SINCE 1984

Brilliant®

STUDY CENTRE, PALA

JEE MAIN 2025

SESSION-1

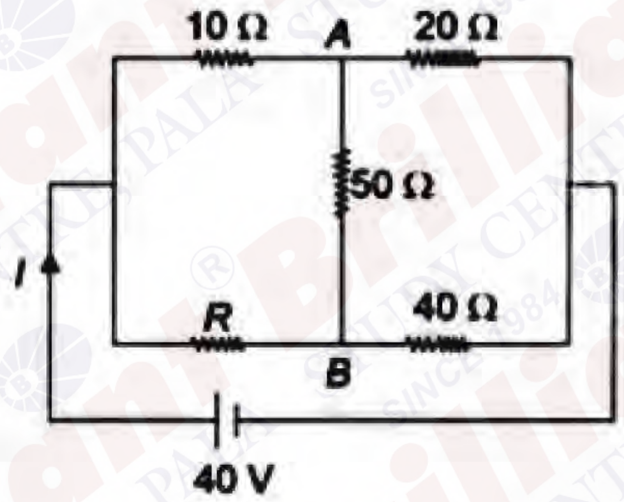
SHIFT-2 EVENING

SCAN ME

VIDEO SOLUTION

MEMORY BASED QUESTIONS

1. In the given circuit, find *I* if the potentials at A and B are equal



1) 1A 2) 2A 3) 3A 4) 4A

2. Bohr's model is applicable for single electrone atom of atomic number Z. Dependency of frequency of rotation of electyron in n^{th} principal quantum number is proportional to

1) Z/n^2 2) Z^2/n^3 3) n^3/Z 4) Z/n

3. For concave mirror, distance between object and image = 20cm and m = -3 find focal length

4. In an electromagnetic wave, the magnetic field is given as

$\vec{B}=\left(\frac{\sqrt{3}}{z}\hat{i}+\frac{1}{2}\hat{j}\right)30\sin(\omega t-kz)$, the corresponding electric field is

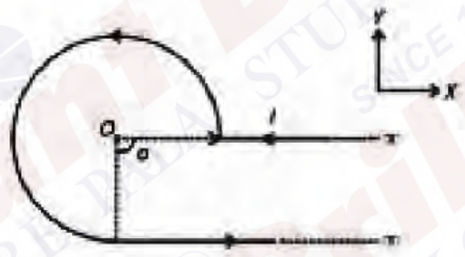
1) $\left(\frac{1}{2}\hat{i}+\frac{\sqrt{3}}{2}\hat{j}\right)9\times10^9\sin(\omega t-kz)$

2) $\left(\frac{1}{2}\hat{i}-\frac{\sqrt{3}}{2}\hat{j}\right)9\times10^9\sin(\omega t-kz)$

3) $\left(\frac{1}{2}\hat{i}+\frac{\sqrt{3}}{2}\hat{j}\right)9\times10^9\cos(\omega t-kz)$

4) $\left(\frac{1}{2}\hat{i}-\frac{\sqrt{3}}{2}\hat{j}\right)9\times10^9\cos(\omega t-kz)$

5. The magnetic field $\vec{B}$ at the centre O of the given arrangement is



1) $\frac{+\mu_0 I}{8\pi a}(3\pi+2)\hat{k}$ 2) $\frac{-\mu_0 I}{8\pi a}(3\pi+2)\hat{k}$ 3) $\frac{+\mu_0 I}{8\pi a}(3\pi-2)\hat{k}$ 4) $\frac{-\mu_0 I}{8\pi a}(3\pi-2)\hat{k}$

6. A cube of side 10cm having bulk modules of $1.4\times10^{11}\,Pa$ is placed in atmosphere. Now it is subjected to extra pressure of $7\times10^{6}\,Pa$ then magnitude of change in volume of cube is

1) 0.03 mL 2) 0.3 mL 3) 0.05 mL 4) 0.2 mL

7. In an electromagnetic wave, the magnetic filed is given as

$\vec{B}=\left(\frac{\sqrt{3}}{2}\hat{i}+\frac{1}{2}\hat{j}\right)30\sin(\omega t-kz)$, the corresponding electric field is

1) $\left(\frac{1}{2}\hat{i}+\frac{\sqrt{3}}{2}\hat{j}\right)9\times10^{9}\sin(\omega t-kz)$

2) $\left(\frac{1}{2}\hat{i}-\frac{\sqrt{3}}{2}\hat{j}\right)9\times10^{9}\sin(\omega t-kz)$

3) $\left(\frac{1}{2}\hat{i}+\frac{\sqrt{3}}{2}\hat{j}\right)9\times10^{9}\cos(\omega t-kz)$

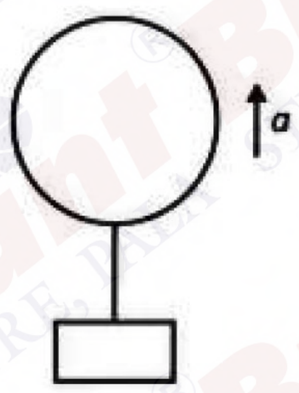
4) $\left(\frac{1}{2}\hat{i}-\frac{\sqrt{3}}{2}\hat{j}\right)9\times10^{9}\cos(\omega t-kz)$

8. Which of the following phenomenon is not explained by wave theory of light?

1) Reflection of light 2) Refraction of light

3) Diffraction 4) Compton effect

9. A balloon system having mass m is moving up with acceleration a, find the mass to be removed from it to have acceleration 3a. (Neglect the volume of mass attached)



1) $\frac{2ma}{3a+g}$ 2) $\frac{2ma}{2a+g}$ 3) $\frac{ma}{3a+g}$ 4) $\frac{ma}{g-3a}$

10. Mass M and radius R of a planet is related with mass M_e and Radius R_e of earth as $M_e = 8M_p$ and $R_e = 2R_p$. If escape speed for each is 11.2 km/sec, then escape speed for the planet is

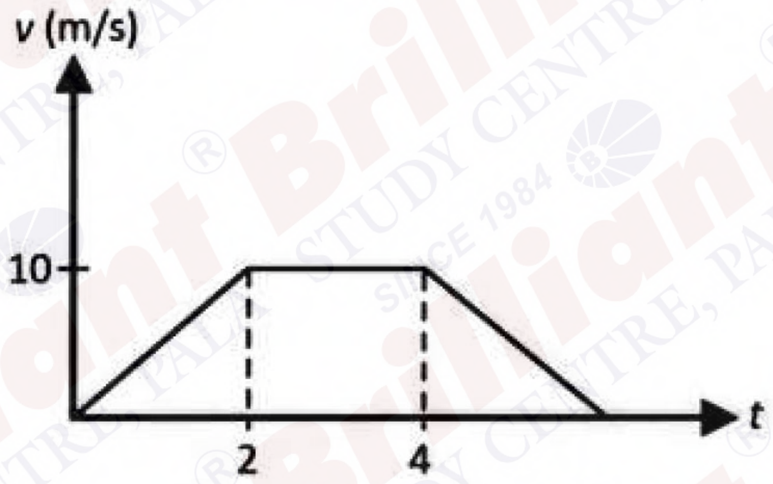
1) $11.2\sqrt{2}\,km/sec$ 2) $5.6\,km/sec$

3) $5.6\sqrt{2}\,km/sec$ 4) $11.2\,km/sec$

11. An equilateral triangle frame of side l is carrying current i, find magnetic field at its centroid

1) $\frac{3\mu_0 i}{4\pi\ell}$ 2) $\frac{3\mu_0 i}{\pi\ell}$ 3) $\frac{9\mu_0 i}{2\pi\ell}$ 4) $\frac{\mu_0 i}{\pi\ell}$

12. The velocity vs time graph of a particle moving along X-axis id plotted as shown. The distance travelled (in metre) by the particle in the interval t = 0 s to t = 4 s is



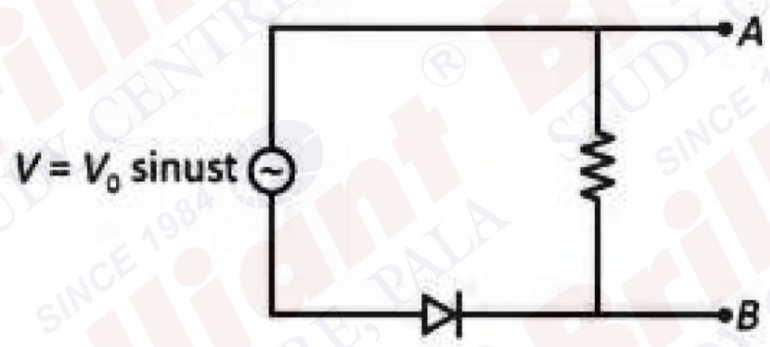
13. Find energy density of the capacitor if V = 20V, C = 1μF and distance between the plates is 1μm

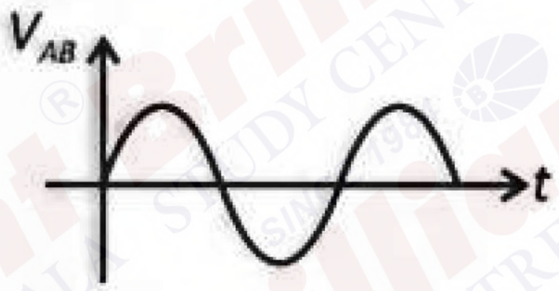
14. Choose the correct option representing the energy density between the plates of a parallel plate capacitor with plate area A, plate separation d and potential difference V.

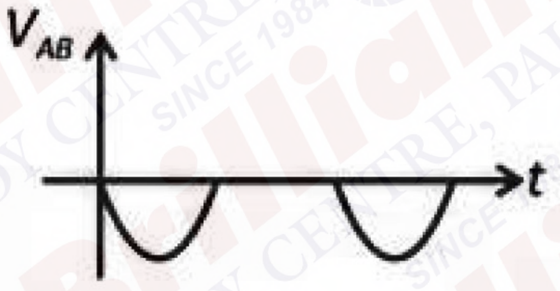
1) $\frac{\varepsilon_0 V^2}{2d^2}$ 2) $\frac{\varepsilon_0 Vd^2}{2}$

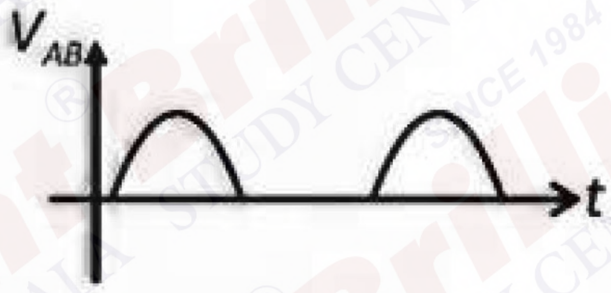
3) $\frac{\varepsilon_0 AV^2}{2d}$ 4) $\frac{\varepsilon_0 AV^2}{2d^2}$

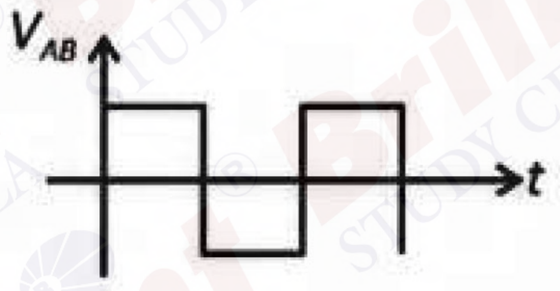
15. The correct variation of voltage across AB is given by (consider that the threshold voltage of the diode is very small)



1 

2 

3 

4 

16. An electric dipole of moment 6×10^{-6} cm is placed parallelly in electric field of strength 10^6 N/C. Work done required to rotate the dipole by 180^0 is X joules, then X is

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28-01-2025 SHIFT 2-EVENING

MEMORY BASED QUESTIONS

CHEMISTRY

1. Consider the following oxides,
V_2O_3, V_2O_4, and V_2O_5
Change in oxidation state of vanadium when amphoteric oxide reacts with acids to form VO_4, is
1) 1 2) 2 3) 3 4) 4

2. Which has maximum oxidising power among the following
1) VO_2^+ 2) $Cr_2O_7^{2-}$ 3) MnO_4^- 4) TiO_2

3. No. of paramagnetic species among the following is O_2, O_2^+, O_2^-, NO_2, NO, CO

4. How many of the following molecules are polar?
CH_4, CCl_4, CH_2Cl_2, H_2O, NH_3, H_2O_2, O_2F_2

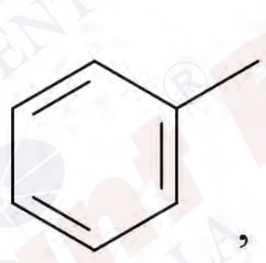
5. Calculate the spin magnetic moment of Mn_2O_3

6. Which of the following compound (s) is/are yellow in colour?
(a) CdS,(b) PbS, (c) CuS, (d) Zns (Cold), (e) $PbCrO_4$
Choose the correct answer from the options given below
1) (a), (c) and (e) only 2) (a) and (e) only 3) (b) and (d) only 4) (a), (b) and (e) only

7. The correct order of energy of the following subshell is
1s 2s 3p 3d
1) 1s < 2s< 3d < 3p 2) 2s < 1s < 3p < 3d 3) 1s < 3p < 2s < 3d 4) 1s < 2s < 3p < 3d

8. $CH_3 - C \equiv CH \xrightarrow[H_2]{Pd/C} (A) \xrightarrow[(ii)\,Zn, H_2O]{(i)\,O_3} (B) + (C)$

9. How many of the following will give Benzoic acid on oxidation with $KMnO_4$?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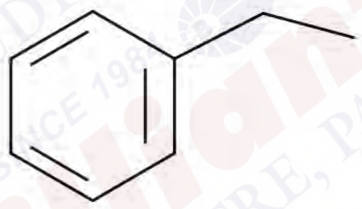
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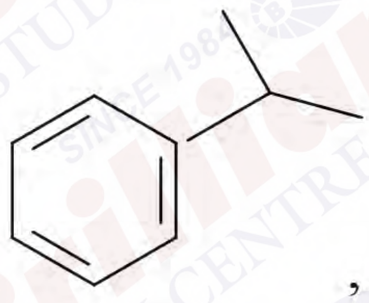
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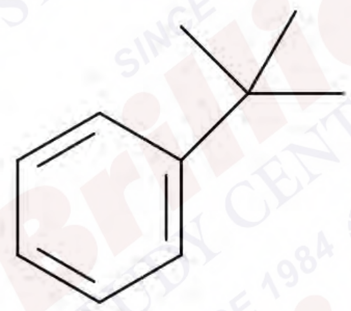
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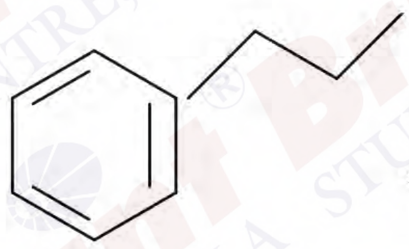
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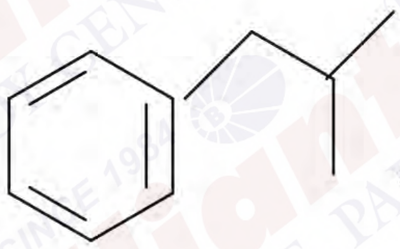
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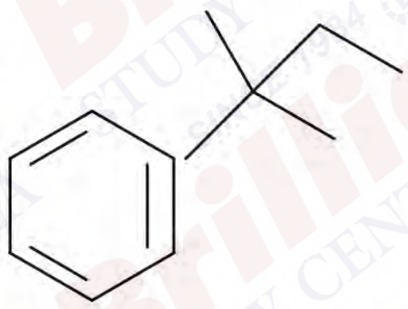
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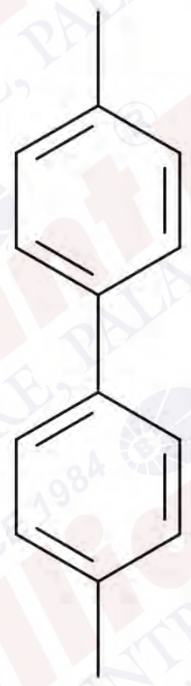
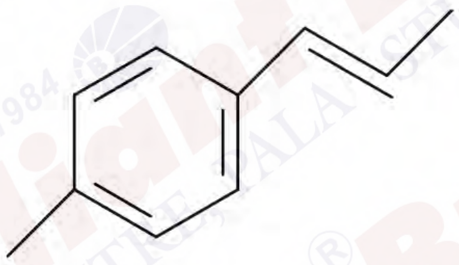


10. 
$\xrightarrow{HCl}$ (A) *Major* $\xrightarrow{AgCN}$ (B) *Major*

11. $CH_3 - C \equiv CH \xrightarrow[H_2]{Pd/C} (A) \xrightarrow[(ii)\,Zn, H_2O]{(i)\,O_3} (B) + (C)$

12. Bohr's model is applicable for single electron atom of atomic number Z. Dependency of frequency of rotation of electron in n^{th} principal quantum number is proportional to

1) Z/n^2 2) Z^2/n^3 3) n^3/z 4) Z/n

13. Which of the group - 15 element forms $d\pi - d\pi$ Bond and strongest basic hydrice?

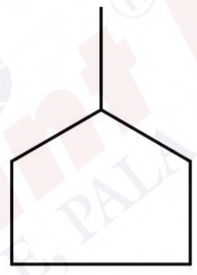
1) z = 7 2) z = 15 3) z = 33 4) z = 51

14. Which of the following complex is paramagnetic

1) $[NiCl_4]^{2-}$ 2) $[Ni(CO)_4]$ 3) $[Ni(CN)_4]^{2-}$ 4) $[Fe(CO)_5]$

15. 30gm HNO_3 is added to a solution to prepare 75% w/w solution having density 1.25g/mL. Volume of solution is

1) 32mL 2) 48mL 3) 36mL 4) 28mL

16. S-I  and  are ring chain isomers

S-II  NH_2 and  are functional isomers

1) Both S - I and S - II are correct statements
2) S- I is correct and S - II is not correct
3) S-I is wrong statement and S-II is correct statement
4) Both statement are correct

17. For an elementary reaction

$A + B \rightarrow C + D$

When volume becomes 1/3 rd, rate of reaction becomes

1) 8 times 2) 9 times 3) 6 times 4) 2 times

18. Match the following List - I with List - II

List I	List - II
A) $[COF_6]^{3-}$	i) sp^3d^2
B) $[CO(NH)_3)_6]^{3+}$	ii) d^2sp^3
C) $[NiCl_4]^{2-}$	iii) sp^3
D) $[Ni(CN)_4]^{2-}$	iv) dsp^2

Choose the correct answer from the options given below

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

19. The correct name of I & II in the following process is

Solid $\xrightarrow{I}$ *vapours* $\xrightarrow{II}$ *solid*

1) $I \rightarrow$ sublimation
II $II \rightarrow$ vaporisation

2) $I \rightarrow$ sublimation
$II \rightarrow$ Decomposition

3) $I \rightarrow$ sublimation
$II \rightarrow$ Deposition

4) $I \rightarrow$ Deposition
$II \rightarrow$ Sublimation

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28-01-2025 SHIFT 2-EVENING

MEMORY BASED QUESTIONS

MATHEMATICS

1. Set $f(x)=\int \frac{dx}{x^{1/4}\left(x^{1/4}+1\right)}$. If f(0) = – 6, then f(2) is

A) $4\left[\frac{1}{\sqrt{2}}-2^{1/4}+\ln\left|1+2^{1/4}\right|\right]-6$ B) $4\left[\frac{1}{\sqrt{2}}-2^{1/4}+\ln\left|1+2^{1/4}\right|\right]+6$

C) $4\left[\frac{1}{\sqrt{2}}+2^{1/3}+\ln\left|2^{1/4}\right|\right]-6$ D) $4\left[3+2^{1/3}-\ln 2^{1/4}\right]+6$

2. Evaluate $\sum_{r=1}^{13}\frac{1}{\sin\left[\frac{\pi}{4}+(r-1)\frac{\pi}{6}\right]\sin\left[\frac{\pi}{4}+\frac{r\pi}{6}\right]}$

A) $2\sqrt{3}+2$ B) $2\sqrt{3}-2$ C) $3\sqrt{2}+2$ D) $3\sqrt{2}-4$

3. Area bounded between the curves C_1 : $(1+y^2)-1=0$ and c_2: $y^2-2x=0$ is (in sq. unit)

A) $\frac{\pi}{2}-\frac{1}{3}$ B) $\frac{\pi}{4}-\frac{1}{6}$ C) $2\left(\frac{\pi}{2}-1/6\right)$ D) $\frac{\pi}{6}+\frac{1}{2}$

4. There are three bags such that bag, has 4 white, 6 blue, bag 2 has 6 white and 4 blue and bag 3 has 5 white and 5 blue balls. A bag is randomly selected and a ball is randomly picked out of it, it comes out to be white , then probability that selected bag was bag 2

A) $\frac{2}{5}$ B) $\frac{2}{15}$ C) $\frac{1}{15}$ D) $\frac{7}{15}$

5. If S is a set of words formed by all the letters of word "GARDEN", then find the probability that vowels are not in alphabetical order.

A) $\frac{1}{2}$ B) $\frac{1}{3}$ C) $\frac{1}{4}$ D) $\frac{1}{5}$

6. In isosceles triangle two sides are x + 2y = 4, x + y = 4, then the sum of all possible value of slope of third side of triangle is

A) $\frac{3}{2}$ B) $\frac{2}{3}$ C) $\frac{-3}{2}$ D) $\frac{-2}{3}$

7. If $x^2-(3-2i)x-(2i-2)=0$ has roots $\alpha+i\beta$ and $y-$ is. Find the value of $\alpha\gamma+\beta\delta$

8. Find domain of $\sec^{-1}\left(2[x]+1\right)$, where $[.]$ denotes GIF

9. 212, 213, ...999, find no. of numbers in the sequence above whose sum of digits is 15

10. $A=\begin{bmatrix}\frac{1}{2} & -2\\ 0 & 1\end{bmatrix}$

$P=\begin{bmatrix}\cos\theta & \sin\theta\\ \sin\theta & \cos\theta\end{bmatrix}$

$B = PAP^{T}$, $X = PB^{10}P^{T}$. Find $X = ?$

11. Let an ellipse $\frac{x^2}{a}+\frac{y^2}{4}=1$. If midpoint of chord is $\left(\sqrt{2},\frac{4}{3}\right)$. If length of this chord is $\frac{2\sqrt{\alpha}}{3}$. Find α ?

12. If $f(x) = 2x^3 - 15x^2 + 36x + 7: [0,3] \to A$ $g(x)=\frac{x^{2025}}{1+x^{2025}}:[0,\infty)\to B$ f(x) and g(x) are into functions

13. If $\overrightarrow{OA}=\sqrt{3}\,\hat{i}+\hat{j}, \overrightarrow{OB}=\hat{i}+\sqrt{3}\hat{j}$. If distance of the point $a\hat{i}+(1-a)\hat{j}$ from the angle bisector of $\overrightarrow{OA}$ and $\overrightarrow{OB}$ is $\frac{9}{\sqrt{2}}$. Find a

14. $x^2 + y^2 - 8x = 0$, $\frac{x^2}{9}-\frac{y^2}{4}=1$ intersect at A, B. A triangle formed using vertices A, B, C whre C lies on $2x-3y + 4 = 0$ find locus of centroid of ΔABC

15. If f(x) is polynomial satisfying $f(x)\times f\left(\frac{1}{x}\right)=f(x)+f\left(\frac{1}{x}\right)$ and $f(2) = 129$, then find real values of 'k' satisfying $f(k) = -2k$