

# Science Proficiency Practice Quiz

Science · Answer Key · 20 Questions

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1. What is the value of  $\sin 15$  degrees?

A)  $(\sqrt{6}-\sqrt{2})/4$

B)  $(\sqrt{3}+1)/2$

C)  $1/2$

D)  $(\sqrt{2}+1)/4$

2. Which equation represents the slope of a straight line  $3y = x + 3$ ?

A)  $\tan 30$

B)  $\tan 60$

C)  $\tan 45$

D)  $\tan 90$

3. What is the unit of the rate constant for an  $n$ th order reaction?

A)  $\text{litre}^{(1-n)} \text{ mol}^{(1-n)} \text{ sec}^{-1}$

B)  $\text{mol}^{(n-1)} \text{ litre}^{(n-1)} \text{ sec}^{-1}$

C)  $\text{mol}^{(1-n)} \text{ litre}^{(n-1)} \text{ sec}^{-1}$

D) None

4. Which phase of the cell cycle involves DNA replication?

A) G1 phase

B) S phase

C) G2 phase

D) M phase

5. What is the result when karyokinesis is not followed by cytokinesis?

A) Synaptonemal complex

B) Syncytium

C) Recombination nodules

D) Terminalisation

6. Which enzyme is responsible for catalyzing crossing over during meiosis?

A) DNA polymerase

B) Ligase

C) Recombinase

D) Helicase

7. If a vector A is perpendicular to vector B, what is their dot product?

- A) 1
- B) 0**
- C) infinity
- D) Undefined

8. What is the SI unit of electric flux?

- A) N/C
- B)  $\text{Nm}^2/\text{C}$**
- C)  $\text{C}/\text{m}^2$
- D) V/m

9. Which of the following is a unit of electric potential?

- A)  $[\text{M}^1\text{L}^2\text{T}^{-2}\text{A}^{-1}]$
- B)  $[\text{M}^1\text{L}^2\text{T}^{-3}\text{A}^{-1}]$**
- C)  $[\text{M}^1\text{L}^2\text{T}^{-3}\text{A}^1]$
- D)  $[\text{M}^1\text{L}^2\text{T}^{-1}\text{A}^{-1}]$

10. What happens to the rate of a zero-order reaction if concentration is doubled?

- A) Doubles
- B) Halves
- C) Remains same**
- D) Quadruples

11. Which of these is the most abundant protein in the biosphere?

- A) Collagen
- B) Keratin
- C) RuBisCO**
- D) Hemoglobin

12. What is the typical arrangement of microtubules in a motile eukaryotic flagellum?

- A) 9+0
- B) 9+1
- C) 9+2**
- D) 8+2

13. Which term describes the movement of water across a selectively permeable membrane?

- A) Diffusion
- B) Active transport
- C) Osmosis**
- D) Facilitated diffusion

14. What is the concentration of a 1000g  $\text{CaCO}_3$  solution containing 10g carbonate in ppm?

A) 10000 ppm

B) 1000 ppm

C) 100 ppm

D) 10 ppm

15. Which charge transfer property describes body A gaining positive charge?

A) Lost electrons

B) Gained electrons

C) High work function

D) None

16. What is the relationship between electric field and charge density inside a sphere?

A) Inversely proportional

B) Directly proportional

C) Constant

D) Zero

17. At what temperature are the rate constants  $k_1$  and  $k_2$  equal for the given Arrhenius equations?

A) 1000 K

B) 2000 K

C)  $1000/\ln(10)$  K

D) None

18. Which structure in the cockroach is the passage for faeces, urine, and sperms?

A) Ovary

B) Cloaca

C) Spermatheca

D) Vagina

19. Which statement is false regarding proteins?

A) Proteins can act as enzymes

B) Proteins are homopolymers

C) Proteins function as hormones

D) Proteins transport nutrients

20. What is the result of  $1 + \frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \dots$ ?

A) 1

**B) 2**

C) 3

D) Infinite