JB 2 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 = 1.0×10^{-24} cm^2]

   (a) 5.6×10^{-13} cm   (b) 4.3×10^{-13} cm   (c) 2.3×10^{-11} cm   (d) 5.6×10^{-24} 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

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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. The number of oxygen atoms in 4.4 g of CO_2 is approx.
    (a) 6×10^{22}
    (b) 1.2×10^{23}
    (c) 6×10^{23}
    (d) 12×10^{23}

10. The mass of 112 cm^3 of CH_4 gas at STP is
    (a) 0.08 g
    (b) 0.8 g
    (c) 0.16 g
    (d) 1.6 g

11. 7.5 grams of a gas occupy 5.8 liters of volume at STP the gas is
    (a) CO_2
    (b) N_2O
    (c) CO
    (d) NO

12. One liter 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

13. What is the normality of a 1 M solution of H_3PO_4?
    (a) 3.0 N
    (b) 1.0 N
    (c) 2.0 N
    (d) 0.5 N

14. The molality of a H_2SO_4 solution is 9. The weight of the solute in 1 kg H_2SO_4 solution is:
    (a) 900 g
    (b) 469 g
    (c) 882 g
    (d) 9 g

15. Equivalent weight of $KMnO_4$ acting as an oxidant in acidic medium is
    (a) The same as its molecular weight
    (b) Half of its molecular weight
    (c) One-fifth of its molecular weight
    (d) One-third of its molecular weight

Space for Rough Work

Max. Marks: 60   **Date: 09.10.2022**

JB 2 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) $\dfrac{9!}{2! + 3! + 4!}$

(d) $\dfrac{9!}{2! \, 3! \, 4!}$

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) $(^{m}C_2)^2$ (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 be 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) $^{n+1}C_r$

Space for Rough Work

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) $\dfrac{(a + 2b + 3c + d)}{a!(b!)^2(c!)^2}$ (b) $\dfrac{(a + 2b + 3c + d)!}{a!b!c!}$ (c) $\dfrac{(a + b + c + d)!}{a!b!c!}$ (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 $\dfrac{1}{^{2n+1}C_r} + \dfrac{1}{^{2n+1}C_{r+1}}$ is equal to

    (a) $\dfrac{2n + 2}{2n + 1} \cdot \dfrac{1}{^{2n}C_r}$ (b) $\dfrac{1}{^{2n}C_r}$ (c) $\dfrac{1}{^{2n}C_{r+1}}$ (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

Space for Rough Work

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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.	(a)
11.	(d)	12.	(c)	13.	(a)	14.	(b)	15.	(c)

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JB 2 MR BATCH
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)