MODEL QUESTIONS - B.Tech

PART1: PHYSICS

1. Torque per unit moment of inertia is equal to
   a) angular velocity
   b) angular acceleration
   c) radius of gyration
   d) inertia

2. If a projectile has a velocity greater than the escape velocity, which trajectory will it follow?
   a) elliptic
   b) hyperbolic
   c) vertical straight
   d) parabolic

3. To a fish under water, viewing obliquely a fisher-man standing on the bank of a lake, does appear as
   a) slightly shorter
   b) taller
   c) with no change in height
   d) with half the original height.

4. Moderator is used to
   a) accelerate the bombarding neutrons
   b) slow down the bombarding neutrons
   c) to eject more electrons
   d) to arrest the nuclear reaction

5. In a ferroelectric material, as the applied field is gradually reduced to zero, the polarization still left is known as
   a) remanent polarization
   b) coercive polarization
   c) zero polarization
   d) positive polarization.

PART 2: CHEMISTRY

6. Which is used as flux in metallurgy?
   a) CaF2
   b) SF6
   c) UF6
   d) NaF

7. The value of electrical resistance at super conductivity state is
   a) 100
   b) 0
   c) Low
   d) High

8. Geometrical isomerism is exhibited by (i) 1-pentene (ii) 2-pentene (iii) 2-chloro-2-pentene (iv) 3-methyl-2-pentene
   a) (i) and (ii)
   b) (ii) and (iii)
   c) (iii) and (iv)
   d) (ii), (iii) and (iv)

9. Which among the following has both local anaesthetics and antiseptic properties?
   a) Benzyl benzoate
   b) Phenol
   c) Benzyl alcohol
   d) n-propyl alcohol

10. The medicines which prevent nausea, vomiting and motion sickness is
    a) Antibiotics
    b) Antacids
    c) Antispasmodics
    d) All of these

PART 3: MATHEMATICS

11. If $f(2) = 4$ and $f'(2) = 4$, then $\lim_{x\to 2}\left(\frac{xf(2) - 2f(x)}{(x-2)}\right)$ is equal to
    a) 2
    b) -2
    c) -4
    d) 3

12. Let f: **R→R** be a function defined by f(x) = |x| + 1.
    Then which of the following is true?
    a) f is 1-1 and onto
    b) f is neither 1-1 nor onto
    c) f is onto but not 1-1
    d) f^{-1} exists

13. The principal value of i^i is equal to
    a) e
    b) $e^{-\pi}/2$
    c) $e^{-3\pi}/2$
    d) none of these

14. The line $y = 4x + c$ touches the parabola $y^2 = 4x$ if
    a) C = 0
    b) C = 1/4
    c) C = 4
    d) 2

15. If the lines $\frac{x-1}{2} = \frac{y+1}{3} = \frac{z-1}{4}$ and $\frac{x-3}{1} = \frac{y-k}{2} = \frac{z}{1}$ intersect, then k equals
    a) 3/2
    b) 9/2
    c) -2/9
    d) -3/2

PART 4: BIOLOGY

16. Passage through pores in the nuclear envelope is restricted primarily to
    a) proteins, RNA, and protein-RNA complexes
    b) lipids and glycolipids
    c) DNA and RNA
    d) RNA and protein-carbohydrate complexes

17. Which of the following are not energy sources but necessary for enzymatic reactions, for protein complexes, or as precursors for biomolecules?
    a) minerals and vitamins
    b) carbohydrates
    c) lipids
    d) proteins

18. What was the first bacterium shown to cause human disease?
    a) Anthrx
    b) Mycobacterium
    c) Diphteria
    d) Streptococus

19. The cytoplasm of a bacterium
    a) is supported by the cytoskeleton
    b) is supported by microtubules
    c) is supported by keratin
    d) has no internal support structure

20. Which of the following is not an isoenzyme?
    a) G6PDH
    b) LDH
    c) NP
    d) ATPase