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BIOLOGY
STANDARD LEVEL
PAPER 1

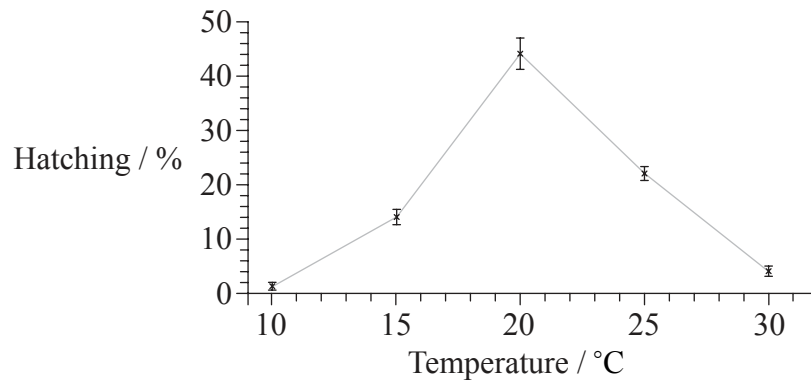
Monday 13 May 2013 (afternoon)

45 minutes

INSTRUCTIONS TO CANDIDATES

- Do not open this examination paper until instructed to do so.
- Answer all the questions.
- For each question, choose the answer you consider to be the best and indicate your choice on the answer sheet provided.
- The maximum mark for this examination paper is *[30 marks]*.

1. The graph shows the effect of temperature on hatching of brine shrimp eggs (*Artemia* sp.).



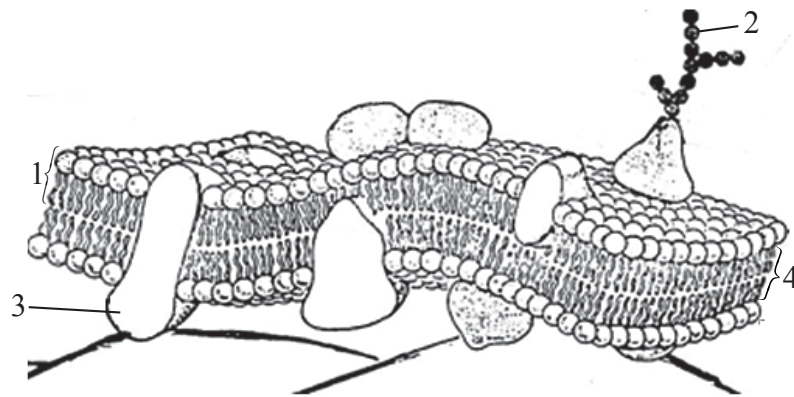
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What do the error bars indicate?

- A. Measurements made at 10 °C have the greatest variability.
 - B. Greatest range for hatching is at 20 °C.
 - C. Measurements at each temperature are very similar to each other.
 - D. Standard deviation is greatest for the values measured at 15 °C.
2. What are stem cells?
- A. Specialized cells that can be used therapeutically
 - B. Surplus cells taken from an embryo
 - C. Cells that retain their ability to divide and differentiate
 - D. Cells in the xylem and phloem tissues that support a plant
3. What causes cells to differentiate?
- A. Sufficient nutrition
 - B. Full expression of all genes
 - C. Specialized functions at different stages of embryo development
 - D. Expression of some genes with suppression of other genes

4. Which structure is found in *E. coli*, but **not** in a eukaryotic cell?
- A. Cell wall
 - B. Endoplasmic reticulum
 - C. Cytoplasm
 - D. Pili
5. What actions occur during interphase?
- A. DNA replication and RNA synthesis
 - B. Spindle formation and DNA replication
 - C. Chromosome alignment at the metaphase plate
 - D. Growth and separation of sister chromatids
6. Which process contributes to growth of a multicellular body?
- A. Exocytosis
 - B. Meiosis
 - C. Mitosis
 - D. Osmosis

7. What are the parts of the cell membrane indicated in the diagram?



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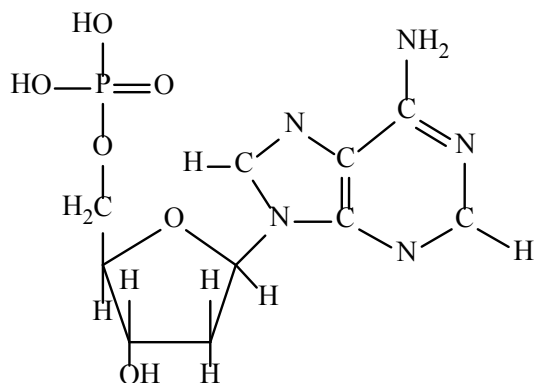
	1	2	3	4
A.	phospholipid	glycoprotein	integral protein	hydrophobic layer
B.	hydrophilic layer	carbohydrate	cholesterol	phospholipid
C.	phospholipid	peripheral protein	glycoprotein	cholesterol
D.	hydrophobic layer	carbohydrate	integral protein	phospholipid

8. What property makes water an important coolant in the natural world?

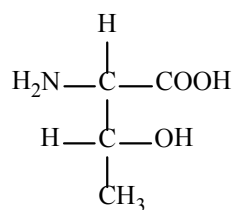
- A. It is cohesive.
- B. It requires much energy to evaporate.
- C. It has a lower temperature than blood.
- D. It has a low specific heat.

9. Which molecules show a monosaccharide and a fatty acid?

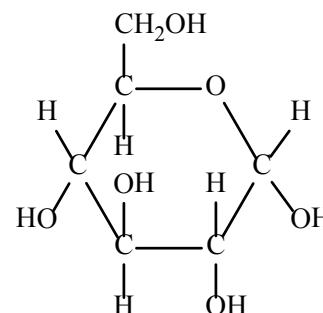
Molecule 1



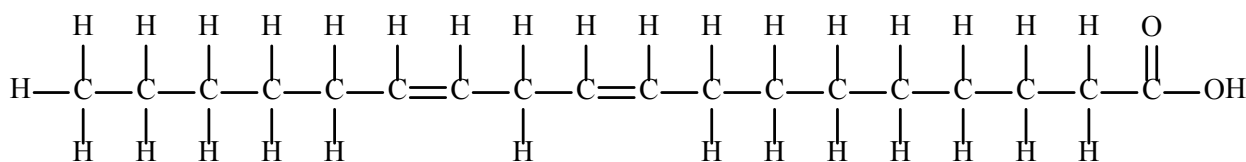
Molecule 2



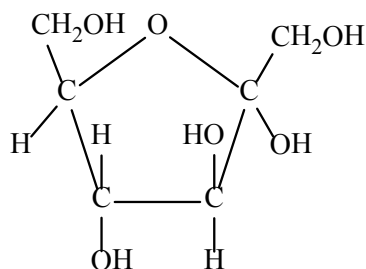
Molecule 3



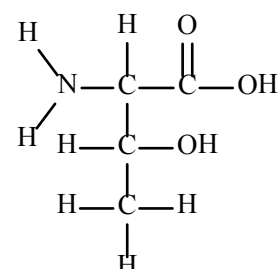
Molecule 4



Molecule 5



Molecule 6



	Monosaccharide	Fatty acid
A.	1, 3 and 5 only	2, 4 and 6 only
B.	1 only	2 and 6 only
C.	3 only	2 and 6 only
D.	3 and 5 only	4 only

10. What contributes to the structure of an enzyme?
- A. Sequence of bases linked by hydrogen bonds
 - B. Sequence of substrates linked by condensation reactions
 - C. Sequence of amino acids linked by peptide bonds
 - D. Sequence of polypeptides linked by hydrolysis reactions
11. For what purpose is the enzyme lactase useful?
- A. Production of lactose-free milk so that more people can consume dairy products
 - B. As a dietary supplement to aid in protein digestion of milk
 - C. For use in coagulating milk protein to make cheese
 - D. To improve protein consumption in developing countries that lack milk
12. How does chlorophyll respond to the red, green and blue wavelengths in white light?

	Red	Green	Blue
A.	reflects	reflects	absorbs
B.	absorbs	reflects	reflects
C.	reflects	absorbs	reflects
D.	absorbs	reflects	absorbs

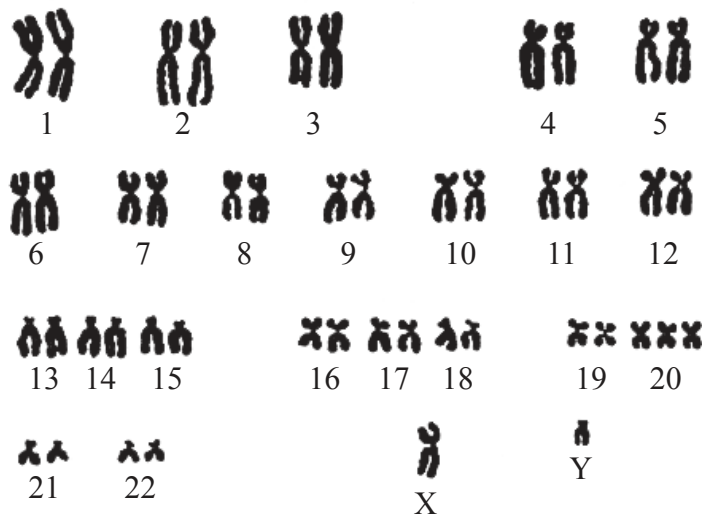
13. One type of gene mutation involves a base substitution.

Original DNA sequence:	GAC TGA GGA CTT CTC TTC AGA
mutated sequence 1:	GAC TGA GGA CAT CTC TTC AGA
mutated sequence 2:	GAC TGA GGA CTC CTC TTC AGA
<hr/>	
mRNA codons for valine	GUU GUC GUA GUG
mRNA codons for glutamic acid	GAA GAG

What are the consequences of the base substitutions in the two new sequences of DNA?

- A. Both are mutations that would result in different polypeptides.
 - B. Sequence 2 would result in a changed polypeptide but sequence 1 would not.
 - C. All three DNA sequences would translate into the same polypeptide.
 - D. Only the original DNA and sequence 2 would translate into the same polypeptide.
14. Which genetic condition can be diagnosed by karyotyping?
- A. Trisomy 21
 - B. Sickle-cell anemia
 - C. Hemophilia
 - D. Colour blindness

15. The image shows a human karyotype.

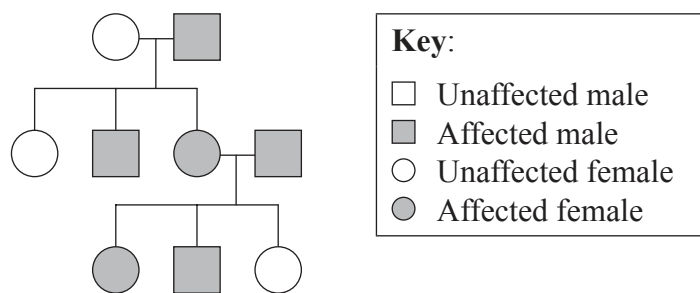


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According to the image, what conditions can be determined?

- A. Non-disjunction has occurred and the individual is male.
- B. Non-disjunction has occurred and the individual is female.
- C. The individual is female and has Down syndrome.
- D. The individual is male and has Down syndrome.

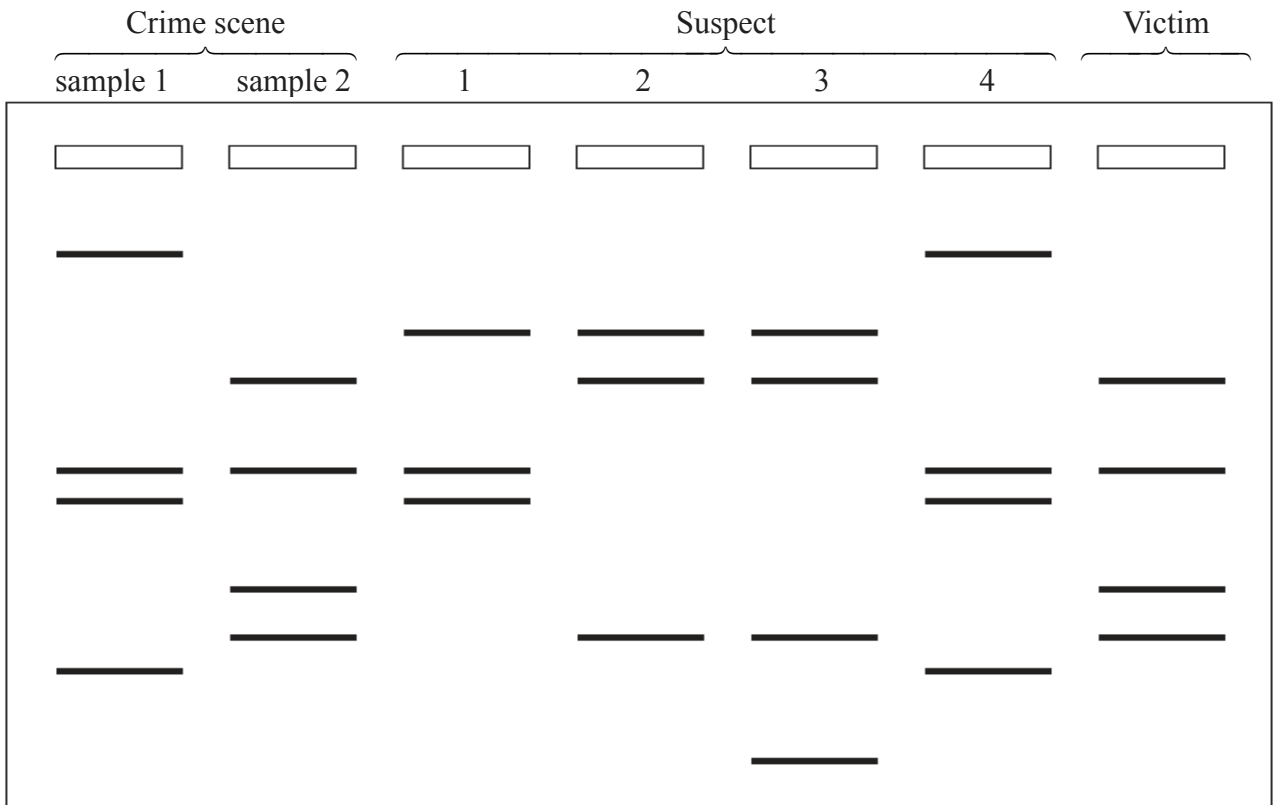
16. The diagram shows a pedigree.



According to the pedigree shown, which pattern of inheritance is indicated?

- A. Sex-linked recessive trait
- B. Autosomal recessive trait
- C. Autosomal dominant trait
- D. Codominant alleles

17. The diagram shows results of electrophoresis of DNA from a crime scene.

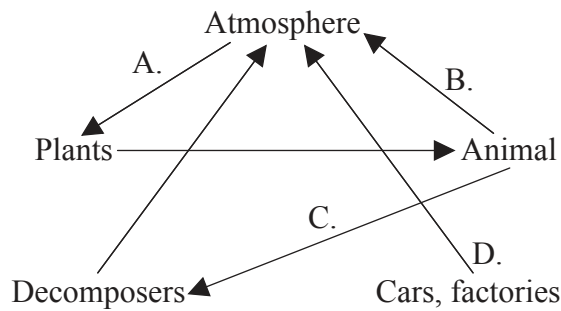


Which suspect could be implicated as the criminal, according to the gel of DNA shown?

- A. Suspect 1
 - B. Suspect 2
 - C. Suspect 3
 - D. Suspect 4
18. What term can be used to describe clams that eat decaying plant matter?
- A. Detritivores
 - B. Tertiary consumers
 - C. Saprotrophs
 - D. Decomposers

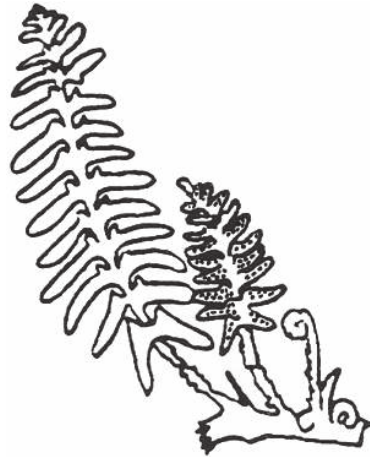
19. At each trophic level energy is lost. How is this energy regained by the ecosystem?
- A. Heat
 - B. Nutrients
 - C. Photosynthesis
 - D. Recycling

20. The diagram is a representation of a carbon cycle. Which arrow will reduce the greenhouse effect?



21. What would you expect to find in the fossil record if evolution had **not** occurred?
- A. Fossils of simple organisms only in the oldest layers
 - B. Only fossils of extinct forms
 - C. Fossils of complex organisms only in the oldest layers
 - D. Same fossil forms in all layers

22. The image shows a drawing of an organism.



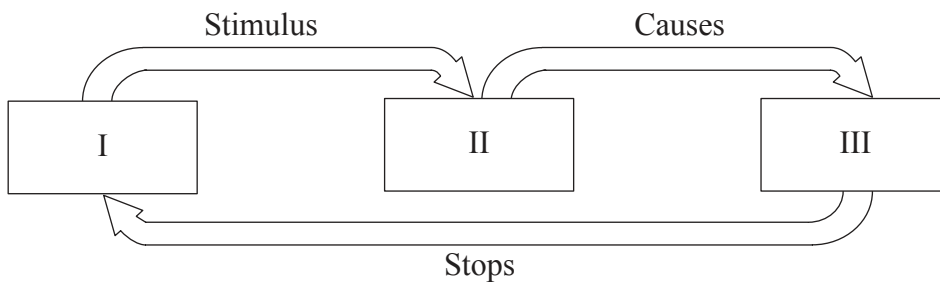
To which phylum of plants does this organism belong?

- A. Bryophyta
 - B. Filicinophyta
 - C. Coniferophyta
 - D. Angiospermophyta
23. To which phylum do organisms with exoskeleton, jointed appendages and segmented bodies belong?
- A. Mollusca
 - B. Porifera
 - C. Arthropoda
 - D. Annelida

24. What causes the **rate** of heart contraction to increase or decrease?
- A. The heart muscle itself
 - B. Nerve impulses from the brain
 - C. A hormone from the thyroid gland
 - D. The rate of return of blood to the left atrium
25. Why do nutrient molecules enter the blood?
- A. Blood carries nutrients to cells.
 - B. Blood converts nutrients into energy.
 - C. Nutrients and oxygen are mixed by blood.
 - D. Nutrients are stored in blood.
26. Why does shivering occur?
- A. The body cannot control muscles when they become cold.
 - B. Shivering informs the brain that the body is too cold.
 - C. Shivering generates heat and raises body temperature.
 - D. The body diverts blood away from skin reducing heat loss.

27. What initiates an action potential along a neuron?
- A. Potassium and sodium ions diffuse out of a neuron.
 - B. Potassium and sodium ions diffuse into a neuron.
 - C. Neurotransmitters cause depolarization of membrane.
 - D. Acetylcholinesterase breaks down acetylcholine.

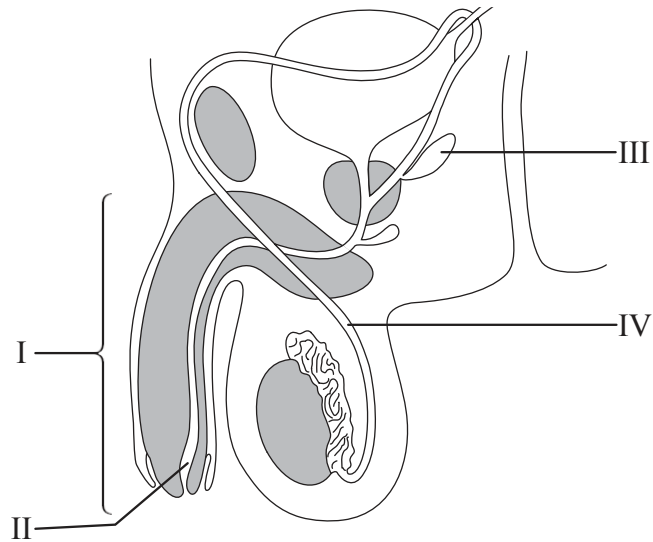
28. The diagram shows a feedback pathway.



Which sequence is an example of the pathway?

	I	II	III
A.	high blood sugar	alpha cells	secretion of insulin
B.	low blood sugar	alpha cells	secretion of glucagon
C.	high blood sugar	beta cells	secretion of glucagon
D.	low blood sugar	beta cells	secretion of insulin

29. What structures are indicated on the diagram?



	I	II	III	IV
A.	penis	urethra	seminal vesicles	sperm duct
B.	erectile tissue	ureter	prostate	sperm duct
C.	penis	sperm duct	prostate	seminal vesicles
D.	penis	urethra	sperm duct	seminal vesicles

30. LH causes the rupture of a follicle and release of an egg cell. What is this process called?

- A. Conception
- B. Fertilization
- C. Menstruation
- D. Ovulation