JEE-Main-08-04-2024 (Memory Based)
[MORNING SHIFT]

Physics

Question: In a LCR circuit at resonance, what will happen to current if resistance is halved?
Options:
(a) Current will be Halved
(b) Current will be doubled
(c) Current will be tripled
(d) Current will be quadrupled
Answer: (b)

Question: Identify the expression for Bernoulli's Equation
Options:
(a) $P + \rho gh + \frac{1}{2}\rho v^2 = \text{const}$
(b) $P^2 + \rho gh + \frac{1}{2}\rho v^2 = \text{const}$
(c) $P + \rho gh + \rho v^2 = \text{const}$
(d) $P + \frac{1}{2}\rho gh + \rho v^2 = \text{const}$
Answer: (a)

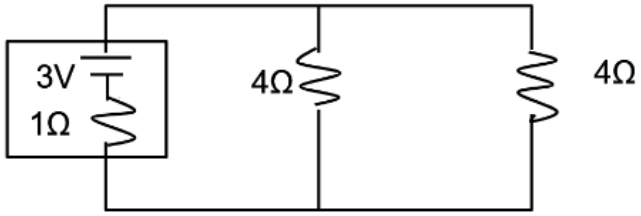
Question: A player caught a ball of mass 150 gm, travelling at 20 m/s. If the catching process was completed in 0.1 sec, find the force exerted by the ball on the player's hands.
Options:
(a) 30 N
(b) 60 N
(c) 70 N
(d) 90 N
Answer: (a)

Question: In a diffraction setup, if the slit width is b = 0.03 cm and wavelength is 600 nm then the angular position of 2^{nd} order minimum is θ. Find the value of $\sin\theta$
Options:
(a) 0.004
(b) 0.001
(c) 0.002
(d) 0.003
Answer: (a)

Question: Which of the following statements is INCORRECT regarding the paramagnetic substance ?

Options:
(a) They have small but positive susceptibility
(b) They are stighty attracted by magnetic field
(c) Their susceptibility increases with rise in temperature
(d) None of the above
Answer: (c)

Question: Find Potential difference across terminals of the cell

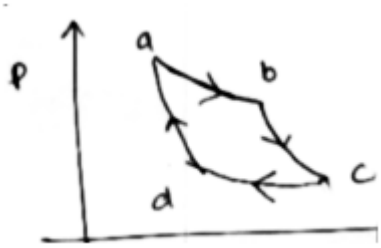


Options:
(a) 1 V
(b) 2 V
(c) 3 V
(d) 4 V
Answer: (b)

Question: Determine the ratio of specific heat at constant volume for monoatomic to Diatomic gas
Options:
(a) 5/3
(b) 3/5
(c) 5/7
(d) 7/5
Answer: (b)

Question: The resistance of conductor is 10 Ω at 0o C and 10.2 Ω at 100o C what Temp the resistance will be 10.95 Ω
Options:
(a) 234 K
(b) 500 K
(c) 748 K
(d) 900 K
Answer: (c)

Question:
Options: The PV curve shown in the diagram consists of two isothermal and adiabatic curves. Then:



(a) $\frac{V_a}{V_d} = \frac{V_b}{V_c}$

(b) $\frac{V_a}{V_d} = \left(\frac{V_b}{V_c}\right)^{-1}$

(c) $\frac{V_a}{V_d} = \left(\frac{V_c}{V_b}\right)^{2}$

(d) $\frac{V_a}{V_d} = \frac{V_c}{V_b}$

Answer: (a)

Question: In a series LCR Circuit, the value of resistance as well as (X_L - X_C) is halved, then the new current amplitude (I_2) will satisfy: (I_1 is old current amplitude)

Options:

(a) $I_2 = 2I_1$

(b) $I_2 = 0$

(c) $I_2 = \frac{I_1}{2}$

(d) $I_2 = I_1$

Answer: (a)

Question: Proton and electron have same kinetic energy. Find ratio of their de-broglie wavelength.

Given $m_P = 1836\ m_e$

Options:

(a) $1 = \sqrt{1836}$

(b) $\sqrt{1836} = 1$

(c) 1 = 1836

(d) 1 : 1

Answer: (a)

Question: Binding energy is 18×10^8 Find Mass in Microgram

Options:

(a) 10

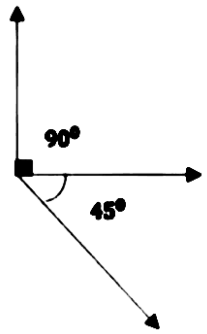
(b) 20

(c) 30

(d) 40

Answer: (b)

Question: If the resultant of the vectors shown in $A\sqrt{x}$, find x.



Answer: (3)

Question: In a clock, second hand and minute hand are of 75 cm and 60 cm respectively. After 30 minutes, ratio of distance travelled by the tip of second hand to that of minute hand is x. Find x.

Options:

Answer: (75)

Question: Two planets are revolving around the sun of mass M_a and M_b. Ratio of angular momentum is 1:3. Find time period ratio in terms of masses.

Options:

(a) $m_b^3/27m_a^3$

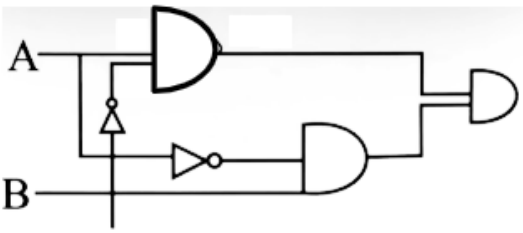
(b) $m_a^3/27m_b^3$

(c) $m_b^3/9m_a^3$

(d) $m_a^3/9m_b^3$

Answer: (a)

Question: What would be the Output of the given logic gate?



Options:

(a) $A \cdot B + \underline{A}$

(b) $\underline{A} \cdot B + A$

(c) $\underline{A} \cdot B + A + \underline{B}$

(d) 0

Answer: (d)

Question: The ratio of frequency of 7th overtone of closed organ pipe and open organ pipe of same length is___.

Options:

(a) 15/6

(b) 16/5
(c) 1/1
(d) 7/6
Answer: (a)

Question: Three masses M_A = 400 gram, M_B = 1.2 KG, M_C = 1.6 KG have same. Kinetic Energy. Determine ratio of their linear momenta.
Options:
(a) 1: √5 : 2
(b) 1: √3 : 5
(c) 1: √3 : 2
(d) 1: √3 : 3
Answer: (c)

Question: If an rea 4m2 lies along $2\sqrt{6}\hat{\imath} + 4\sqrt{6}\hat{\jmath} + 2\sqrt{6}\hat{k}$.
Find flux is $\vec{E} = 4\hat{\imath} + 8\hat{\jmath} + 4\hat{k}$
Options:
(a) 3 Wb
(b) 4 Wb
(c) 5 Wb
(d) 6 Wb
Answer: (d)

Question: Two conducting sphere of radii a and b are connected by wire. What is the ratio of their charges respectively?
Options:
(a) a/b
(b) b/a
(c) ab
(d) None of these
Answer: (a)

Question: On a perfectly absorbing surface of area A, a light rays of intensity I = 360 W/cm^2 falls normally if the force exerted is F, then find the area (A in m^2)
Options:
(a) F/12 × 10^5
(b) F × 10^5
(c) 12F × 10^5
(d) None
Answer: (a)

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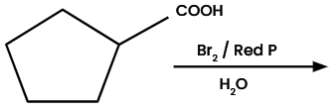
Chemistry

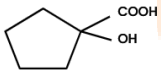
Question: Which of the following do not undergoes disproportionation reaction?
Options:
(a) F_2
(b)Cl_2
(c) Br_2
(d) I_2
Answer: (a)

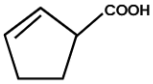
Question: Find the correct shape of the following molecules NH_3 , BrF_5 , PCl_5 , CH_4
Options:
(a) $NH_3 \rightarrow$ Pyramidal ; $CH_4 \rightarrow$ Square Pyramidal
(b)$BrF_5 \rightarrow$ Square Pyramidal ; $CH_4 \rightarrow$ Tetrahedral
(c) $PCl_5 \rightarrow$ Trigonal Pyramidal ; $BrF_5 \rightarrow$ Octahedral
(d) $NH_3 \rightarrow$ Pyramidal ; $BrF_5 \rightarrow$ Tetrahedral
Answer: (b)

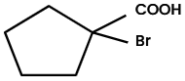
Question:



Options:

(a) 

(b) 

(c) 

(d) 

Answer: (c)

Question:
$\boldsymbol{x} \rightleftharpoons \boldsymbol{y}$ (K_1)
$\boldsymbol{y} \rightleftharpoons z$ (K_2)

$z \rightleftharpoons w$ (K_3)

Find out equilibrium constant for $x \rightleftharpoons w$.

Options:

(a) $K_1 \times K_2 \times K_3$

(b)$K_1 + K_2 + K_3$

(c) $K_1 \times K_3$

(d) $K_1 \times K_2$

Answer: (a)

Question: If the wavelength of light is 3pm. Find out the frequency ?

Options:

(a) 10^{19} sec^{-1}

(b) 10^{20} sec^{-1}

(c) 10^{21} sec^{-1}

(d) 10^{18} sec^{-1}

Answer: (b)

Question: In the process of combustion of glucose (C6H32O6) , CO2 and water formed, find amount of (O2) in g for complete combustion of (glucose).

Molar mass of glucose (180 g/mol)

Options:

(a) 32 g

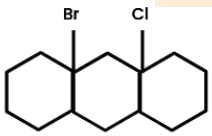
(b) 192 g

(c) 16 g

(d) 180 g

Answer: (b)

Question: Find out the Number of optical isomers?



Options:

(a) 15

(b) 16

(c) 32

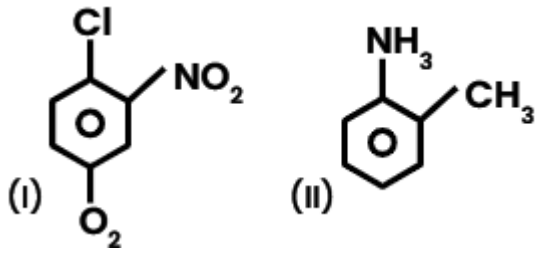
(d) 18

Answer: (b)

Question: Consider following statements.

Statement - 1 :- IUPAC name of (I) is 4-chloro-1,3-dinitrobenzene

Statement - 2 :- IUPAC name of (II) is 2-methylaniline



Options:
(a) Both S-1 and S-2 are correct
(b) S-1 is correct, S-2 is incorrect
(c) S-1 is incorrect, S-2 is correct
(d) Both S-1 and S-2 are incorrect
Answer: (c)

Question: We have two complexes, $[Fe(H_2O)_6]^{2+}$ and $[Cu(H_2O)_6]^{2+}$, the magnetic properties respectively are
Options:
(a) Diamagnetic and diamagnetic
(b) Paramagnetic and Paramagnetic
(c) Diamagnetic and Paramagnetic
(d) Paramagnetic and Diamagnetic
Answer: (b)

Question: Find among the spin only magnetic moment (nearest integer) of M in MO^{2-}_4 , M being the atom having least atomic radii among Sc, Ti, V, Cr, Mn, Zn.
Options:
(a) 1
(b) 2
(c) 0
(d) 3
Answer: (c)

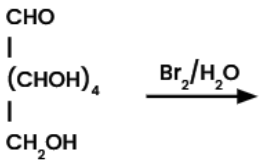
Question: A solution contains 100 g water and 10 g of AB_2. The boiling of the solution was found to tbe 100.52% . The degree of dissociation of AB_2 is :
[MW of Ab = 200 gm/mol ; K_b = 0.52 K kg/mol]
Options:
(a) 0.5
(b) 1
(c) 2
(d) 1.5
Answer: (a)

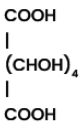
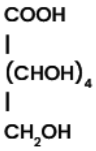
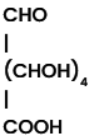
Question: Which of the following compounds will not give Hinsberg's test ?
Options:
(a) NH_2 - NH - CO - NH_2
(b) CH_3CO - NH_2
(c) CH_3-CH_2-NH_2
(d) CH_3-NH-CH_3
Answer: (b)

Question: Statement - I : Stability of +1 oxidation state increases as Ga < In < Tl.
Statement - II : Stability of +1 oxidation state increases down the group due to inert pair effect.
Options:
(a) Both S-1 and S-2 are correct
(b) Both S-1 and, S-2 are incorrect
(c) S-1 is correct and S-2 is incorrect
(d) S-1 is incorrect and S-2 is correct
Answer: (a)

Question: $CoCl_3 \cdot xNH_3$ on reaction with excess $AgNO_3$(aq.) gives tn mole of AgCl as precipitate. Summation of oxidation state of Co in $CoCl_3.xNH_3$ and x is :
Options:
(a) 8
(b) 7
(c) 9
(d) 6
Answer: (d)

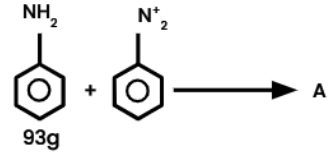
Question:



Options:
(a) 
(b) 
(c) 
(d) None of the above
Answer: (a)

Question: Find out the magnitude of work done on the gas when 1 mole of an ideal gas undergoes compression form 9 litre to 1 litre through a reversible isothermal process. (in Joule) (Nearest integer)
Options:
Answer: (4980 J)

Question: How many moles of A will be formed ?



Options:
(a) 2
(b) 1
(c) 4
(d) 1.5
Answer: (b)

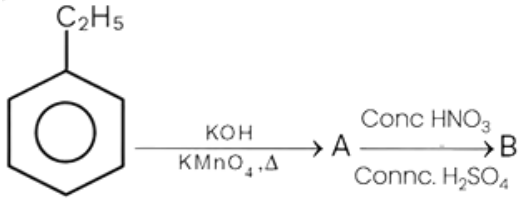
Question: Number of even number unpowered e^- is $[Co(NH_2O)_6]^{3+}$

Question: Match the following :-

a. $[Fe(SCN)]^{2+}$	i. Yellow
b. $[Fe(CN)_5\ NOS]^{4+}$	ii. Blood Red
c. $Fe_4[Fe(CN)_6].xH_2O$	iii. Prussian Blue
d. $(NH_4)_3PO_4.12MoO_3$	iv. Purple

Options:
(a) a → ii, b → iii, c → iv, d → i
(b) a →ii, b →iv, c →iii, d →i
(c) a →i, b →iii, c →iv, d →ii
(d) a →iii, b →i, c →ii, d →iv
Answer: (b)

Question: Number of $\boldsymbol{\pi}$ bonds in product B



Options:
(a) 5
(b) 4
(c) 3
(d) 6
Answer: (a)

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Maths

Question: Find the range of $\frac{\sin^4\theta+3\cos^2\theta}{\sin^4\theta+\cos^2\theta}$
Answer: [1, 3]

Question: $A=\begin{bmatrix}2 & a & 0\\ 1 & 3 & 1\\ 0 & 5 & b\end{bmatrix}$, $A^2=4A^2-A-21I$ Find 2a + 3b =
Options:
(a) -10
(b) 10
(c) -13
(d) 13
Answer: (c)

Question: $\lim_{x\to 0}\ 2\left[\frac{1-\cos x\sqrt{\cos 2x}\cdot\sqrt[3]{\cos 3x}\ldots 10\sqrt{\cos 10x}}{x^2}\right]$
Options:
(a) 55
(b) 65
(c) 56
(d) 66
Answer: (a)

Question: $\sin\theta=-\frac{3}{5}$ and $\theta\in\left[\pi,\ \frac{3\pi}{2}\right]$ then find 80 ($\tan^2\theta$ - $\cos\theta$)

Answer: (109)

Question: If $I_n=\int_0^1\left(1-x^k\right)^n dx$ and if $147I_{20}=148I_{21}$, find k.
Options:
(a) 4
(b) 5
(c) 6
(d) 7
Answer: (d)

Question: $\int\frac{6}{\sin^2 x(1-\cot x)^2}dx$

Question: Find sum of solutions of the equation 8^{2a} - 16.8^a + 48 = 0

Question: $A=\begin{bmatrix}2 & -1\\ 1 & 1\end{bmatrix}$, Sum of diagonal elements of $A^{13}=3^n$ find n =
Options:
(a) 7

(b) 8
(c) 9
(d) 10
Answer: (7)

Question:
In a hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$, eccentricity is $\sqrt{3}$ Length of Latus rectum is $4\sqrt{3}$, If $(\alpha, 6)$ Lies on hyperbola. Product of focal distance from $(\alpha, 6)$ is β, then $\alpha^2 + \beta =$
Options:
(a) 170
(b) 171
(c) 172
(d) 173
Answer: (b)

Question: $f(x)=4\cos^3 x + 3\sqrt{3}\cos^2 x - 1$ then find the local maxima at point $[0, 2\pi]$

Question: Let $f(x) = \cos x - x + 1$, $x \in [0, \pi]$. Let M and m be the maximum and minimum values find (M-m)
Options:
(a) π
(b) $\pi + 1$
(c) $\pi + 2$
(d) 2π
Answer: (c)

Question: Let z be a complex number then $|z + 2| = 1$ and

imaginary part of $\frac{z+1}{z+2} = \frac{1}{6}$ then find the value of real part of $z + 2$

Question: $\bar{r}_1 = (5+\mu)i + (1-3\mu)j + (1+2\mu)k$
$\bar{r}_2 = (2+\lambda)i + (3-3\lambda)j + (3+4\lambda)k$ SD = ?

Question: Find 3 digit numbers using digits 0,2,4,6 and 7 without repetition and the number cannot be divisible by 3 is ?
Options:
(a) 20
(b) 24
(c) 28
(d) 30
Answer: (c)