SINCE 1984

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STUDY CENTRE, PALA

KEAM 2025

25/04/2025

VIDEO SOLUTION

SCAN ME

MEMORY BASED QUESTIONS

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PHYSICS

1. The ratio of distance of sun from the earth to that of moon from the earth is in the order

2. Which of the following statement is incorrect

   A) Work energy theorem is not independent of Newton's 2nd law

   B) Work energy theorem applies to all inertial objects

   C) Work done by frictional force along a cyclic path is zero

   D) Work done is a scalar quantity

3. The dimensional formula of product of moment of inertia and square of angular velocity

4. Two radiation having wavelength λ and $4\frac{\lambda}{3}$ incident on a metal surface. Kinetic energy of electron emitted is E and 4E respectively. What is the ratio of their work function

5. If the kinetic energy decreases by 49%, what is the percentage change in speed

6. When a rectangular coil having length '0' and breadth 'b' are placed perpendicular to the magnetic field. The torque experienced by coil is

7. The ratio of angular velocity of two satellites at a distance r and 2r from centre of earth

8. Ratio of wavelength of a particle with energy E and 3E respectively

9. What is true for a full wave rectifier?

   i) Current passes through +ve diode only

   ii) Current passes through -ve diode

   iii) Current passes both +ve and -ve diode

10. Which of the following statement is / are correct

    i) Both f_s and f_k independent of area

    ii) f_s depends on area

    iii) f_k depends on area

    (f_s, f_{hr} are static frictional force and kinetic frictional force)

12. The transition of an atom from $n = \infty + 0$ $n = 3$ represents

    i) Shortest wavelength of paschen series

    ii) Longest wavelength of paschen series

    iii) Shortest wavelength of Balmer series

13. 3 identical resistors are connected as triangle ABC . Voltage across AB = 12V. Find ratio of current through AB ACB

14. If maximum height and range are equal in projectile motion, then $\tan\theta =$ .....

15. If young's modulus and densities are in the ratio 3 : 2 and 3 : 1 respectively ratio of velocity of sound is

16. The wavelength of body radiation having maximum energy is λ_m at temperature T. If the wavelength of radiation corresponds to maximum energy is $\frac{\lambda}{3}$, then temperature is

17. Dimensional unit of product of momentum of inertia and angular momentum

18. A body drop from rest from the top of a tower passes through 28^{th} floor and 4^{th} floor in 3s and 5s respectively. Find the distance between the floor

19. A planet rotating about its own axis and around the sun in a circular orbit will not have

    A) Rotational k.E

    B) Potential Energy

    C) Vibrational Energy

    D) moment of inertia

    E) Angular momentum

20. Mobility of electrons $\bar{e}$

21. The angular velocity of minute hand and second hand

22. μ_s and μ_k are static and kinetic friction, then

    A) $\mu_k >$ maximum value of μ_s

    B) μ_s is opposing impending motion

    C) μ_s depends on area

    D) Both doesn't depend on area

23. Two equal capacitors are given initially 4C charge. Later charge -2C is given to one and 2C given to other. Ratio of potential

24. When planet revolves around earth. Which of the following quantity remain unchanged.

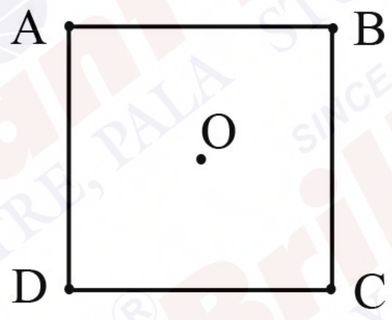
25. The number of photon of wavelength 622 nm emitted per second from the light source having power 150 W

26. Mean free path is inversely proportional +0 (n = number density, d = diameter of particle

A) $\frac{1}{n^2}$ B) $\frac{1}{\sqrt{n}}$ C) $\frac{1}{d^2}$

27. Angular fringe width is USE if distance between slit is halved

28. 4 masses are placed at 4 corner of square ABCD. If one mass is removed from the corner B. Then centre of mass lies in the line joining



A) OA B) OB C) OD D) OC

29. Find object distance of concave mirror of R = 24 cm which gives magnification of 3

30. mean free path is inversely proportional to

31. Given same 3 resistors connected to form a ΔABC. If 12V is connected across AB the ratio of effective resistance of ACB to AB

32. If initial no. of reacting molecules in a radioactive decay is N, find the number of molecules reacted after 5 half life

33. A charge q is placed inside a cavity in metal sphere. Inside cavity

A) E = 0 V = 0

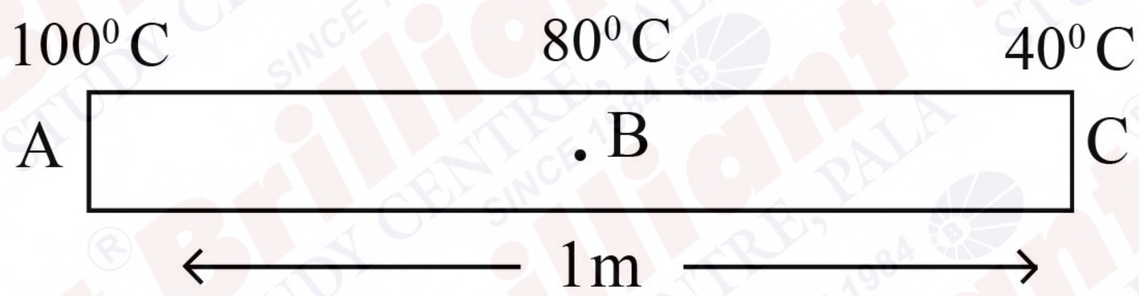
B) E = 0 $V \neq 0$

C) $E \neq 0$ $V \neq 0$

D) $E \neq 0$ V = 0

34. Velocity of man swimming along the flow of river is 10km/h and against the flow is 6 km/hr. Velocity of man in still water is

35. The ratio of rate of heat flow through AB and BC



36. Product of P and V of an ideal gas related to translational part of internal energy E as

37. Biot Savart law is proportional to

38. If the torque on electric dipole placed with 30^0 to electric field is τ, then what will be the torque if it is placed 45^0 with electric field.

39. Rectangular loop of side a and b carrying current I is placed perpendicular to magnetic field. What will be the magnetic moment.

40. Moment of inertia of solid sphere having mass M and radius R about an axis passing through diameter is I. Moment of inertia of sphere of mass 2M and radius 2R is

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CHEMISTRY

1. The transition of an atom from $n = \alpha$ to n = 3 represents
   A) shortest wavelength of paschen series
   B) longest wavelength of paschen series
   C) Shortest wavelength of Balmer series
2. The IUPAC name of $[Co(en)_3]_2(SO_4)_3$ is
3. Ethyl alcohol on reaction with H_2SO_4 at 413K give
4. 4 magnetic moment is 3.87BM. find the number of unpaired electrons?
5. Which has high boiling point
   a) ethanol b) propanol
6. Which is the strongest acid?
   A) Formic acid B) Fluroacetic acid C) Dichloro acetic acid
   D) Acetic acid
7. What is incorrect for Bond order
   A) Represents the number of bonds present between a compound /molecule
   B) Bond order decreases with bond energy
   C) Bond order increases with Bond energy
   D) Bond order inversely proportional to bond length

9. Write the product of the reaction
   $CH_3 - CH_2 - (CH_2)_3 - ONa + C_2H_5Br \rightarrow$
10. The order of reactivity of the given compound towards S_N2 reaction

    i) $C_6H_5 - \underset{\displaystyle C_6H_5}{\underset{|}{CH}} - Br$ ii) $C_6H_5 - \underset{\displaystyle CH_3}{\underset{|}{CH}} - Br$ iii) $C_2H_5 - CH_2 - Br$ iv) $C_2H_5 - CH_2 - Br$

11. IUPAC name of the compound is
    $HO - CH_2 - (CH_2)_3 - CH_2 - CO - Br$
12. Which element doesnot show variable oxidation state
13. What is the debrogile wavelength of a particle having kinetic energy 2E
14. Which of the following are neutral
    a) KF b) KBr C) NaCl D) $Na(NO_3)_2$
15. Hindsberg reagent is
16. Bromoethene on reaction with Na and dry ether gives?
    a) n propane b) n - butane c) isopropane
17. Formula of chromium ore?
18. Bromoethene react with H_2SO_4 in 413K gives?
19. Find log K value, if $\Delta G = -11.4$ and $2.303RT = 5.7 \times 10^3$
20, Hydration enthalpy of sucrose
21. Which orbital represents n = 4 and $l = 2$
    A) 4d
22. Complex with dsp^2 hybridisation
    A) $[Ni(CN)_4]^{2-}$ B) BF_4^-
23. In which of the following X - Y interaction is less than X –X and Y - Y interaction
    A) Chloroform + acetone B) phenol + aniline C) HNO_3 + water
24. Find half life of a first order reaction if $K = 2.31 \times 10^5\ s^{-1}$

25. Arrange the following elements in the decreasing order of metallic character?
Na, Al, Si, P

26. Find the mass of solute to make 0.5 molar 250ml solution (molar mass = 40)?

27 . The actinide that can show +7 oxidation state

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MATHEMATICS

1. $\cot^{-1}(1) + \cot^{-1}(2) + \cot^{-1}(3) =$

2. If $|\vec{a}| = 5, |\vec{b}| = 8, |\vec{a} - \vec{b}| = 7$ find angle between $\vec{a}$ and $\vec{b}$

3. The value of $i^3 + i^4 + i^5 + ... + i^{93}$ is

4. Imaginary part of $\left(\frac{3-2i}{2i}\right)^2 =$

5. $\int \frac{\sec^2\sqrt{2x+5}}{\sqrt{2x+5}}dx =$

6. If $|\vec{a}| = 3, |\vec{b}| = 2$. Find $(3\vec{a} - 2\vec{b}).(3\vec{a} + 2\vec{b})$

7. $\int \frac{1}{x(x^4+1)}dx$

8. If n(A) = 7 and number of relations from A to B is 128. Then n(B) =

9. If $\cos^{-1}x - \sin^{-1}x = \frac{\pi}{6}$, then x =

10. $\frac{3\tan 15^0 - \tan^3 15^0}{1 - 3\tan^2 15^0}$

11. If $Z_1 = \frac{1}{2} + \frac{\sqrt{3}}{2}i$ and $Z_2 = -\frac{1}{2} - \frac{\sqrt{3}}{2}i$ and $w = Z_1 + \bar{Z}_2$ find w?

12. Term independent of x in $\left(2x - \frac{5}{x^2}\right)^6$

13. If U is the universal set with 2S elements, $n(A \cup B) = 20, n(A) = 14, n(B') =$

14. $\int \frac{\sin 4x}{\sin 2x}dx =$

15. If $x = \frac{\sin^2\theta}{\tan\theta - \sec\theta}$ and $y = \frac{\sec\theta + \tan\theta}{\sec^2\theta}$ then $\frac{y}{x}$

16. $\int \frac{e^x}{e^{-x} - 3e^x}dx =$

17. If ABCD is a recatangle, $\overrightarrow{AB} = 5\hat{i} + 4\hat{j} - 3\hat{k}$ and $\overrightarrow{AD} = 3\hat{i} + 2\hat{j} - \hat{k}$, then find $\overrightarrow{BD}$

18. If a box has 8 red balls, to white balls, 17 black balls. If two balls are taken one by one without replacement, then the probability of taking one red ball and one black ball is

19. $\int_0^2 \frac{x^4}{x^4 + (2-x)^4}dx =$

20. If $X = A^{-1}B, A = \begin{bmatrix} 1 & 2 \\ -1 & 1 \end{bmatrix}, B = \begin{bmatrix} 3 \\ 6 \end{bmatrix}, x = \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$. Find $x_1 + x_2$

21. $(1+i)^{10} =$

22. Solve $(1 + y)\,dx = (1 + x)\,dy$

23. $\int_0^{\pi} \frac{\tan x}{\cos x} dx =$

24. $\int_{-1}^{1} |x-3| dx =$

25. Find the area of triangle formed byx – 4, y = –4 and y = x

26. The number of 5 digit numbers that can be formed using the digits 0 and 1 is

27. $\lim_{x \to 11} \left[\frac{x-11}{\sqrt{49+x^2}-13} \right]$

28. $\sum_{k=0}^{n+1} {}^{n+1}C_k = 512$, then $\sum_{k=0}^{n} {}^{n}C_k =$

29. If $a_1, a_2 \ldots a_{10}$ are in G.P, $a_1 + a_2 = 6$ and $a_9 + a_{10} = \frac{3}{128}$ find the common ratio

30. S={a, b, c, d, e, f}. Then the total number of subsects with odd number of elements

31. If a, b, c are in G.P, abc = 27, a + c =10 find $a^2 + b^2 + c^2$

32. $\lim_{x \to 0^+} 2[x] - \frac{x}{|x|}$

33. If $a_n = 2^{n-1}$, n = 1,2, 3.... then $\sum_{n=1}^{20} a_n =$

34. If a_1, a_3, a_3 are in G.P then $\begin{vmatrix} a & ar & 1 \\ ar^2 & ar^3 & 1 \\ ar^5 & ar^6 & 1 \end{vmatrix} =$

35. Find the domain of $f(x) = \sqrt{7-11x}$

36. If $f(x) = \frac{\sqrt[3]{x^4}}{\sqrt{x^2}}$, find $f'(27)$

37. If $\tan\left(\alpha - \frac{\pi}{12}\right) = \frac{1}{\sqrt{3}}$, find α ?

38. Area bounded by $\frac{x^2}{16} + \frac{y^2}{25} = 1$ and line joining (0, 5) and (4, 0) is

39. $\cos^{-1}(2\sin\alpha) = \frac{47}{12}$, find α ?

40. $\sin 60^0 - \sin 80^0 + \sin 100^0 - \sin 120^0$

41. $\frac{dy}{dx} + \frac{2x}{1+x^2} \times y = x$, then integrating

42. Two numbers m and n are selected from {11, 13, 14, 35, 36, 72} then find the probability that mn is odd

43. $\frac{8}{4} \times 7P_3 =$

44. Equation of parabola having focii(–3, 1) and (3, 1)

45. $y = \sec(\tan^{-1}x)$, find $\frac{dy}{dx}$ at $x = \sqrt{3}$

46. If $Z = \alpha x + 2y$ has maximum value for points on the line joining (20, 0) and (10, 15) subject to $3x + 2y \leq 60$, $x + 3y \leq 40$ x,y=0. Find α?

47. If $f(x) = \frac{1}{x^2}$, $u = f(x)\, f'(x)$ then $\frac{du}{dx}$

48. $\lim_{x \to 0} \frac{1+\cos 4x}{\tan_2^2 x} =$

49. $f(x) = e^x (2x^2 + 9x + 2 – a)$ has a local maximumat x = 2. Find a?

50. The geometric mean of α, β is 6 α, β are roots of $2x^2 – 25x + \lambda = 0$. Find λ

51. Equation of parabola having focus (–3, 1) and vertex (1,)

52. x + y = 2 touches a circle with centre (0, 4) find radius

53. If $A = \begin{bmatrix} a & 1 & -a \\ 0 & 2 & -5 \\ 4 & 5 & 2 \end{bmatrix}$, find a if $|A| = 24$

54. $2x^2 + 2y^2 – 4y+10 = 0$, equation of line joining the centre and (–1, 2)

55. $\frac{2x-21}{11-x} \geq 3$, $x \neq 11$ then x belongs to