SINCE 1984

Brilliant®

STUDY CENTRE, PALA

JEE MAIN 2025

SESSION-1

SHIFT-2 EVENING

SCAN ME

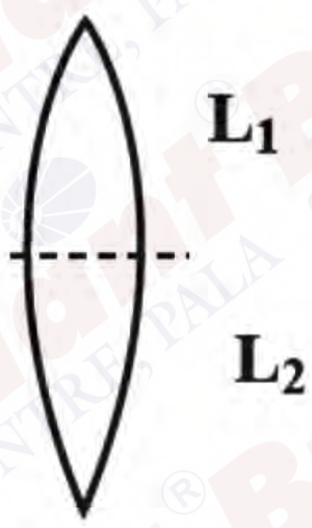
VIDEO SOLUTION

MEMORY BASED QUESTIONS

1. A solenoid of radius 10cm carrying current 0.29A and having total 200 turns. If magnetic field inside solenoid is 2.9×10^{-4}T. Find length of solenoid

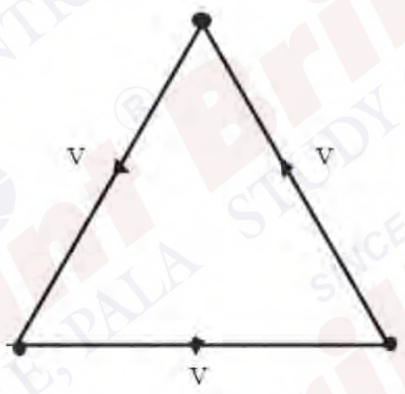
1) 6πcm 2) 8πcm 3) 4.5cm 4) 16cm

2. An equiconvex lens is cut in two ways as shown. If the focal length of the parts are as mentioned in the diagram. Find $\frac{L_1}{L_2}$



1) 2 2) 4 3) 1/2 4) 1/4

3.



1) $\frac{3mva}{2}$ 2) $\frac{2}{3}$mva 3) $\frac{\sqrt{3}}{2}$mva 4) $\frac{2}{\sqrt{3}}$mva

4. Match the physical quantities with their corresponding dimensions

Column I	Column II
A) Young's modulus	i) $[AL^2]$
B) Magnetic moment	ii) $[ML^2T^{-1}A^{-1}]$
C) Magnetic flux	iii) $[AL^{-1}]$
D) Magnetic intensity	iv) $[ML^{-1}T^{-2}]$

1) A -(iii), B - (i), C - (ii), D - (iii)
2) A- (iv), B- (ii), C - (i), D - (iii)
3) A - (iii), B - (i), C - (ii), D -(iv)
4) A - (iii), B -(ii), C - (i), D - (iv)

5. Two particles of same mass are performing SHM vertically with two different springs of spring constants K_1 and K_2. If amplitude of both is same. Find ratio of the maximum speed of two particles

1) $\sqrt{\frac{K_1}{K_2}}$ 2) $\sqrt{K_2K_1}$ 3) $\sqrt{\frac{K_2}{K_1}}$ 4) $\sqrt{\frac{K_1+K_2}{K_1-K_2}}$

6. A physical quantity Q is given as $Q = \frac{ab^4}{cd}$, if the percentage error is a,b,c and d are 2%, 1%, 2% and 1%, the % error in Q will be

1) 5% 2) 15% 3) 9% 4) 2%

7. Assertion: On increasing the pressure, the volume decrease in more in an isothermal proces than in an adiabatic process

Reason: Adiabatic process is given by PV^{γ}

1) Assertion is correct and Reason is false
2) Assertion is correct and Reason is correct
3) Assertion is false and Reason is correct
4) Assertion is false and Reason is false

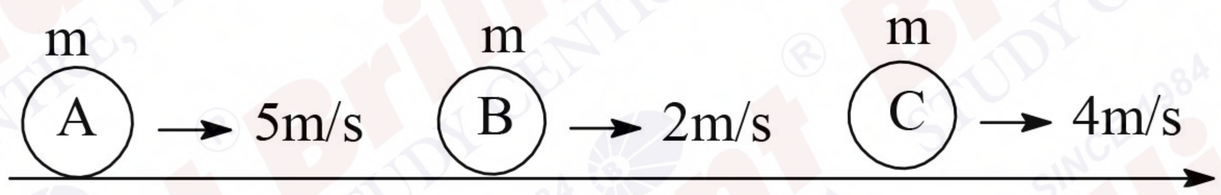
8. Two planet A and B are revolving around a massive star such that $r_A = 2r_B$ and $m_A = 4\sqrt{3}m_B$. Find ratio of angular momentum of planet B to planet A

1) $8\sqrt{3}$ 2) $\frac{1}{8\sqrt{3}}$ 3) $\frac{1}{2\sqrt{3}}$ 4) $\frac{1}{3\sqrt{2}}$

9. A capacitor $C_1 = 6\mu F$, initially charged with a cell of emf 5V is disconnected and connected to another capacitor $C_2 = 12\mu F$ which is initially neutral. The charges on C_1 and C_2 after connection are

1) $0\mu C, 30\mu C$
2) $10\mu C, 20\mu C$
3) $20\mu C, 10\mu C$
4) $30\mu C, 0\mu C$

10. Three particles of same mass are moving a shown. (all collisions are elastic)



S_1: After all collisions velocities are 4m/s, 2m/s and 5m/s
S_2: Velocities are get interchanged in elastic collision of same mass

1) S_1: Correct S_2: Correct
2) S_1: Incorrect, S_2: Correct
3) S_1: Incorrect, S_2: Incorrect
4) S_1: Correct, S_2: Incorrect

11. An electromagnetic wave propagates in +X - direction. Then, electric field and magnetic field are directed along

1) X,Y 2) Y,Z 3) Z, Y 4) Y, X

12. A converting lens of focal length 24cm, made of glass $(\mu_{glass} = 1.5)$ is immersed completely in water $(\mu_{water} = 1.33)$. It will now behave like a converging lens of focal length ——cm.

13. The truth table for the logical circuit shown below is

1)

A	B	Y
0	0	0
0	1	0
1	0	0
1	1	1

2)

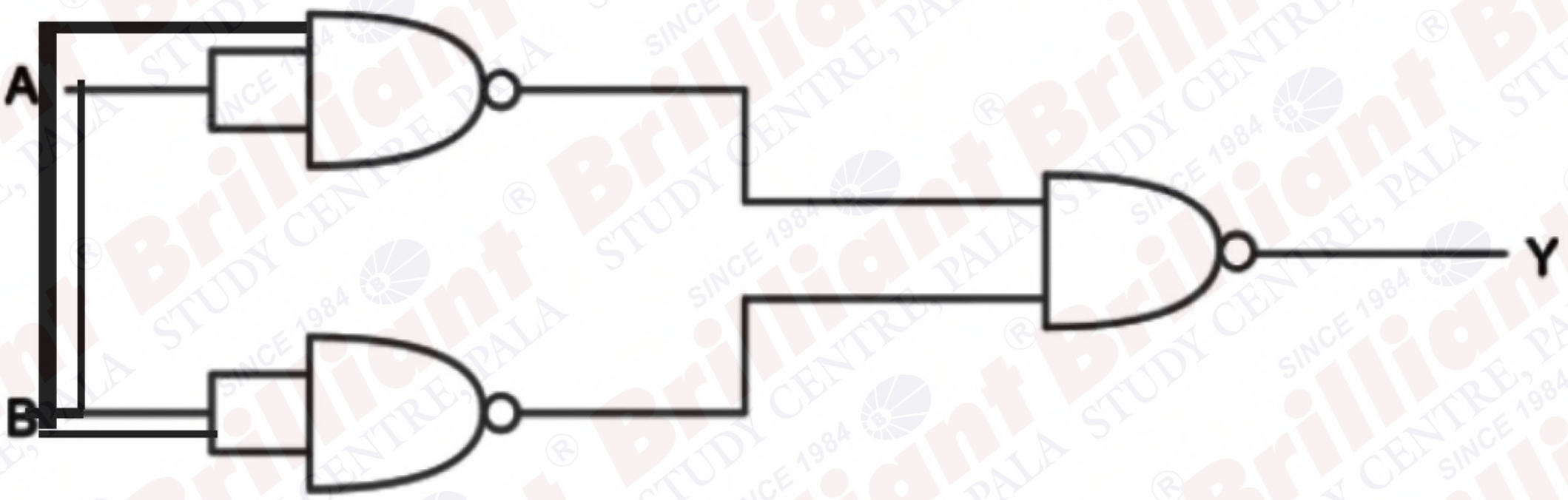
A	B	Y
0	0	0
0	1	1
1	0	1
1	1	0

3)

A	B	Y
0	0	0
0	1	1
1	0	1
1	1	1

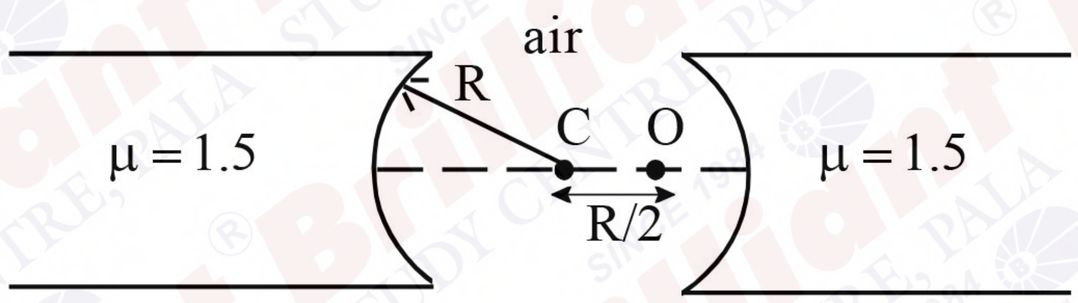
4)

A	B	Y
0	0	1
0	1	0
1	0	0
1	1	1



14. Figure shows two spherical surfaces of radius R having common centre. If the object is placed at O, find the distance between the first images formed by both the surfaces.

1) $\frac{4R}{35}$ 2) $\frac{4R}{27}$ 3) $\frac{4R}{70}$ 4) $\frac{2R}{35}$



15. A cup of coffee take a time 't' to cool from 90°C to 80°C in a surrounding of 20°C. If a similar cup of coffee is cooled from 80°C to 60°C in the same surrounding, it takes a time

1) $\frac{13t}{5}$ 2) $\frac{5t}{13}$ 3) $\frac{12t}{5}$ 4) 2t

16. A dipole is placed such that its axis is perpendicular to the infinite charged sheet. Select the correct options

a) $T_{net} = 0, F_{net}$ is along –ve x - axis

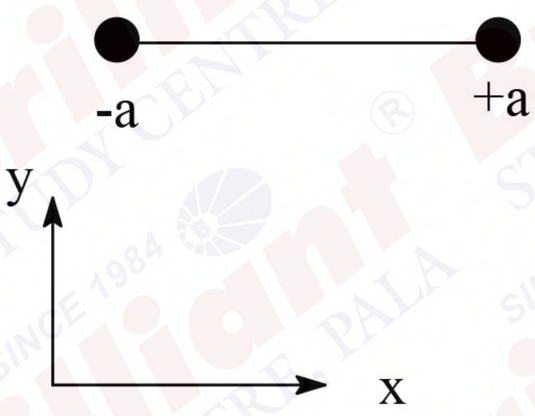
b) $T_{net} = 0$, U = min

c) $T_{net} = 0$, $F_{net} = 0$

d) T_{net} and U both are maximum

1) (a), (b), (c) and (d) 2) (b) and (c)

3) (a) and (c) 4) (b) and (d)



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29-01-2025 SHIFT 2-EVENING

MEMORY BASED QUESTIONS

CHEMISTRY

1. Which of the following form most stable carbocation?

1) $(Ph)_3 C.Br$ 2) $C_6H_5CH_2Br$

3) $C_6H_5CH(Br)CH_3$ 4) $CH_3CH_2CH_2Br$

2. 0.41 g of $BaSO_4$ is obtained from 0.2 g of organic compound in Carius method. What is the percentage of sulphur present in organic compound?

3. Number of σ and π bonds respectively in hex-1-en-yne are

1) 13, 3 2) 14, 3

3) 3, 14 4) 14, 13

4. Which element in group 15 lowest Ionisation Energy?

1) Bi 2) P

3) As 4) Sb

5. The number of benzenoid structural isomers having molecular formula C_9H_{12} which do not give Baeyer's reagent test is?

6. Consider the following thermochemical reactions and choose the correct option

$C(diamond) \rightarrow C(graphite) + xKJ$

$C(diamond) + O_2 \rightarrow CO_2 + yKJ$

$C(graphite) + O_2 \rightarrow CO_2 + zKJ$

1) $x = y + z$ 2) $x = y - z$

3) $x + y = z$ 4) $x + y = -z$

7. Which of the following will give azo dye test?

1) Aniline 2) Anisole

3) Benzene 4) Benzaldehyde

8. Total number of non-bonding electrons in NO_2^-

9. Which of the following is an essential amino acid?

1) Alanine 2) Glycine

3) Valine 4) Aspartic acid

10. A drug becomes ineffective when it decomposes to 50% its concentration. If 16 mg of said drug becomes 4 mg in 12 months, find the time in which drug becomes ineffective given that decomposition of drug follows first order kinetics

1) 6 months
2) 3 months
3) 2 months
4) 12 months

11. Which of the following gives predominantly O_2 on electrolysis among the following

A. Aq.$AgNO_3$ (Pt electrodes)

B. Aq.$AgNO_3$ (Ag electrodes)

C. Conc.H_2SO_4 (Pt electrodes)

D. Dilute H_2SO_4 (Pt electrodes)

1) AB
2) BC
3) ABC
4) AD

12. Determine the type of oxide formed by an element (A) which has smallest size among following

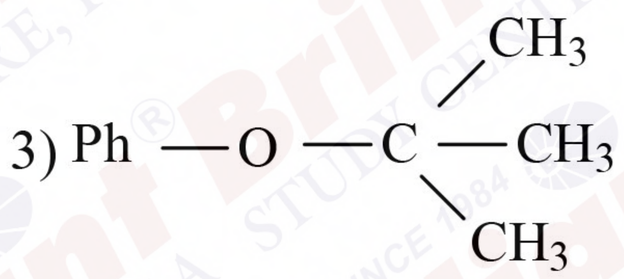
Li, Na, K, Be, B, Mg

1) A_2O_3
2) AO
3) AO_2
4) A_2O_2

13. Which of the following ether react with HBr to form phenol?

1) $Ph-CH_2-O-CH_2-CH_3$

2) $Ph-CH_2-OCH_3$

3) 

4) $Ph-CH_2-O-CH_2-Ph$

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29-01-2025 SHIFT 2-EVENING

MEMORY BASED QUESTIONS

MATHEMATICS

1. If the letters of the word 'KANPUR" are arranged in dictionary, then the 440^{th} word is

2. If 3^{107} is divided by 23, then remainder is

3. Let $a_{ij} = \left(\sqrt{2}\right)^{itj}$, $A = \left[a_{ij}\right]_{3\times1}$. If sum of A^2 is $\alpha+\beta\sqrt{2}$, then $\alpha+\beta$ is

4. Let $f(x) = \int_0^x t\left(t^2-3t+20\right)dtx \in (1,3)$ and range of f(x) is (α,β) then $\alpha+\beta$ is equal to

5. The value of the limit $\lim\limits_{x\to0}(\cos ex)\left(\sqrt{2\cos^2 x+3\cos x}-\sqrt{\cos^2 x+\sin x+4}\right)$ is

6. Let the line L be $\frac{x-1}{1}=\frac{y-4}{3}=\frac{z-7}{5}$ and foot of perpendicular from (1, –2, 1) to L is (α,β,γ) then $\alpha+\beta+\gamma$ is

7. If the exhaustive values of a for which the equation $2x^2 + (a-5)x + 15 = 3a$ has no real roots is (α,β), then $\left|4(\alpha+\beta)\right|$ is equal to

8. If $\log y = x\log\frac{2}{5}, x\in N\cup\alpha_0\}$. Then sum of all values of y equals to

9. Area enclosed between the curves $|y| = 1-x^2$ and $x^2+y^2=1$ is $(\pi-\alpha)$ sq. units then 9α is

10. There is an arithmetic progression $a_1, a_2, a_3 \ldots\ldots a_{2024}$ and $a_1+(a_5+a_{10}+a_{15}+\ldots. a_{2020})+a_{2024}=2233$. Find the value of $a_1+a_2+a_3+\ldots.+a_{2024}$

11. Two points (4, 2) and (0,2) lie on the circle whose centre lies on $3x+2y+2=0$, then length of chord whose mid-point is (1, 2) is

12. If a,β are the value s of m where

$$x+y+2z=1$$

$$x+2y+4z=m$$

$$x+4y+8z=m^2$$

have infinitely many solutions. Then $\sum_{n=1}^{10}\left(n^{\alpha}+n^{\beta}\right)$ is equal to

13. The value of $\int_0^{\pi/4}\left(\sin\left|\left(4x-\frac{\pi}{2}\right)\right|+\sin[2x]\right)dx$ is (where $[\bullet]$ denotes the greatest integer function)

14. If the domain of $\log_{x-1}\left(\frac{2x^2-9x+4}{x^2-4x+5}\right)$ is (α,∞) and $\log_5(18x-x^2-77)$ is (β,γ), then the value of $\alpha^2+\beta^2+\gamma^2$ is