

Science Proficiency Practice Quiz

Science · Practice Test · 20 Questions

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 nth 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) Nm^2/C
- C) C/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 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