

MODEL QUESTIONS - B.Tech

PART1: PHYSICS

- Torque per unit moment of inertia is equal to
 - angular velocity
 - angular acceleration
 - radius of gyration
 - inertia
- If a projectile has a velocity greater than the escape velocity, which trajectory will it follow?
 - elliptic
 - hyperbolic
 - vertical straight
 - parabolic
- To a fish under water, viewing obliquely a fisherman standing on the bank of a lake, does appear as
 - slightly shorter
 - taller
 - with no change in height
 - with half the original height.
- Moderator is used to
 - accelerate the bombarding neutrons
 - slow down the bombarding neutrons
 - to eject more electrons
 - to arrest the nuclear reaction
- In a ferroelectric material, as the applied field is gradually reduced to zero, the polarization still left is known as
 - remanent polarization
 - coercive polarization
 - zero polarization
 - positive polarization.

PART 2: CHEMISTRY

- Which is used as flux in metallurgy?
 - CaF₂
 - SF₆
 - UF₆
 - NaF
- The value of electrical resistance at super conductivity state is
 - 100
 - 0
 - Low
 - High
- Geometrical isomerism is exhibited by (i) 1-pentene (ii) 2-pentene (iii) 2-chloro-2-pentene (iv) 3-methyl-2-pentene
 - (i) and (ii)
 - (ii) and (iii)
 - (iii) and (iv)
 - (ii), (iii) and (iv)
- Which among the following has both local anaesthetics and antiseptic properties?
 - Benzyl benzoate
 - Phenol
 - Benzyl alcohol
 - n-propyl alcohol
- The medicines which prevent nausea, vomiting and motion sickness is
 - Antibiotics
 - Antacids
 - Antispasmodics
 - All of these

PART 3: MATHEMATICS

11. If $f(2) = 4$ and $f'(2) = 4$, then $\lim_{x \rightarrow 2} \left(\frac{xf(2) - 2f(x)}{(x-2)} \right)$ is equal to
- a) 2
b) -2
c) -4
d) 3
12. Let $f: \mathbf{R} \rightarrow \mathbf{R}$ 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) Anthrax
b) Mycobacterium
c) Diphtheria
d) Streptococcus
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