

**BJNP***Learning with the Speed of Mumbai and the Tradition of Kota***Max Marks: 60****Date: 09.10.2022****JB 1 MR BATCH
CHEMISTRY : DCT****Topic: Atomic Structure (Till lecture 3) + Mole Concept (Full)**

1. The effective neutron capture radius of a nucleus having a cross-section of 1.0 barn is
[Given, 1 bam = $1.0 \times 10^{-24} \text{ cm}^2$]
(a) $5.6 \times 10^{-13} \text{ cm}$ (b) $4.3 \times 10^{-13} \text{ cm}$ (c) $2.3 \times 10^{-11} \text{ cm}$ (d) $5.6 \times 10^{-24} \text{ cm}$
2. The argument which favours the particle nature of cathode rays is
(a) they produce fluorescence
(b) they travel through vacuum
(c) they get deflected by electric and magnetic fields
(d) they cast shadows of objects present in their way
3. Magnitude of deflection of cathode rays in discharge tube is more when
(a) magnitude of charge of the particle is more
(b) greater interaction with the electric or magnetic field
(c) less mass of the particle
(d) all the above
4. A neutral atom (Atomic no. > 1) consists of
(a) Only protons (b) Neutrons + protons
(c) Neutrons + electrons (d) Neutron + proton + electron
5. Atoms have a mass of the order
(a) 10^{-28} (b) 10^{-15} kg (c) 10^{-26} g (d) 10^{-15} g
6. The ratio of charge and mass would be greatest for
(a) Proton (b) Electron (c) Neutron (d) α particle

Space for Rough Work



7. Cathode rays are
 - (a) electromagnetic waves
 - (b) radiation
 - (c) stream of alpha particles
 - (d) stream of electrons
8. The fraction of volume occupied by the nucleus with respect to the total volume of an atom is
 - (a) 10^{-15}
 - (b) 10^{-5}
 - (c) 10^{-30}
 - (d) 10^{-10}
9. In the following reaction:
 $3\text{Fe} + 4\text{H}_2\text{O} \longrightarrow \text{Fe}_3\text{O}_4 + 4\text{H}_2$, if the atomic weight of iron is 56, then its equivalent weight will be:
 - (a) 42
 - (b) 21
 - (c) 63
 - (d) 84
10. Sulphur forms the chlorides S_2Cl_2 and SCl_2 . The equivalent mass of sulphur in SCl_2 is
 - (a) 8 g/mol
 - (b) 64.8 g/mol
 - (c) 16 g/mol
 - (d) 32 g/mol
11. One gram of hydrogen is found to combine with 80 g of bromine. One gram of calcium (valency = 2) combines with 4 g of bromine the equivalent weight of calcium is
 - (a) 10
 - (b) 40
 - (c) 20
 - (d) 80
12. 250 ml of a sodium carbonate solution contains 2.65 g of Na_2CO_3 . If 10 ml of this solution is diluted to 1 L, what is the concentration of the resultant solution (mol. wt. of $\text{Na}_2\text{CO}_3 = 106$)?
 - (a) 0.1 M
 - (b) 0.01 M
 - (c) 0.001 M
 - (d) 10^{-4} M
13. Number of molecules in 100 ml of each of O_2 , NH_3 and CO_2 at STP is
 - (a) In the order $\text{CO}_2 < \text{O}_2 < \text{NH}_3$
 - (b) In the order $\text{NH}_3 < \text{O}_2 < \text{CO}_2$
 - (c) $\text{NH}_3 = \text{CO}_2 < \text{O}_2$
 - (d) The same
14. One litre of a gas at STP weight 1.16 g it can possibly be
 - (a) O_2
 - (b) CO
 - (c) C_2H_2
 - (d) CH_4
15. 250 ml of a sodium carbonate solution contains 2.65 g of Na_2CO_3 . If 10 ml of this solution is diluted to 1 L, what is the concentration of the resultant solution (mol. wt. of $\text{Na}_2\text{CO}_3 = 106$)?
 - (a) 0.1 M
 - (b) 0.01 M
 - (c) 0.001 M
 - (d) 10^{-4} M

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JB 1 MR BATCH
MATHEMATICS : DAILY CLASS TEST
Topics: Permutation and Combination

16. How many different arrangements can be made out of the letters in the expansion $A^2B^3C^4$, when written in full?
- (a) $2! 3! 4!$ (b) $2! + 3! + 4! (2! 3! 4!)$
- (c) $\frac{9!}{2! + 3! + 4!}$ (d) $\frac{9!}{2! 3! 4!}$
17. The number of proper divisors of 1800 which are also divisible by 10, is
- (a) 34 (b) 18 (c) 27 (d) None of these
18. A parallelogram is cut by two sets of m lines parallel to its sides. The number of parallelogram, then formed is
- (a) $({}^{m+2}C_2)^2$ (b) $({}^{m+1}C_2)^2$ (c) $({}^mC_2)^2$ (d) None of these
19. A person is permitted to select at least one and at most n cross from a collection of $(2n + 1)$ distinct coins. If the total number of ways in which he can select coins is 255, then x equals
- (a) 32 (b) 16 (c) 8 (d) 4
20. Total number of positive integral solutions of $15 < x_1 + x_2 + x_3 \leq 20$, is equal to
- (a) 1245 (b) 685 (c) 1025 (d) None of these
21. If in a chess tournament each contestant plays once against each of the others and in all 45 games are played, then the number of participants is
- (a) 15 (b) 10 (c) 9 (d) None of these
22. ${}^nC_r + {}^nC_{r-1} + {}^nC_{r-2} =$
- (a) ${}^{n+1}C_{r-1}$ (b) ${}^{n+2}C_r$ (c) ${}^{n+2}C_{r+1}$ (d) ${}^{n+1}C_r$

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23. A man has 7 friends. In how many ways he can invite one or more of them for a tea party
(a) 256 (b) 130 (c) 127 (d) 128
24. A library has a copies of one book, b copies of each of two books, c copies of each of three books and single copy of d book. The total number of ways in which these books can be distributed is
(a) $\frac{(a + 2b + 3c + d)}{a!(b!)^2(c!)^2}$ (b) $\frac{(a + 2b + 3c + d)!}{a!b!c!}$ (c) $\frac{(a + b + c + d)!}{a!b!c!}$ (d) None of these
25. The number of lines drawn through 6 points lying on a circle, is
(a) 12 (b) 15 (c) 24 (d) 20
26. The sum of proper divisors of 72 (1 and 72 are exclude) is equal to
(a) 194 (b) 195 (c) 122 (d) None of these
27. The values of $\frac{1}{2^{n+1}C_r} + \frac{1}{2^{n+1}C_{r+1}}$ is equal to
(a) $\frac{2n+2}{2n+1} \cdot \frac{1}{2^n C_r}$ (b) $\frac{1}{2^n C_r}$ (c) $\frac{1}{2^n C_{r+1}}$ (d) None of these
28. Total number of divisors of 480, that are of the form $4n + 2$, $n \geq 0$, is equal to
(a) 4 (b) 2 (c) 3 (d) None of these
29. Number of zeroes at the end of $300!$ is equal to
(a) 98 (b) 74 (c) 89 (d) 75
30. A box contains two white balls, three black balls and four red balls. In how many ways can three balls be drawn from the box if at least one black ball is to be included in the draw?
(a) 46 (b) 64 (c) 45 (d) None of these

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CHEMISTRY : DCT ANSWER KEY
Topic: Atomic Structure (Till lecture 3) + Mole Concept (Full)

1.	(a)	2.	(c)	3.	(d)	4.	(d)	5.	(a)
6.	(b)	7.	(d)	8.	(a)	9.	(b)	10.	(c)
11.	(c)	12.	(c)	13.	(b)	14.	(c)	15.	(c)

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MATHEMATICS : DCT ANSWER KEY
Topics: Permutation and Combination

16.	(d)	17.	(b)	18.	(a)	19.	(d)	20.	(b)
21.	(b)	22.	(b)	23.	(c)	24.	(a)	25.	(b)
26.	(c)	27.	(a)	28.	(a)	29.	(b)	30.	(b)