

VITEEE 2021 Question Paper May 29 Slot 3

Time Allowed :90 Minutes

Maximum Marks :80

Total Questions :80

General Instructions

Read the following instructions very carefully and strictly follow them:

1. The question paper contains a total of 80 questions divided into four parts:
 - Part I: Physics (Questions 1 to 25)
 - Part II: Chemistry (Questions 26 to 50)
 - Part III: Mathematics (Questions 51 to 75)
 - Part IV: English & Logical Reasoning (Questions 76 to 80)
2. All questions are multiple-choice with four options, and only one of them is correct.
3. For each correct answer, the candidate will earn 1 mark.
4. There is no negative marking for incorrect answers.
5. The test duration is 12 hours.

1. Bakelite is a thermosetting resin. It is formed by the condensation of

- (A) Phenol and Formaldehyde
- (B) Urea and Formaldehyde
- (C) Ethylene Glycol and Phthalic acid
- (D) Vinyl chloride and Hexamethylenediamine

2. Which one of the following has zero dipole moment?

- (A) H_2O
- (B) NH_3
- (C) CO_2
- (D) $CHCl_3$

3. The intermediate obtained in Reimer-Tiemann reaction is

- (A) Carbocation
- (B) Carbanion
- (C) Dichlorocarbene

(D) Free radical

4. The rest mass of a photon is

- (A) 1.6×10^{-27} kg
 - (B) 9.1×10^{-31} kg
 - (C) Zero
 - (D) Infinite
-

5. A cylindrical wire is stretched to increase its length by 10%. Percentage increase in its resistance is:

- (A) 10%
 - (B) 11%
 - (C) 20%
 - (D) 21%
-

6. If you place 0°C ice into 0°C water in an insulated container, what will the net result be?

- (A) More ice will melt
 - (B) More water will freeze
 - (C) The amounts of water and ice will remain the same
 - (D) The temperature will drop below 0°C
-

7. 1 atomic mass unit (amu) is equivalent to:

- (A) 1.66×10^{-24} kg
 - (B) 1.67×10^{-27} kg
 - (C) 9.11×10^{-31} kg
 - (D) 1.66×10^{-25} kg
-

8. A 12V battery, a 12Ω resistor and a 4Ω resistor are connected in series. The voltage across the 12Ω resistor is how many times the voltage across the 4Ω resistor?

- (A) Equal to
 - (B) Two times
 - (C) Three times
 - (D) Four times
-

9. A straight section PQ of a circuit lies along the x-axis from $x = -a/2$ to $x = +a/2$ and carries a steady current i . The magnetic field due to the section PQ at a point $x = +a$ will be

- (A) Maximum
 - (B) Minimum but non-zero
 - (C) Equal to zero
 - (D) Infinite
-

10. If p is the hole concentration, n is the electron concentration and n_i is the intrinsic concentration, then at thermal equilibrium, the mass action law in semi-conductors states that

- (A) $n + p = n_i$
 - (B) $n \cdot p = n_i^2$
 - (C) $n \cdot p = n_i$
 - (D) $n/p = n_i$
-

11. Area of the greatest rectangle that can be inscribed in the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ is

- (A) ab
 - (B) $2ab$
 - (C) $3ab$
 - (D) πab
-

12. The number of integral values in the range of the function $f(x) = \sin^{-1} x - \cot^{-1} x + x^2 + 2x + 6$ is

- (A) 6
- (B) 7
- (C) 8
- (D) 9

13. The largest positive term of the harmonic progression whose first two terms are $2/5$ and $12/23$ is

- (A) 4
- (B) 5
- (C) 6
- (D) 12

14. If $|a + b| < |a - b|$, then the angle between a and b can lie in the interval

- (A) $[0, \pi/2)$
- (B) $(\pi/2, 3\pi/2)$
- (C) $(0, \pi)$
- (D) $(\pi, 2\pi)$

15. Perpendicular distance of the point P (3, 5, 3) from Y-axis is

- (A) $3\sqrt{2}$ units
- (B) $\sqrt{34}$ units
- (C) $\sqrt{18}$ units
- (D) 5 units

16. The solution of the differential equation $\frac{dy}{dx} = e^{x-y} + 1$ is

- (A) $e^{x-y} = x + c$
- (B) $e^{y-x} = x + c$
- (C) $e^{-x+y} = x + c$
- (D) $e^{x+y} = x + c$

17. The equation of the curve passing through (3, 9) satisfies $\frac{dy}{dx} = x + \frac{1}{x^2}$.

- (A) $6xy = 3x^3 + 29x - 6$
- (B) $6xy = 3x^3 - 29x + 6$
- (C) $xy = x^3 + 29x - 6$
- (D) $6y = 3x^2 + 29x - 6$

18. Two identical metal block with charges $+2Q$ and $-Q$ are separated by some distance, and exert a force F on each other. If the blocks are brought into contact and then separated to the same distance, the force between them then will be.

- (A) $F/2$
- (B) $F/4$
- (C) $F/8$
- (D) $F/16$

19. Proton and electron are heated at $25^{\circ}C$ and then cooled in the process of cooling. If they are maintained at the same temperature, which particle will have a larger de Broglie wavelength?

- (A) Proton
 - (B) Electron
 - (C) Both will have the same wavelength
 - (D) Cannot be determined
-