EST II – Individual Subject Test

Student's Name _____

National ID _____

Test Center: _____

Subject: Biology

Duration: 60 minutes

80 Multiple Choice Questions

Instructions:

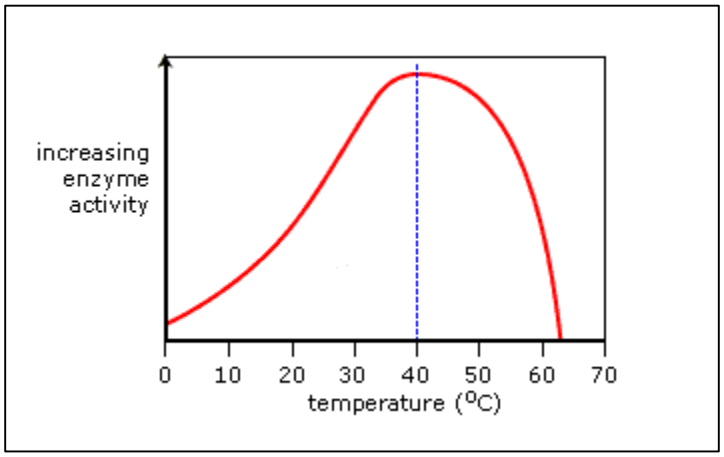
- Place your answer on the answer sheet. Mark only one answer for each of the multiple choice questions.
- Avoid guessing. Your answers should reflect your overall understanding of the subject matter.
- Calculators are not allowed.

Directions: In this section of the exam, each question or incomplete statement is followed by five possible answers or completions. For each of the following problems, choose the best answer from the given list of possible choices.

1. The binomial nomenclature system is defined by

A. Two names: the first one is capitalized and refers to the genus and the second name begins with a small letter and refers to the species.
B. Two names: the first one is capitalized and refers to the species and the second name begins with a small letter and refers to the genus.
C. Two names: the first one begins with a small letter and refers to the genus and the second name is capitalized and refers to the species.
D. Two names: the first one refers to the genus and the second name refers to the species; both names are written with small letter.
E. Two names: the first one refers to the genus and the second name refers to the species; both names are capitalized.

2. Grade 12 students measure the enzyme activity on a substrate at various temperatures of pH=3.



Based on the data, what results can be predicted if the experiment is carried out at 62°C?

A. No prediction would be valid.
B. An amount of product equal to that at 20°C would form.
C. An amount of product equal to that at the optimum temperature would form.
D. An amount of product equal to that at 5°C would form.
E. Little or no product would form.

3. Suppose you are provided with an actively dividing culture of *Streptococcus aureus* bacteria to which radioactive thymine has been added. What would happen if a cell replicates once in the presence of this radioactive base?

A. One of the daughter cells, but not the other, would have radioactive DNA.
B. Neither of the two daughter cells would be radioactive.
C. All four bases of the DNA would be radioactive.
D. Radioactive thymine would pair with nonradioactive guanine.
E. DNA in both daughter cells would be radioactive.

4. A scientist performed an experiment to determine the effect of temperature on the length of the cell cycle in one of the species. The duration of the cell cycle at room temperature is 15 hours. He cultured identical stem cells in four culture media with the same content of nutrient and oxygen gas but at different temperatures. The duration of the cell cycles at different temperatures are recorded in the following table.

Temperature (ºC)	Length of the cell cycle (hours)
10	54.6
15	29.8
20	18.8
25	13.3

The data in the table shows that

A. cells divide faster as the temperature decreases.
B. the length of the cell cycle is not affected by temperature.
C. the length of the cell cycle is inherited and not affected by temperature.
D. cells divide faster as the temperature increases.
E. B and C

5. ATP is produced during which of the following processes?

I. Photosynthesis
II. Aerobic respiration
III. Fermentation

A. I only
B. II only
C. I and III only
D. II and III only
E. I, II, and III

6. What is a community?

A. A group of producers and consumers living and interacting in an area
B. A group of species living and interacting in an area
C. A group of populations living and interacting in an area
D. A group of organisms living and interacting in an area
E. None of the above definitions

Directions: Each set of lettered choices below refers to the numbered questions or statements immediately following it. Select one lettered choice that best answers each question. A choice may be used once, more than once, or not at all in each set.

Questions 7-8

A. Decomposers (e.g., bacteria)
B. Producers (e.g., grasses)
C. Primary consumers (e.g., mice)
D. Secondary consumers (e.g., snakes)
E. Tertiary consumers (e.g., hawks)

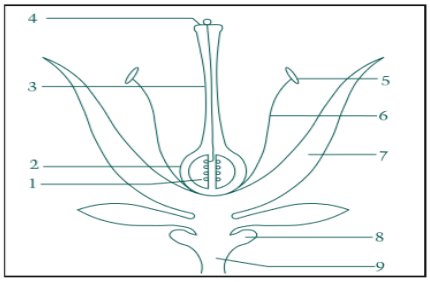
7. An autotrophic organism capable of producing complex organic compounds from simple inorganic molecules through the process of photosynthesis.

8. An organism whose ecological function involves the recycling of nutrients by performing the natural process of decomposition as it feeds on decaying organisms.

Directions: In this section of the exam, each question or incomplete statement is followed by five possible answers or completions. For each of the following problems, choose the best answer from the given list of possible choices.

Questions 9-10

Refer to the following diagram.



9. Structure 2 is

A. Ovary
B. Sepal
C. Petal
D. Receptacle
E. Stamen

10. Pollination involves a transfer of pollen from

A. 4 to 1
B. 4 to 2
C. 4 to 5
D. 5 to 4
E. 5 to 9

Questions 11-12

In a breeding experiment using gray and white rabbits of unknown genotypes, the following results were obtained.

	Parents			**Offspring**	
Cross	**Female**		**Male**	**Gray**	**White**
I	*gray*	*x*	*white*	82	78
II	*gray*	*x*	*gray*	118	39
III	*white*	*x*	*white*	0	50
IV	*gray*	*x*	*white*	74	0

11. If the gray female from cross IV mated with the gray male from cross II, then which of the following would most likely be true?

A. All of the offspring would be gray.
B. All of the offspring would be white.
C. Half of the offspring would be gray.
D. One-quarter of the offspring would be gray.
E. One-quarter of the offspring would be white.

12. If two gray progeny of cross IV mate with each other, what is the probability that any one individual offspring will be gray?

A. 100%
B. 75%
C. 50%
D. 25%
E. 0

13. In our current classification system, members that belong to the same order also belong to the same

A. genus.
B. class.
C. species.
D. family.
E. race.

14. The scarlet cup fungus, *Sarcoscypha coccinea*, obtains its nutrition from decaying wood by releasing digestive enzymes into the wood and absorbing the digested products. Which of the following terms describe(s) the fungus?

A. autotroph
B. heterotroph
C. saprotroph
D. autotroph, heterotroph, and saprotroph
E. saprotroph and heterotroph

15. The cells of the yellow dung fly contain 5 pairs of autosomal chromosomes and one pair of sex chromosomes. Upon completion of Meiosis II, how many chromosomes will each yellow dung fly gamete contain?

A. 5
B. 6
C. 10
D. 12
E. 24

16. Which of the following characteristics is present in the taxa Gymnospermae (gymnosperms)?

I. The appearance of true leaves
II. The ability to fertilize eggs in a non-water environment
III. The process of double fertilization
IV. The development of seeds
V. The development of a vascular system

A. I, V
B. I, IV, V
C. I, II, IV, V
D. I, III, IV, V
E. I, II, III, IV, V

17. Puromycin is an antibiotic that can block protein synthesis of bacteria without harming its eukaryotic host. This phenomenon is caused

A. by prokaryotic cells that have membrane-bound organelles.
B. when eukaryotic DNA is linear while prokaryotic DNA is circular.
C. in prokaryotes where translation can occur at the same time as transcription.
D. when there is much more space within a eukaryotic cell than within a prokaryotic cell.
E. when prokaryotes have ribosomes that are much smaller and simpler than eukaryotes.

18. Vitamin D-resistant rickets is considered a sex-linked dominant disease (gene located on the non-homologous segment of chromosome X). We can conclude that

A. every boy with an affected mother is affected.
B. every girl with an affected father is affected.
C. an affected male definitely transmits the disease to his children.
D. the children of an affected male and a normal female are not affected.
E. every boy with an affected father is affected.

19. A sample of living tissue from a human who makes a living by fishing was found to have a specific heavy metal concentration of 800,000 ppt (parts per trillion). Note that fish represent the main dish of this fisherman. What is the best inferential explanation you could make based on the given data?

A. Air pollution may have caused this fisherman to inhale dangerous amounts of heavy metals while fishing.
B. The entire population of fishermen, from which this sample was taken, died.
C. The population exploded, causing an ecosystem imbalance.
D. Pollutants tend to collect in areas of land where this fisherman lives.
E. This fisherman is at a high trophic level on the food chain.

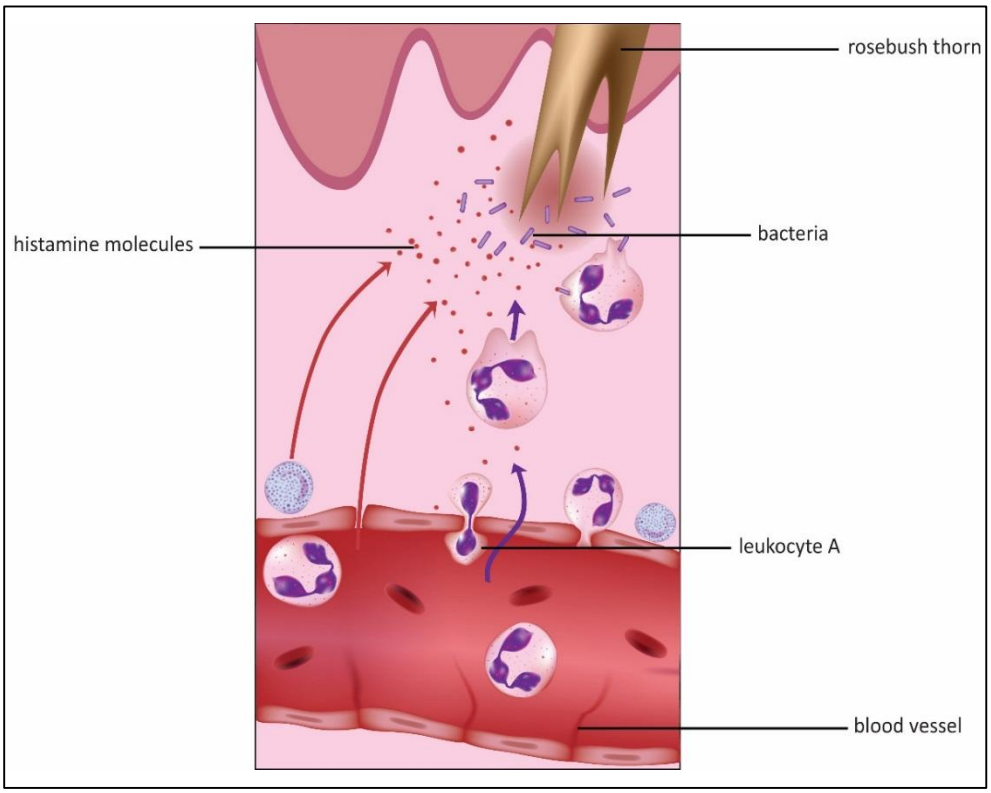
20. 84% of mice DNA is homologous to human DNA. Which of the following statements provides the best explanation for this observation?

A. Humans and mice have the same number of chromosomes.
B. The morphologies of humans and mice are similar.
C. Humans and mice share the same ecological niche.
D. Humans and mice share a very recent common ancestor.
E. The high degree of homology is the result of convergent evolution.

21. The ABO blood type system is a system that codes for agglutinogen at the level of red blood cells thus determining the blood type. Blood transfusions are conducted in several cases such as bleeding. The possible transfusion according to the ABO blood type system is

A. A→AB
B. AB→A
C. A→O
D. AB→O
E. AB →B

22. Following an injury, several signs appear at the level of the wound such as redness, heat, and pain. These are the signs of an inflammatory reaction.



Leukocyte A is/are (a)

A. lymphocyte traversing the wall of blood vessels via chemotaxis.
B. phagocyte traversing the wall of blood vessels via diapedesis.
C. granulocyte traversing the wall of blood vessels via phagocytosis.
D. lymphocyte, producer of antibodies.
E. cytotoxic T cells secreting granzymes.

23. Human chromosome 1 constitutes 270 x 10^6 base pairs (bp). It undergoes the action of a restriction enzyme which has a restriction site, every 3000 bases. The number of restriction fragments is

A. 270000
B. 90000
C. 90001
D. 89999
E. 270001

24. The point at which the cytoplasm divides is

A. mitosis.
B. prophase.
C. cytokinesis.
D. interphase.
E. metaphase.

25. Sara wants to choose a hormone that elicits seed dormancy, slows plant growth, and can regulate stomata during adverse environmental conditions such as drought. Which of the following hormones is the best choice?

A. gibberellin
B. IAA
C. abscisic acid
D. ethylene
E. phytochrome

26. Which of the following nutrient cycles has its largest reservoir in the atmosphere?

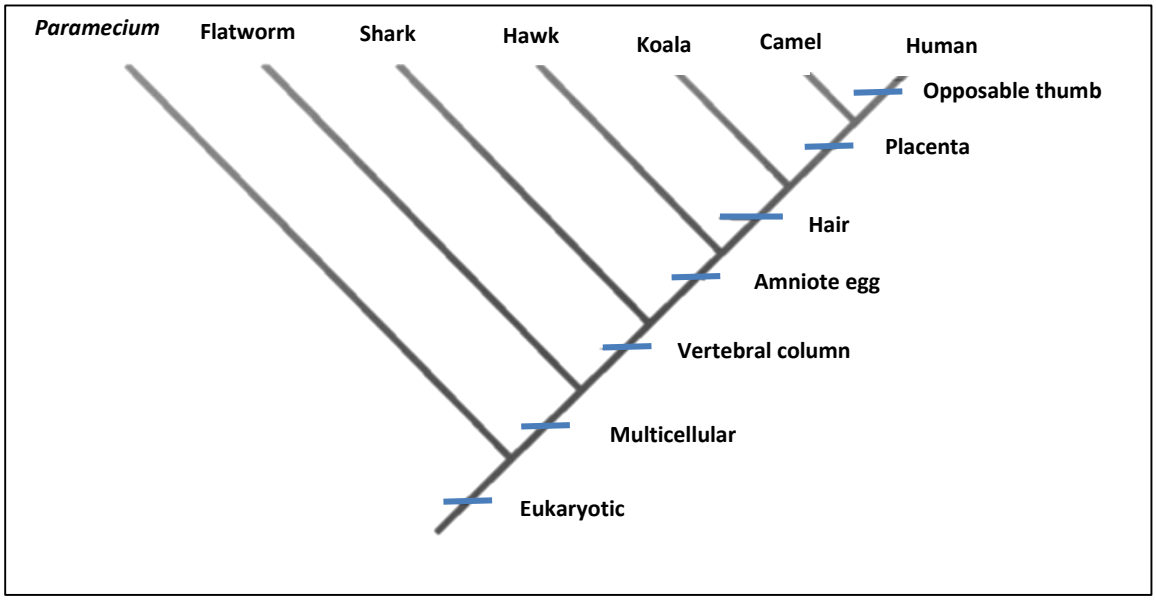
A. carbon cycle
B. nitrogen cycle
C. potassium cycle
D. phosphorus cycle
E. oxygen cycle

27. Which of the following is NOT a function performed by a membrane protein?

A. hormone-binding
B. cell adhesion
C. enzyme synthesis
D. pumps of active transport
E. receptors

Questions 28-30

Refer to the following cladogram



28. The most primitive characteristic in this cladogram is

A. Multicellular.
B. Eukaryotic.
C. Opposable thumb.
D. Vertebral column.
E. Placenta.

29. Choose the members of the mammal clade in this cladogram.

A. hawk, koala, camel, human
B. shark, hawk
C. koala, camel, human
D. camel, human
E. shark, hawk, koala, camel, human

30. Which organism possesses characteristics that evolved more recently?

A. human
B. camel
C. koala
D. hawk
E. Paramecium

Questions 31-32

DNA, Chromosome, and Cell Cycle

In a Petri dish, we dispose a culture of plant cells. Under specific treatment, all cells undergo the beginning of G1 phase at t_0 (synchronized cell cycle at the beginning of the experiment). Let X be the DNA mass of the culture at t_0.

Given:

For the studied cells:

- Cell cycle lasts 12 hours.
- G1 lasts 7 hours.
- S lasts 3 hours.
- G2 lasts 1 hour.

31. The DNA mass of the culture after 36 hours will be:

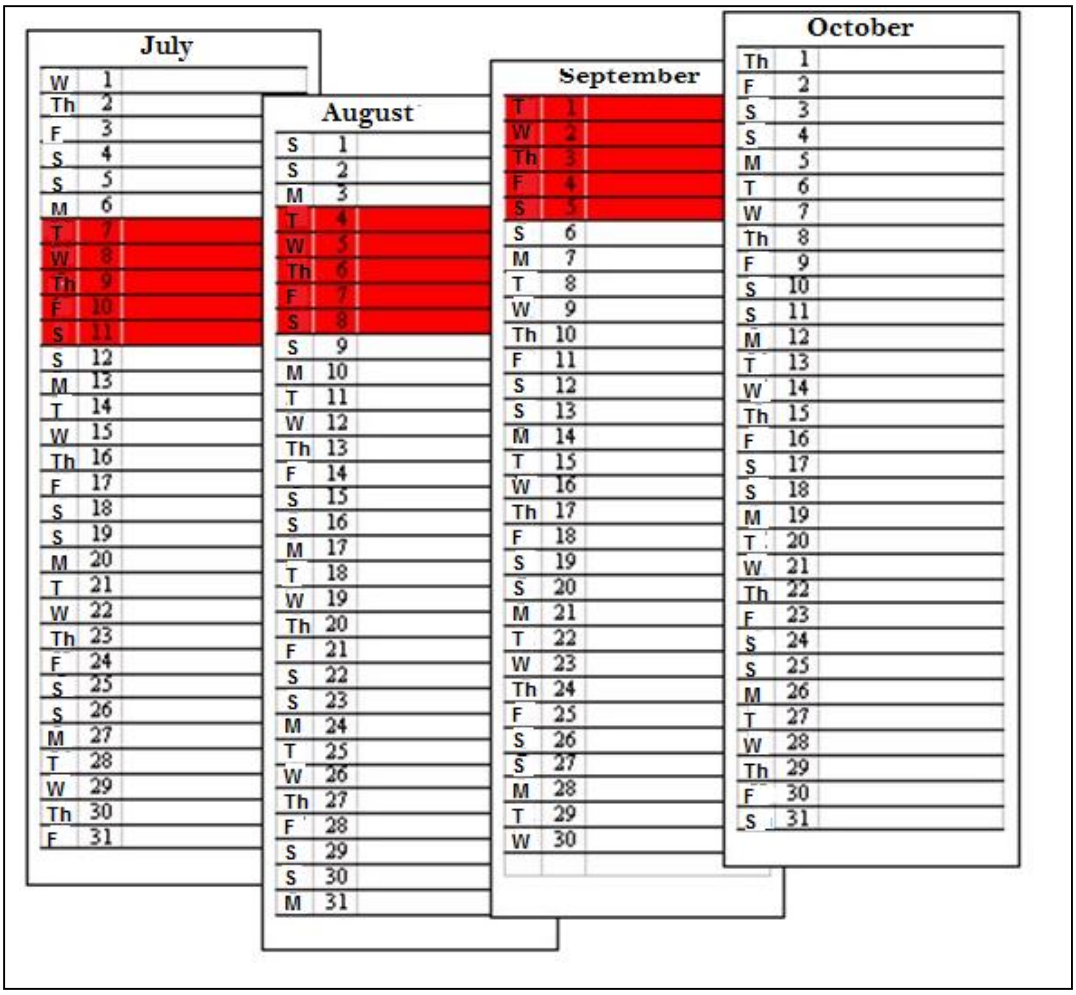
A. X
B. 2X
C. 4X
D. 8X
E. 16X

32. The cultured cells are diploid cells and contain 4 chromosomes each. The number of chromosomes found in each cell after t_0 + 35 hours is

A. 4 chromosomes with one chromatid each.
B. 4 chromosomes with two chromatids each.
C. 8 chromosomes with one chromatid each.
D. 8 chromosomes with two chromatids each.
E. The data is insufficient.

Questions 33-34

A woman indicated with a red color on a calendar the date of her period throughout 3 months.



33. This woman will have the chance to become pregnant on

- **A.** October 5.
- **B.** September 28.
- **C.** October 12.
- **D.** October 15.
- **E.** October 1.

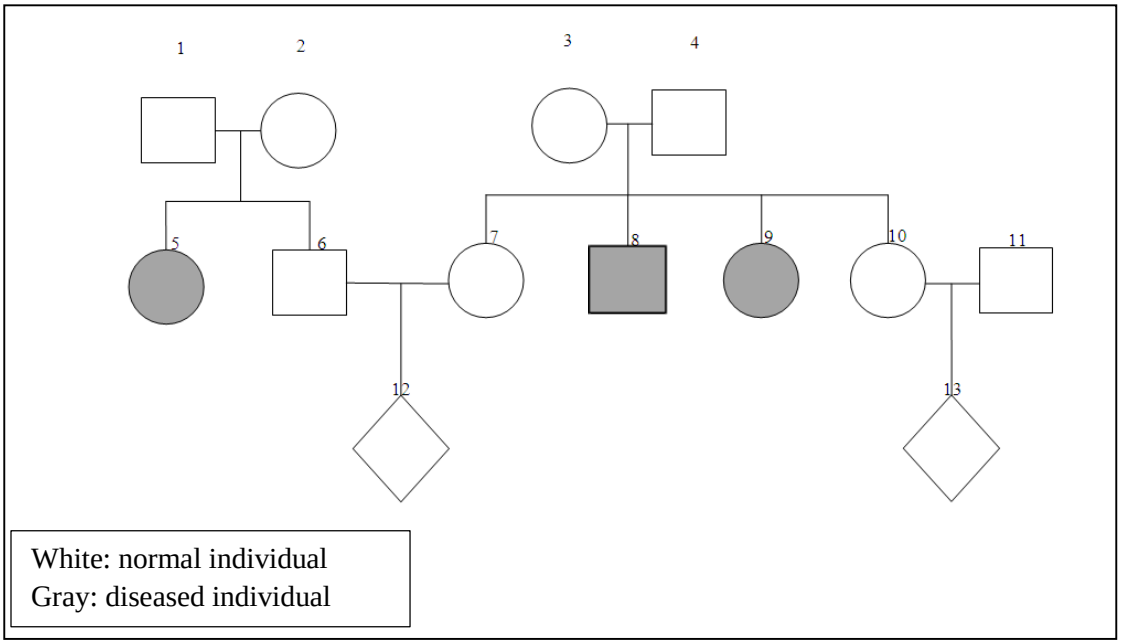
34. The ovulation date that corresponds to the August cycle is

- **A.** August 17.
- **B.** August 14.
- **C.** August 29.
- **D.** August 31.
- **E.** None of the above.

Questions 35-36

Hemochromatosis is an inherited genetic disease. It is an autosomal recessive disease. In a given population, the frequency of having a heterozygous individual is 1/11.

Consider the following family tree of a family from this population.



35. The genotype of individual 5 is (N: normal individual, h:diseased individual)

A. NN
B. hh
C. Nh
D. X^hX^h
E. X^NX^h

36. The probability that fetus 12 presents hemochromatosis is

A. 1/11
B. 1/9
C. 4/66
D. 1/484
E. None of the above.

37. All of the following living organisms are autotrophs EXCEPT

A. cyanobacteria.
B. algae.
C. zooplankton.
D. grass.
E. trees.

38. During karyotype preparation, the dividing cells are blocked at

A. prophase.
B. anaphase.
C. interphase.
D. telophase.
E. metaphase.

39. A food chain consists of producers, primary consumers, secondary consumers, and tertiary consumers. If the producers produce 10,000 kcal of energy, how many kcal are theoretically available to the secondary consumers based on normal trophic efficiencies?

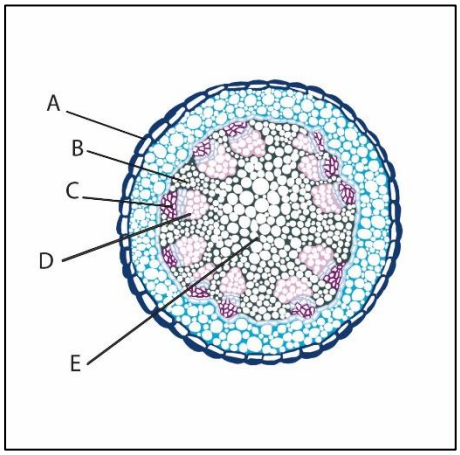
A. 10000
B. 1000
C. 100
D. 10
E. 5

40. What is a section of DNA that codes for a protein called?

A. gene
B. allele
C. chromosome
D. plasmid
E. transcription

Questions 41-43

Please refer to the following scheme.



41. This is a

A. dicot stem.
B. dicot root.
C. monocot stem.
D. monocot root.
E. It cannot be determined.

42. Structure E is the

A. meristem.
B. cambium.
C. vascular cylinder.
D. pith.
E. cortex.

43. If structure D is blocked with a specific chemical, which of the following functions will be lost?

A. The transport of water downward
B. The absorption of nutrients into the plant
C. The transport of water upward
D. The transport of sugar upward
E. The transport of sugar downward

Directions: Each set of lettered choices below refers to the numbered questions or statements immediately following it. Select one lettered choice that best answers each question. A choice may be used once, more than once, or not at all in each set.

Questions 44-48

A. Light-dependent reactions
B. Light-independent reactions
C. Krebs cycle
D. Glycolysis

44. It occurs in the cytoplasm.

45. Water is broken down.

46. Pyruvate is the product.

47. Sugar is produced.

48. Oxygen is released.

Questions 49-50

A. Marine biome
B. Desert
C. Taiga
D. Temperate grasslands
E. Tundra

49. It is an environment characterized by the presence of salt water. It is found in all of Earth's oceans.

50. It is a snow forest characterized by coniferous trees such as spruce and fir.

Directions: In this section of the exam, each question or incomplete statement is followed by five possible answers or completions. For each of the following problems, choose the best answer from the given list of possible choices.

51. A man with Klinefelter's syndrome has 47 chromosomes and has three sex chromosomes, XXY. This abnormality came about as a result of

A. crossing-over.
B. a deletion of a chromosome.
C. an addition of a chromosome.
D. nondisjunction.
E. a mutation in a gene.

52. The following figure shows the training of a dog in order to sit.

This training refers to

A. operant conditioning.
B. classical conditioning.
C. imprinting.
D. fixed action pattern.
E. habituation.

53. Several species of frogs are capable of hybridization, but none do because the breeding season of the frogs with red legs lasts from November to late April while the other species of frogs with yellow legs have a breeding season that lasts from late April to June. This best describes an evolutionary process known as

A. survival of the fittest.
B. overpopulation.
C. reproductive isolation.
D. artificial selection.
E. stabilizing selection.

54. If guanine makes up 28% of the nucleotides in a sample of DNA from an organism, then thymine would make up _____ % of the nucleotides.

A. 0
B. 22
C. 28
D. 44
E. 56

55. Referring to this list of vertebrates, which is the correct sequence of evolution?

A. bony fish – amphibians – reptiles – birds
B. birds – bony fish – amphibians – reptiles
C. amphibians – reptiles – bony fish – birds
D. reptiles – birds – bony fish – amphibians
E. reptiles – birds – amphibians – bony fish

56. The following table shows three experiments done on 3 different normal mice.

Mouse	Experiments	Results
1	Mouse with a normal thyroid gland	Normal growth
2	Removal of thyroid gland	Stoppage of growth
3	Removal of thyroid gland followed by grafting at another location	The graft is rapidly vascularized, leading to normal growth of the animal.

Consider the following statements.

I. The thyroid gland is responsible for the growth of mice.
II. The thyroid gland stops working when its location is changed.
III. The communication between the thyroid and the organism is via blood.
IV. The location of the thyroid gland is not important as long as it is vascularized.

What do the experimental results justify?

A. I and II
B. I and III
C. I and IV
D. I, III, and IV
E. There is insufficient data.

57. A test cross is done to

A. determine if crossover has occurred.
B. prevent sex-linked traits from being passed on.
C. determine if a person has Huntington's disease.
D. prevent crossover from occurring.
E. determine if an organism with the dominant phenotype is homozygous dominant or hybrid.

Questions 58-59

A coagulated egg is cut into small pieces which are placed in test tubes and subjected to digestion experiments. The conditions are shown in the following table.

Tube	Temperature	Tube content
1	37ºC	water+ egg white+ pepsin+ HCl
2	37ºC	water+ egg white+ HCl
3	37ºC	water+ egg white+ pepsin
4	100ºC	water+ egg white+ pepsin+ HCl
5	0ºC	water+ egg white+ pepsin+ HCl

58. The contents of one of the five tubes become transparent because the fragments are

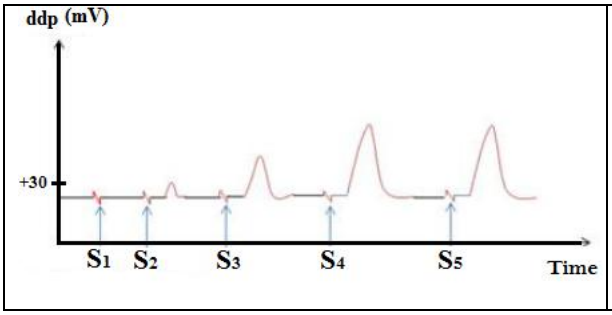
A. dissolved in water.
B. cut into small invisible pieces.
C. degraded into simpler molecules in the presence of enzymes.
D. digested into simpler molecules in the presence of hydrochloric acid.
E. dissolved in water under the action of heat.

59. The contents of one tube undergo digestion. It is

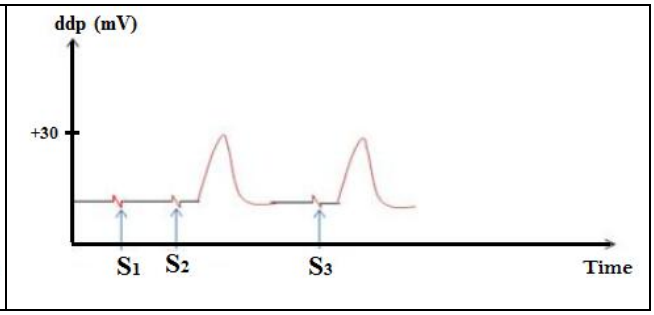
A. Tube 1 because of the presence of an enzyme and a suitable chemical medium.
B. Tube 2 because of the presence of hydrochloric acid as a catalyst.
C. Tube 3 only because of the presence of an enzyme.
D. Tube 4 because of the effect of the very high temperature.
E. Tube 5 because of the effect of the very low temperature.

Questions 60-61

Stimulations of increasing intensity are carried out on a nerve and on a nerve fiber. The electrical activity of each is recorded. The amplitudes of the responses of the nerve are shown in document 2.a and those of the nerve fiber in document 2.b.



Document 2.a



Document 2.b

60. Documents 2.a and 2.b correspond respectively to

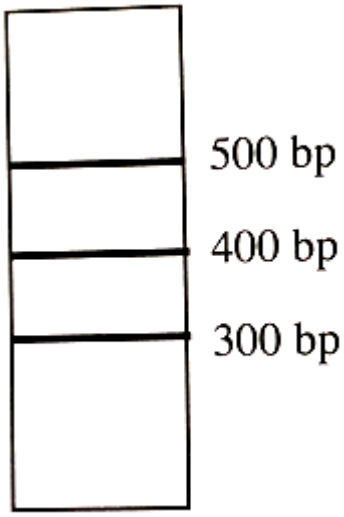
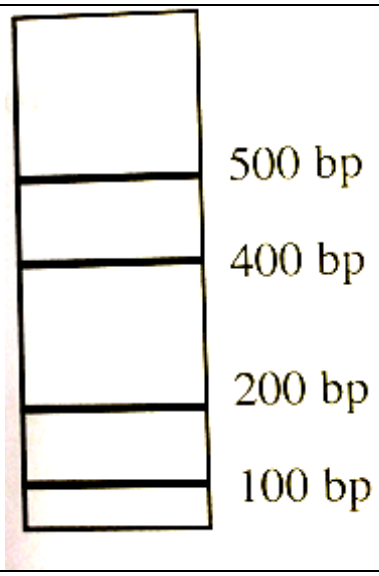
A. a global potential and an action potential.
B. an action potential and a global potential.
C. a rest potential and an action potential.
D. a global potential and a rest potential.
E. an action potential.

61. If the recorded response is at its maximum, its amplitude

A. decreases by propagating in the fiber and in the nerve.
B. decreases by propagating only in the nerve.
C. remains constant by propagating only in the nerve.
D. remains constant by propagating only in the nerve fiber.
E. remains constant by propagating in the nerve fiber and in the nerve.

Questions 62-63

The genes coding for one of the MHC proteins, DQ, are extracted from two identical skin cells and put in two tubes A and B. The same restriction enzyme is added to the two tubes. The produced fragments from each tube are separated by gel electrophoresis. The results are tabulated below.

Tube A	Tube B
	

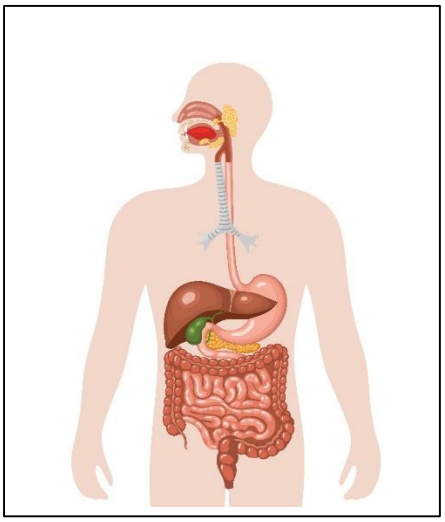
62. The length in base pair (bp) of this gene is

A. 1000 bp
B. 2400 bp
C. 1200 bp
D. 1100 bp
E. 900 bp

63. The result indicates that a mutation at the level of the DQ gene has taken place at fragment

A. 400
B. 500
C. 300
D. 200
E. 900

64. The figure below represents the digestive system.



Which of the following statements is true?

A. The accessory organs involved in digestion are the mouth, esophagus, pharynx, liver, stomach, small intestine, large intestine, and pancreas.
B. The organs involved in digestion are the liver, gallbladder, small intestine, and large intestine.
C. The major organs involved in digestion are the mouth, esophagus, pharynx, liver, gallbladder, stomach, small intestine, large intestine, and appendix.
D. The major organs involved in digestion are the liver, gallbladder, stomach, small intestine, and large intestine.
E. The organs involved in digestion are the mouth, stomach, small intestine, liver, gallbladder, and pancreas.

65. Darwin's ideas concerning natural selection were based on all of the following facts and observations EXCEPT that

A. parents pass their successful traits to their offspring.
B. population members exhibit variations in many traits.
C. all living organisms use the same genetic code.
D. environmental pressures can select various traits based on survivability.
E. populations that adapt to environmental conditions produce many offspring.

66. A red flower is crossed with a white flower, and only red offspring result. If two of these red offspring cross, what is the chance of having a white offspring?

A. 0%
B. 25%
C. 50%
D. 75%
E. 100%

67. Sarah saw a big snake while hiking. She started to run and her heartbeat increased to 100 bpm. Which of the following organs is implicated in this response?

A. adrenal cortex
B. adrenal medulla
C. pancreas
D. thymus
E. anterior pituitary

68. Which of the following diseases results from a chromosomal abnormality?

A. Huntington's disease
B. Sickle cell anemia
C. Cystic fibrosis
D. Down syndrome
E. Phenylketonuria (PKU)

69. Geese hatchlings follow the first thing they see. This is (a/an)

A. imprinting.
B. classical conditioning.
C. fixed action pattern.
D. altruism.
E. operant conditioning.

Questions 70-72

In a certain population of goats, there are two alleles for coat color: brown and white. Brown is dominant and white is recessive. The frequency of white-colored goats is 20% during spring season. Wolves are also present in the area, and goats constitute a major portion of their diet. Wolves recognize prey when they do not blend into the environment.

70. What is the frequency of the allele for brown coat color in the goats?

A. 0.09
B. 0.03
C. 0.3
D. 0.6
E. 0.9

71. In this population of goats, what percentage is hybrid brown?

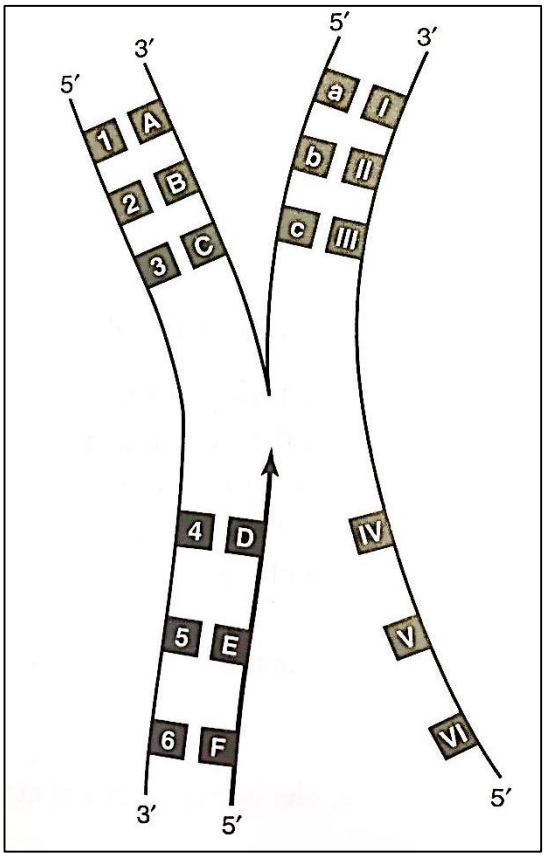
A. 7%
B. 48%
C. 50%
D. 81%
E. 91%

72. If the climate were to change so that snow covered the ground much of the time, what change in the population of goats would you expect?

A. The frequency of white allele would increase.
B. The frequency of white allele would decrease.
C. The frequency of brown allele would increase.
D. The population of goats would decrease and then increase.
E. The population of goats would increase and then decrease.

Questions 73-75

Refer to this sketch of prokaryotic DNA as it commonly undergoes replication and transcription simultaneously.



73. If 2 is thymine, then B must be

A. guanine.
B. cytosine.
C. thymine.
D. adenine.
E. uracil.

74. If 5 is adenine, then E must be

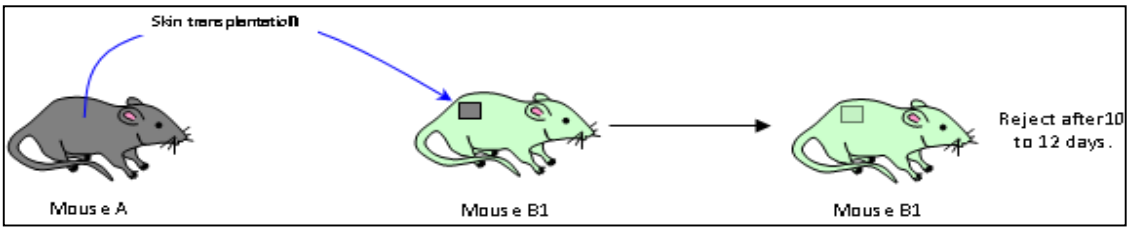
A. guanine.
B. cytosine.
C. thymine.
D. adenine.
E. uracil.

75. How does the process shown differ in a eukaryotic cell?

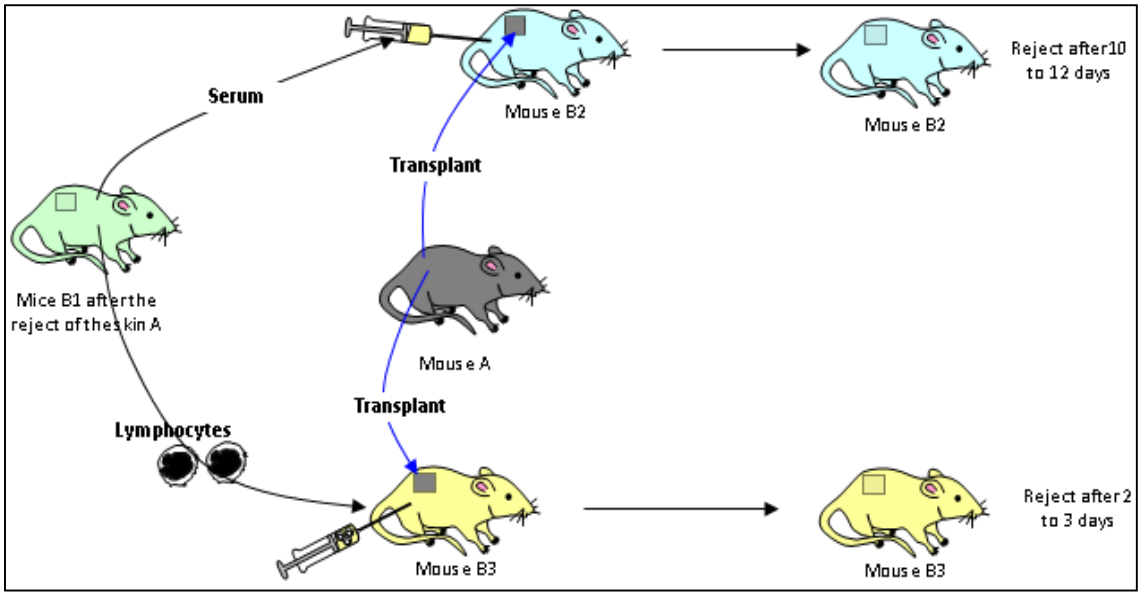
A. Eukaryotic cells do not carry out transcription.
B. Eukaryotic cells do not carry out replication.
C. Eukaryotic cells do not carry out both transcription and replication.
D. Eukaryotic cells carry out both processes, but they do not occur at the same time.
E. Eukaryotic cells carry out both processes in the Golgi body.

Questions 76-77

In order to study the components of the immune system that is implicated in the transplant rejection, the following experiments were done on mice.



Experiment 1: Mice A and B from different strains



Experiment 2: Mice A and B from different strains; Mice B1, B2 and B3 = same strain

76. The above experiments show that

A. the immune response is cell-mediated and the memory cells have an effect on transplant rejection.
B. the immune response is humoral and the memory cells do not have any effect on transplant rejection.
C. the immune response is cell-mediated and the memory cells do not have any effect on transplant rejection.
D. the immune response is humoral and the memory cells have an effect on transplant rejection.
E. there is insufficient data.

77. In reference to the results of the experiment, which statement is correct about grafts?

A. Allografts are never rejected.
B. A thymectomized mouse loses the ability of graft rejection.
C. Granulocytes are the agents of graft rejection.
D. Antibodies are capable of graft rejection.
E. None of these statements are correct.

78. Red blood cells are placed in three solutions of different concentrations. The microscopic observations of these cells are done and the results are shown in the following table.

Solution number	**1**	**2**	**3**
Concentration of the solution (g/cc)	0.03	0.09	26
Aspect of red blood cells	Red blood cells bulge and lyse	Red blood cells remain normal	Red blood cells shrink

Taking into consideration that the cytoplasm of red blood cells has a concentration of 9 g/100 cc, which statement is INCORRECT?

A. The red blood cells lyse in medium 1 because the water passes through osmosis from the exterior hypotonic medium into the interior hypertonic medium.
B. Red blood cells undergo hemolysis in medium 1 due to the flux of water from the extracellular medium towards the intracellular medium.
C. The red blood cells remain normal in solution 2 because both the intracellular and extracellular media are isotonic.
D. The red blood cells shrink in medium 3 because water exits from the hypotonic medium to the hypertonic medium.
E. The red blood cells cannot lyse in medium 3 because there is no exchange that occurs between the two media.

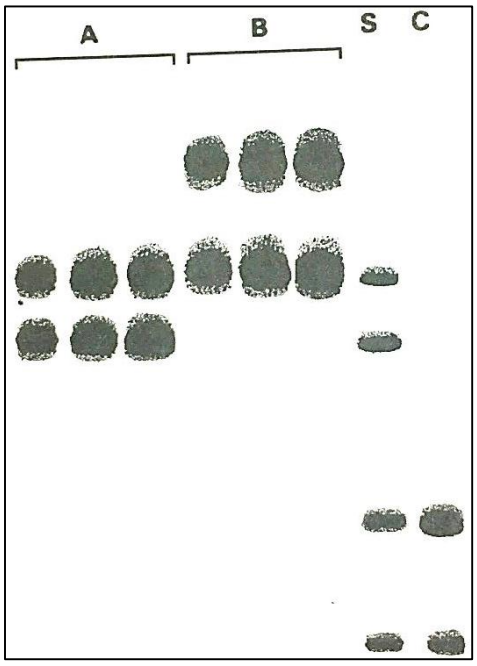
79. Mutations are a permanent alteration that attack sequences of genes. The following strand is a strand of DNA coding for estrogen, a sexual hormone.

3' ACC.GAC.TAT.ATA.TAT.CCG.CAC.TAC.TTC.GAC.ACT 5'

A mutation by deletion attacks the ninth nucleotide. The mutated sequence will be

A. 3' ACC.GAC.TAC.ATA.TAT.CCG.CAC.TAC.TTC.GAC.ACT 5'
B. 3' ACC.GAC.TAG.TAT.ATC.CGC.ACT.ACT.TCG.ACA.CT 5'
C. 3' ACC.GAC.TAT.ATA.TAT.CCG.CAC.TAC.GAC.ACT 5'
D. 3' ACC.GAC.TAA.TAT.ATC.CGC.ACT.ACT.TCG.ACA.CT 5'
E. 5' ACC.GAC.TAG.ATA.TAT.CCG.CAC.TAC.GAC.ACT 3'

80. Three individuals A, B, and C are suspects in murder case. Based on blood stains collected from victim S, we obtained, with a specific probe of a determined locus, the DNA fingerprint S. The DNA fingerprint of suspect A was obtained with the same probe based on blood, skin, and hair samples; the same goes for the fingerprint of B. The DNA fingerprint of C was obtained based on a blood sample.



Based on the results, we can conclude that

A. suspects B and C participated in the murder.
B. suspects A and C participated in the murder.
C. suspects A and B participated in the murder.
D. the three suspects A, B, and C participated in the murder.
E. none of the suspects participated in the murder.