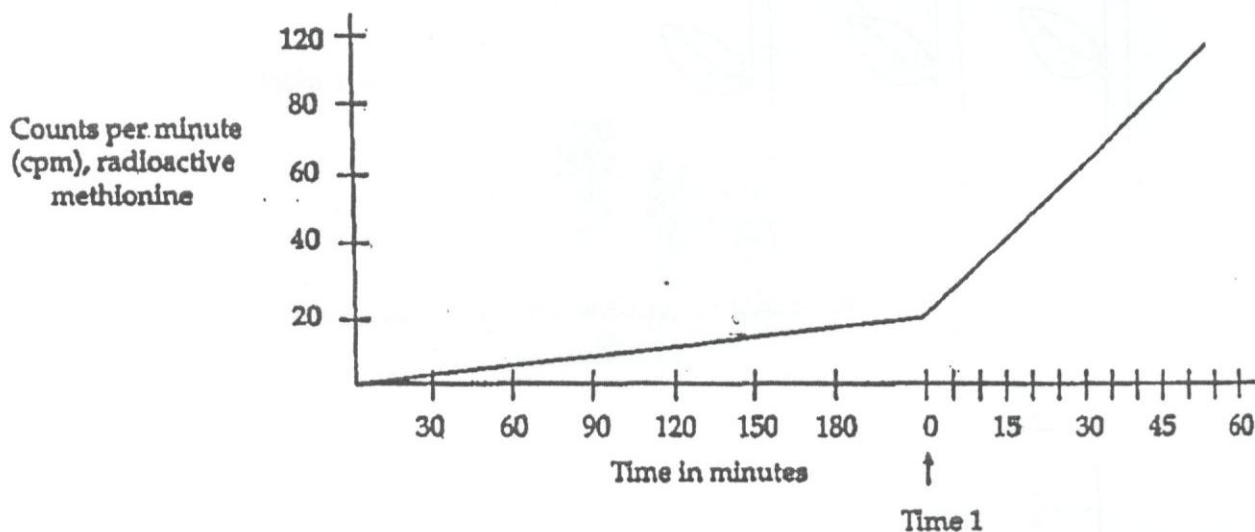
- I Plant 1 grew faster than plants 2 or 3.
- II Plant 4 grew faster than plants 2 or 3.
- III Plant 5 grew faster than plant 1.
- IV Plant 3 grew faster than plant 2.
- V Plant 4 grew faster than plant 5.

In a separate experiment, an auxin / gelatin block applied to only half the cut edge of the tip caused the plant to grow and bend in the opposite direction. For example, if the auxin/ gelatin block was applied to the left side of the cut edge, the plant grew and bent toward the right. Which of the following is the most likely explanation for this observation?

- I Sunlight caused the plant to bend.
- II The plant exhibited gravitropism.
- III Auxin stimulated cell division on the opposite side of the plant.
- IV Auxin stimulated cell division on the same side of the plant.
- V Auxin stimulated cell growth toward a light source.

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Questions 55-58 refer to the following experiment performed on frog oocytes. Unfertilized frog oocytes were bathed in a neutral, isotonic solution (Frog Ringer's solution) to prevent changes in volume due to osmosis. The Frog Ringer's solution was supplemented with radiolabeled amino acids. A sample of oocytes was taken every 30 minutes and assayed for radioactivity. At Time 1, the oocytes were fertilized. Samples were taken at 5-minute intervals after fertilization and assayed for radioactivity. The results are presented in the graph below.



55. The radioactivity measured after fertilization was taken up by
 - (A) Being incorporated into DNA
 - (B) Being incorporated into proteins
 - (C) Attaching to the cell membrane
 - (D) Endocytosis
 - (E) Associating with carbohydrates
56. How could a control be created for this experiment?
 - (A) Immerse the oocytes in non-radiolabeled Ringer's solution prior to fertilization.
 - (B) Sample the oocytes at 5-minute intervals prior to fertilization.
 - (C) Sample the oocytes at 3-minute intervals after fertilization.
 - (D) Divide the oocytes into two groups; immerse one group in non-radiolabeled Ringers' solution and one group in radiolabeled solution.
 - (E) Divide the oocytes into two groups, fertilize one group, and simulate fertilization in the other, but do not actually introduce sperm into the oocytes.
57. Based on the results of the experiment, the process most likely occurring after fertilization is
 - (A) DNA replication
 - (B) Organogenesis
 - (C) Protein synthesis
 - (D) RNA transcription
 - (E) Endocytosis
58. The Frog Ringer's solution in the experiment is described as being isotonic. An isotonic solution
 - (A) Has more DNA than another solution
 - (B) Has more protein than another solution
 - (C) Is more concentrated than another solution
 - (D) Is less concentrated than another solution
 - (E) Is equally concentrated to another solution

ons 59-60

p of 10 newly hatched chicks was separated into two smaller groups containing 5 chicks each. One group (A) was left with the mother hen, the other group (Group B) was taken shortly after hatching and kept with a goose. The chicks in Group A displayed normal behavior and followed the mother hen around. The chicks in Group B followed the mother goose around and exhibited goose-like behavior, such as swimming. After one day, Group B was reunited with the mother hen, but ignored her, and instead continued to follow the mother hen around the barnyard.

behavior exhibited by the chicks in group B is

- Imprinting
- Instinct
- Insight
- Habituation
- Conditioning.

exposed to a mother pig during the period shortly after hatching, the chicks in group B would exhibit

- Pig-like behavior
- Goose-like behavior
- Chick-like behavior
- Unique behavior
- Unknown behavior

E- SECTION

61. Which of the following organisms is able to regulate its own body temperature?
- (A) Frog
 - (B) Fish
 - (C) Snake
 - (D) Sparrow
 - (E) Turtle
62. Successful parasites CANNOT
- (A) Harm their host
 - (B) Live inside their host
 - (C) Kill their host
 - (D) Live outside their host
 - (E) Make their host sick
63. An organism that feeds at several trophic levels is
- (A) A carnivore
 - (B) An omnivore
 - (C) A primary consumer
 - (D) An herbivore
 - (E) A primary producer
64. Yeast is cultured in a flask of nutrient broth under anaerobic conditions. The yeast that are most fit are those that
- (A) Ferment the fastest
 - (B) Consume less of the limited oxygen supply
 - (C) Survive the longest
 - (D) Produce the most ATP
 - (E) Produce the most buds
65. A mushroom is most like a
- (A) Moss
 - (B) Fern
 - (C) Yeast
 - (D) Pine
 - (E) Seaweed
66. In a certain ecosystem, the primary producers represent 100,000 kcal of energy. Assuming a 10% transfer of energy between trophic levels, how much energy is available to the fourth trophic level?
- (A) 10 kcal
 - (B) 100 kcal
 - (C) 1000 kcal
 - (D) 10,000 kcal
 - (E) 100,000 kcal
67. Which of the following represents the proper ecological hierarchy?
- (A) Population → community → ecosystem → biosphere
 - (B) Ecosystem → community → population → biosphere
 - (C) Population → ecosystem → community → biosphere
 - (D) Biosphere → ecosystem → population → community
 - (E) Community → population → biosphere → ecosystem

REAL TEST 15

ons 68-69

Following data table shows the number of different amino acids in the beta hemoglobin chain of various organisms compared to the human beta chain.

Organism	Number of different amino acids
Human	0
Mouse	27
Frog	68
Monkey	11
Lamprey	125
Chicken	35
Gibbon	2

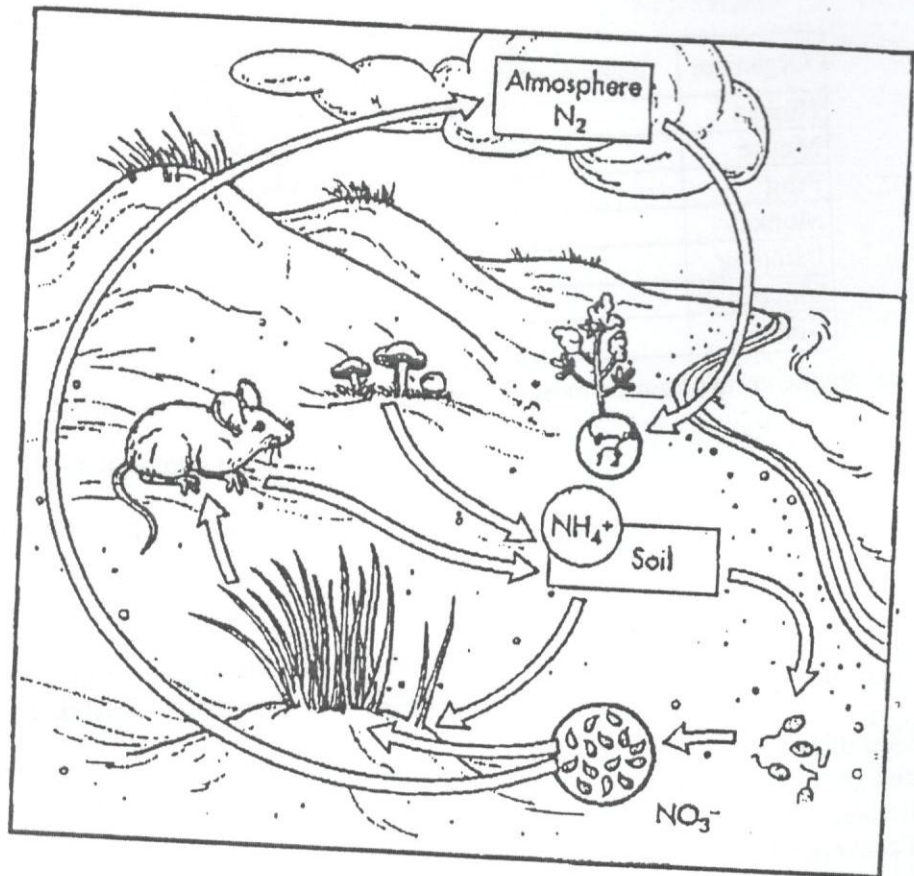
which of the following organisms are humans most closely related, based on hemoglobin amino acid sequence?

- Mouse
- Monkey
- Chicken
- Gibbon
- Lamprey

Human hemoglobin and gorilla hemoglobin is even more closely related than the organisms shown above; they differ by only a single amino acid. Yet humans and gorillas are considered to be separate species. This is because

- Their hemoglobin chains differ by a single amino acid
- Human hemoglobin and gorilla hemoglobin have different functions
- They are unable to interbreed
- They are the result of convergent evolution
- They are the result of parallel evolution

Questions 70 – 71 refer to the diagram below

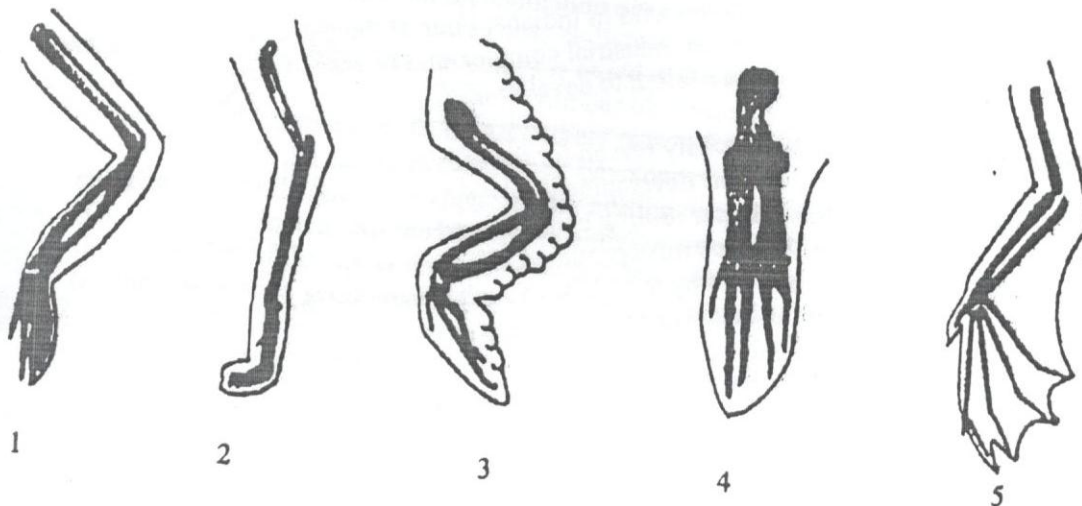


Nitrogen Cycle

70. Can both animals and plants obtain their nitrogen from the atmosphere?
- (A) Yes, both animals and plants take in nitrogen during respiration.
 - (B) Yes, most of the nitrogen in the cycle is in the atmosphere.
 - (C) No, only plants can take in nitrogen from the atmosphere.
 - (D) No, they must consume it through eating or uptake from the soil.
 - (E) No, they must obtain it through symbiotic relationships.
71. Bacteria in the soil are
- (A) Primary producers
 - (B) Primary consumers
 - (C) Secondary consumers
 - (D) Tertiary consumers
 - (E) Decomposers

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Questions 72-75 refer to the following diagrams:



Which of the structures above would be used for grasping?

- A) 1
- B) 2
- C) 3
- D) 4
- E) 5

Which of the structures above most likely evolved before the others?

- A) 1
- B) 2
- C) 3
- D) 4
- E) 5

The structures above are the result of

- A) Mutation
- B) Succession
- C) Convergent evolution
- D) Divergent evolution
- E) Regression

Which of the above structures do NOT belong to mammals?

- A) 2 and 3
- B) 3 and 4
- C) 4 and 5
- D) 4 only
- E) 3 only

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Questions 76-77

Six pairs of bald eagles were released into the wild in Indiana. Four of the pairs of birds successfully nested and raised young. Two of the pairs nested near an industrial complex that released waste products (PCBs) into a nearby lake. These birds laid eggs, but the embryos failed to develop.

76. Which of the following is the LEAST likely reason for the failure of the embryos to develop?
- (A) Mutations in the embryos halted their development.
 - (B) The adult birds failed to exhibit proper nesting behavior and did not care for the eggs.
 - (C) The contaminated lake water that the birds consumed affected the development of their young.
 - (D) The sperm of the males were affected by the PCBs in such a way that they were unable to fertilize the eggs.
 - (E) Indiana is not a good location for bald eagles to mate and reproduce.
77. The eggshells of the embryos that failed to develop were tested and were found to contain more PCBs than the nearby plants and insects. This is due to
- (A) Biological accumulation
 - (B) Increased levels of PCBs in the lake
 - (C) The resistance of the insects to PCBs
 - (D) Failure of the plants to take up PCBs
 - (E) Absorption of PCBs from the nesting site into the eggshell

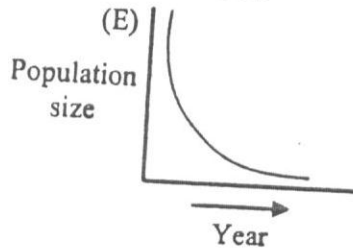
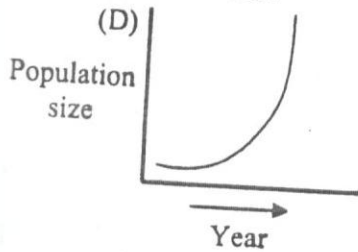
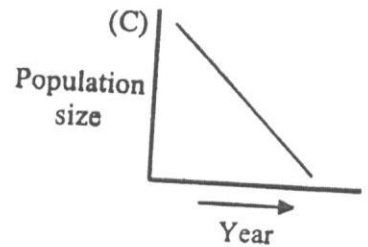
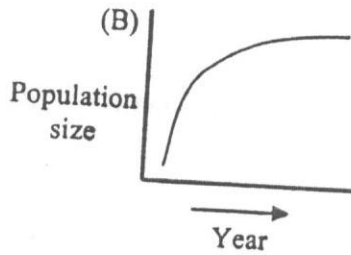
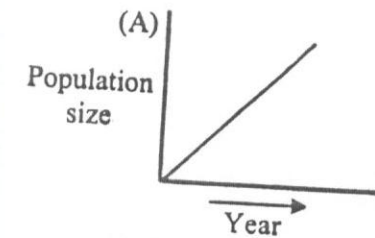
REAL TEST 15

Questions 78-80

Refer to the following data obtained for a rabbit population over a period of several years.

Year	Number of rabbits
1	4
2	17
3	62
4	245

Which of the following graphs best represents the data on rabbit population size?



Assuming unlimited resources, what would be the approximate expected rabbit population in Year 5?

- A) 5000
- B) 1000
- C) 500
- D) 300
- E) 100

Ultimately, the amount of nutrients and other resources would become limiting. What would happen to the rabbit population at that time?

I It would reach the carrying capacity of the environment.

II It would continue to grow indefinitely.

III It would engage in intraspecific competition.

- A) I only
- B) II only
- C) I and II only
- D) I and III only
- E) I, II, and III

REAL TEST 15

Questions 86-89 refer to the following experiment
A population of ampicillin-resistant bacteria (strain 1) is grown in a laboratory and is infected with a virus. The bacterial population begins to decline as the virus initially goes through the lytic cycle then rebounds as the virus integrates into the bacterial chromosome to begin the lysogenic cycle. The bacteria reproduce normally until they are heat-shocked. The rapid increase in temperature causes the virus to move itself from the bacterial genome and enter the lytic cycle. Within several hours all bacteria are dead and a virus is found in high concentration in the bacterial growth medium. A free virus is used to infect a population of bacteria that is sensitive to ampicillin (strain 2). After the expected increase and rebound of this bacterial population (as above), the rebounded population was found to be ampicillin resistant.

Evolution of a bacterial population occurs much more rapidly than evolution of a human population. This is because;

- (A) The bacteria are smaller and thus more susceptible to change
- (B) The bacterial life cycle is short and many new generations can be produced quickly
- (C) Humans do not evolve
- (D) Humans can only reproduce during a portion of their life cycle, while bacteria can reproduce throughout their entire life cycle
- (E) Bacteria do not require oxygen to survive

The acquisition of ampicillin resistance by bacterial strain 2 is due to

- A) Evolution
- B) Speciation
- C) Conjugation
- D) Transformation
- E) Transduction

The bacterial culture is constantly infused with oxygen to ensure a high rate of reproduction among the bacteria and a healthy population. One evening the oxygen delivery system gets clogged and the bacteria receive no oxygen, yet they survive and continue to reproduce, just at a slower rate. These bacteria can be classified as

- A) Obligate aerobes
- B) Obligate anaerobes
- C) Tolerant anaerobes
- D) Facultative anaerobes
- E) Simple anaerobes

Which of the following increase genetic diversity in bacteria?

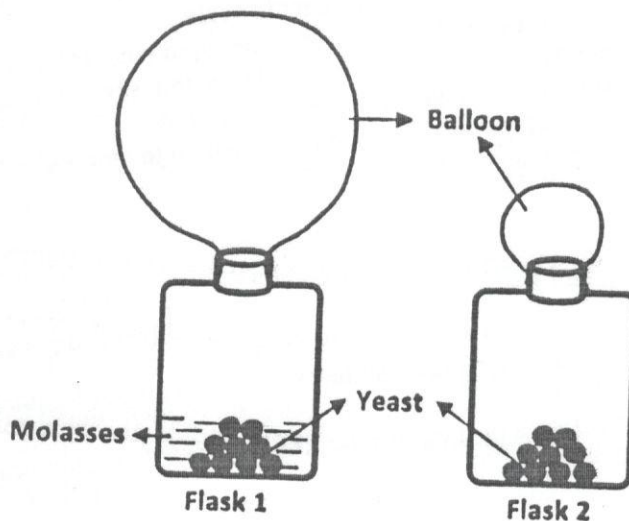
Conjugation
Transformation
Crossing over

I only
I and II only
II only
I and III only
II, and III

REAL TEST 15

Questions 90-93 refer to the following experiment

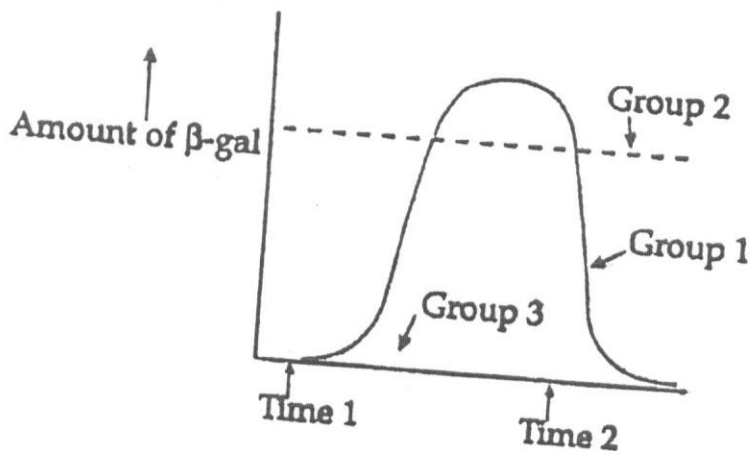
Two flasks containing yeast and sealed with balloons, one of them contains molasses (flask 1) and the other does not (flask 2). Both flasks are kept at room temperature for 24 hours.



90. Molasses is a source of
- (A) Maltose
 - (B) Lactose
 - (C) Glucose
 - (D) Galactose
 - (E) Carbon
91. The balloon in flask 1 is inflated with
- (A) N_2
 - (B) CO_2
 - (C) H_2
 - (D) CH_4
 - (E) O_2
92. The explanation for the inflation in flask 1 balloon only is that
- (A) There is a difference between temperature in flask 1 and 2
 - (B) The amount of yeast in flask 1 is more than that in flask 2
 - (C) Flask 2 is not tightly sealed with the balloon
 - (D) Yeast in flask 1 respired while yeast in flask 2 did not
 - (E) The species of yeast in the 2 flasks are not the same
93. What will happen if both flasks are kept at lower temperature?
- (A) Both balloons will be inflated
 - (B) Both balloons will not be inflated
 - (C) Same results as keeping them at room temperature
 - (D) Flask 1 balloon will inflate in a slower rate, while flask 2 balloon will not be inflated
 - (E) The data are not enough for accurate expectation

Questions 94-96 refer to the following experiment.

β -galactosidase (β -gal) is a bacterial enzyme used in the metabolism of lactose. Three different groups of human intestinal bacteria were cultured in a glucose based medium. At Time 1 the bacteria were transferred to media containing lactose as a nutrient source instead of glucose. At Time 2, the bacteria were returned to the glucose-based medium. Samples of bacteria were removed at 5-minute intervals and tested for the presence of β -gal. The results are presented below.



What could account for the delay in β -gal production after Time 1 seen in Group 1?

- 1) An inability to synthesize β -gal.
- 2) Transcription of β -gal mRNA.
- 3) Continued use of glucose as a nutrient.
- 4) Replication of the bacterial DNA.
- 5) Infection by a virus.

Why is it an advantage to intestinal bacteria to be able to induce β -gal production in this way?

- 1) Humans do not consume foods containing lactose all the time
- 2) It prevents toxic buildup of lactic acid
- 3) β -gal is harmful to bacteria
- 4) It prevents the bacteria from using glucose as a nutrient source
- 5) Lactose is harmful to bacteria

Which of the following could be reasons for the inability of Group 3 to produce β -gal?

- I Error in DNA replication
- II Error in RNA transcription
- III Error in protein translation

- I only
- II only
- I and II only
- II and III only
- I, II, and III

REAL TEST 15

Questions 97–100 refer to a genetic disease. A man and woman are both heterozygous for a disease called phenylketonuria (PKU), which affects a person's ability to metabolize an amino acid called phenylalanine. The man and woman are both phenotypically normal and do not have any symptoms of the disease. Men and women are equally likely to have the disease.

97. This disease is
(A) Autosomal recessive
(B) Autosomal dominant
(C) Sex-linked recessive
(D) Sex-linked dominant
(E) X-linked
98. The man and woman are both carriers of PKU. Therefore:
I. The man and woman could pass the disease on to their offspring.
II. The man and woman will die from the disease.
III. At least one of the man's parents was a carrier of the disease.
(A) I only
(B) II only
(C) I and II only
(D) I and III only
(E) II and III only
99. What is the probability that a child born to the couple will be a heterozygous carrier of the disease?
(A) 0%
(B) 25%
(C) 50%
(D) 75%
(E) 100%
100. The couple has had three phenotypically normal children. What is the probability that their fourth child will have the disease?
(A) 0%
(B) 25%
(C) 50%
(D) 75%
(E) 100%

TEST 15 ANSWER KEY

D	2. B	3. C	4. E	5. C	6. B	7. A	8. B	9. D	10. B
E	12. A	13. E	14. B	15. E	16. C	17. E	18. B	19. B	20. D
B	22. D	23. D	24. C	25. D	26. C	27. D	28. C	29. B	30. C
E	32. D	33. C	34. A	35. D	36. B	37. D	38. B	39. E	40. B
A	42. D	43. D	44. C	45. A	46. D	47. E	48. C	49. E	50. B
C	52. D	53. B	54. D	55. B	56. E	57. C	58. E	59. A	60. A
D	62. C	63. B	64. E	65. C	66. B	67. A	68. D	69. C	70. D
E	72. A	73. C	74. D	75. E	76. E	77. A	78. D	79. B	80. D
A	82. E	83. D	84. B	85. B	86. B	87. E	88. C	89. B	90. C
B	92. D	93. D	94. B	95. A	96. D	97. A	98. D	99. C	100. B