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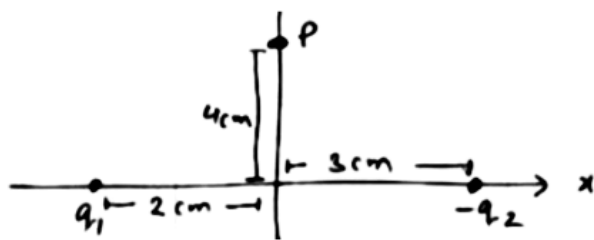
Physics

Question: A figure shows two charges q_1 & $-q_2$ placed on x-axis as shown if electric field at P is along x-direction find q_1/q_2

Options:

(a) $\frac{1}{330} Hz$

(b) $\frac{8\sqrt{5}}{25}$

(c) $\frac{12}{25}$

(d) $\frac{16\sqrt{5}}{25}$

Answer: (b)

Question: If a light ray emitting from the point source A(3, 10) gets reflected from the straight line 2x + y - 6 = 0 and then passes through the point B(7, 2). Then which of the following is/are true

Options:

(a) Equation of the incident ray is x + y - 13 = 0

(b) Equation of the incident is 3x - y + 1 = 0

(c) Equation of the incident ray is x - 2y - 3= 0

(d) Equation of the incident is x + 3y + 13 = 0

Answer: (b)

Question: A disk of mass M_1 radius R is rotating above on axis passing through its centre and perpendicular to its plane with angular speed ω. If another disk of mass M/2 and radius R is gently placed over it what will be their common angular velocity after time

Options:

(a) ω/5

(b) ω/2

(c) 2ω/3

(d) ω/4

Answer: (c)

Question: in given AC circuit consisting resistor R & inductor L and souce emf, two voltmeter V_1 & V_2 are connected as shown. If V_2 = 36 volts then inductance of inductor is(Resistance $\sqrt{91}$ Ω)

120V,
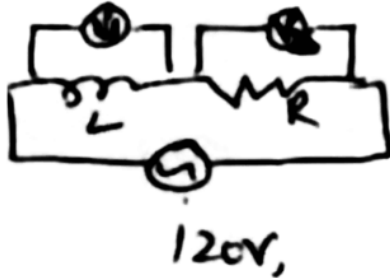
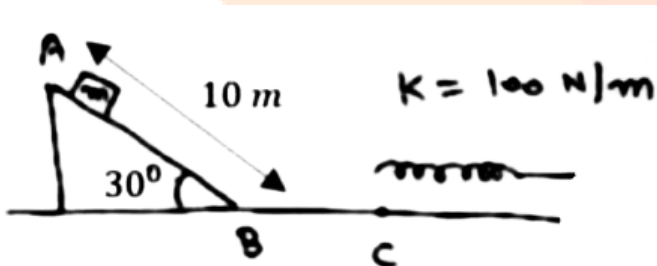Options:
(a) 0.08 H
(b) 0.8 H
(c) 8 H
(d) 80 H
Answer: (a)

Question: Find the dimensions of $\varepsilon_0 E^2$ where E represents electric field
Options:
(a) $[M^{-1}L^{-3}T^4A^1]$
(b) $[M^1L^1T^{-3}A^{-1}]$
(c) $[M^1L^{-1}T^{-2}A^0]$
(d) $[M^1L^{-1}T^{-2}A^2]$
Answer: (c)

Question: A block of mass 5kg is released as shown in the figure. Surface CD is rough with μ = 0.5, rest of all the surfaces are smooth. Find the maximum compression in the spring (initially spring is in its nature length)

Options:
(a) 1.5 m
(b) 2.0 m
(c) 3.5 m
(d) 2.5 m
Answer: (b)

Question: Work done on diatomic gas (γ = 1.4) in an isobaric process is 100 J. Heat supplied

in the process will be?
Options:
(a) 200 J
(b) 350 J
(c) 500 J
(d) 650 J
Answer: (b)

Question: Electron and proton have same de-Broglie wavelength then
Options:
(a) Ke > Kp
(b) Ke < Kp
(c) Ke = Kp
(d) None of these
Answer: (a)

Question: Determine angle of projection of a projectile such that its maximum height is equal to its range.
Options:
(a) $\tan^{-1}(1)$
(b) $\tan^{-1}(2)$
(c) $\tan^{-1}(3)$
(d) $\tan^{-1}(4)$
Answer: (d)

Question: Find the ratio of velocities of satellite orbiting around a planet in orbits having rodi R & 4R respectively.
Options:
(a) 1
(b) 2
(c) 8
(d) 4
Answer: (b)

Question: If terminal velocity of a water drop in air is 10 cm/s and its radius is 0.01 mm. If 8 such drops condense to form a single big drop then find terminal velocity of the drop
Options:
(a) 30 cm/s
(b) 40 cm/s
(c) 50 cm/s
(d) 60 cm/s
Answer: (b)

Question: Find ratio magnetic field at point P to that at point Q. Point P is inside the long

solid cylinder & Q is outside the cylinder current is uniform throughout the cross section of cylinder
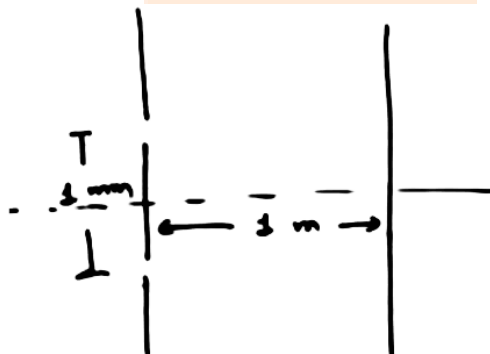

Options:
(a) 2 : 1
(b) 1 : 1
(c) 1 : 2
(d) 4 : 1
Answer: (b)

Question: A in a YDSE shown a monochromatic light of wavelength 500 nm is incident. At point P, 10th maxima is formed. Now the two slits are replaced with a single slit of width ω placed at the centre. If first diffraction minima is observed at P. Find ω (diagram for equation is behind)

Options:
(a) 0.5 mm
(b) 1 mm
(c) 0.1 mm
(d) 0.2 mm
Answer: (c)

Question: A wave is given by the equation
y = A sin [π(330 t - x)], then frequency of the wave is
Options:
(a) 330 Hz
(b) 660 Hz

(c) 165 Hz

(d) $\frac{1}{330} Hz$

Answer: (c)

Question: Two particles projected from height H and 4H with velocity v and v/2. If horizontal range of 1st particle is 100 m what is the range of 2nd particle.

Options:

(a) 100 m

(b) 200 m

(c) 300 m

(d) 400 m

Answer: (a)

Question: In electric field of a sinusoidal electromagnetic wave obeys the equation E = 400 sin 2π(100 t - 50x) N/C. Find the frequency of the wave

Options:

(a) 50 Hz

(b) 100 Hz

(c) 100/2π Hz

(d) 50/2π Hz

Answer: (b)

Question: A heats with 100 W, 100 V rating connected to a resistance R in parallel and 10 ohm in series, dissipates 62.5 W. Now across 100 V supply find R

Options:

(a) 100 Ω

(b) 50 Ω

(c) 10 Ω

(d) 5 Ω

Answer: (d)

Question: Find BE per nucleon of ^{56}Fe where m(^{56}Fe) = 55.935u m_n = 1.00727u, m_p = 1.00727

Options:

(a) 577 MeV

(b) 8.52 MeV

(c) 477.45 MeV

(d) 10.52 MeV

Answer: (b)

Chemistry

Question: Molecular orbital σ^* represents :
Options:
(a) $\Psi_A + \Psi_B$
(b) $\Psi_A - \Psi_B$
(c) $\Psi_A - 2\Psi_B$
(d) $\Psi_A + 2\Psi_B$
Answer: (b)

Question: Consider the given reaction $Cr_2O^{2-}_7 \rightleftharpoons CrO^{2-}_4$
Above reaction shifts in forward direction in

Options:
(a) Acidic Medium
(b) Basic Medium
(c) Neutral Medium
(d) Slightly acidic medium
Answer: (b)

Question: If de⁻ Broglie wavelength of electron is equal to de⁻ broglie wavelength of proton, then what is the relation between their kinetic energy
Options:
(a) $KE_e > KE_P$
(b) $KE_P > KE_e$
(c) $KE_P = KE_e$
(d) $2KE_e = KE_P$
Answer: (a)

Question: Select the correct options :
Statement 1 : Benzene sulphonyl chloride reacts with 1º , 2º and 3º amines.

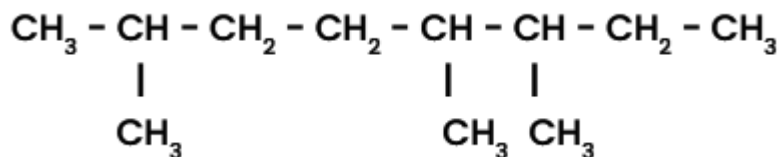Statement 2 : All products of the reaction above are soluble in NaOH.

Options:
(a) Statement 1 is true and statement 2 is false
(b) Statement 1 is false and statement 2 is true
(c) Statement 1 and statement 2, both are true
(d) Statement 1 and statement 2, both are false

Answer: (d)

Question: Consider the following compound :
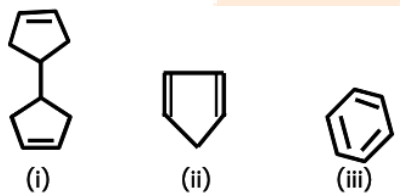What is the IUPAC nomenclature of the compound.

$$CH_3 - CH - CH_2 - CH_2 - CH - CH - CH_2 - CH_3$$

with substituents:

CH_3 (below the second carbon), and CH_3 CH_3 (below the fifth and sixth carbons)

Options:
(a) 2, 5, 6- trimethyl octane
(b) 3, 4, 7-trimethyl octane
(c) 2,4-ethyl, 3-methyl octane
(d) Isopropyl hexane
Answer: (a)
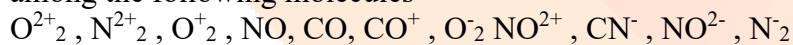
Question: Which of the following are aromatic compounds ?

(i)   (ii)   (iii)

Options:
(a) Only (i) and (ii)
(b) Only (ii) and (iii)
(c) Only (i) and (iii)
(d) All are aromatic
Answer: (b)

Question: Calculate the total number of molecules that will possess fractional bond order among the following molecules
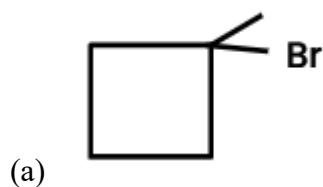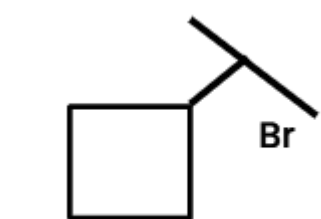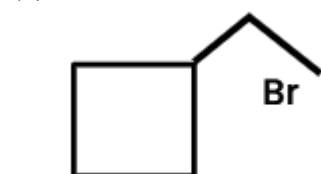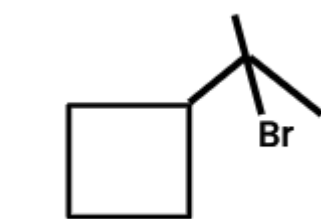O^{2+}_2 , N^{2+}_2 , O^+_2 , NO, CO, CO^+ , O^-_2 NO^{2+} , CN^- , NO^{2-} , N^-_2
Options:
Answer: (7)

Question: The molecule which will undergo S_N2 reaction with the fastest rate ?
Options:

(a)

(b)

(c)

(d)

Answer: (c)

Question: Total number of secondary carbon atoms present in the given compound is :

$$CH_3 - C(CH_3) - CH_2 - CH(CH_3) - CH_3$$
$$|$$
$$H$$
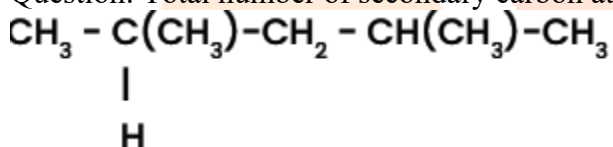
Options:
(a) 1
(b) 2
(c) 3
(d) 4
Answer: (a)

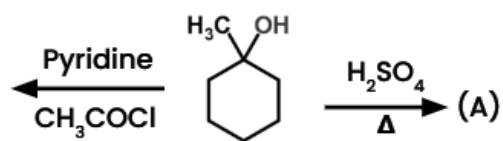Question: Which of the following statements regarding D-glucose is incorrect ?
Options:
(a) It does not give Schiff's test
(b) It has asymmetrical C-atom
(c) It forms a dicarboxylic acid on reaction with Br2 water
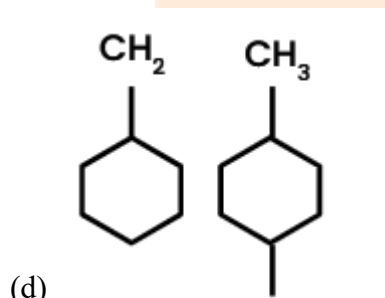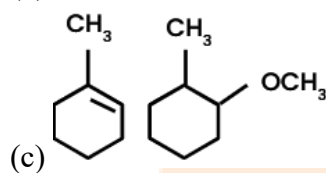(d) It aqueous solution it exists as an equilibrium mixture of two anomeric forms
Answer: (d)

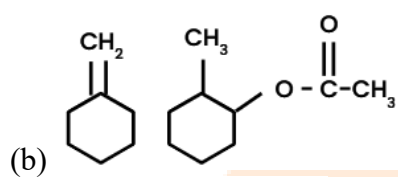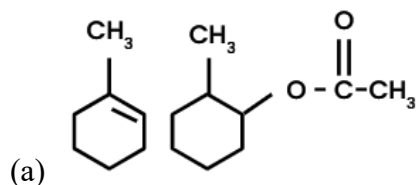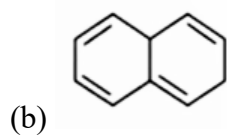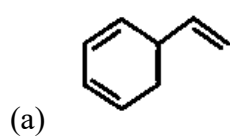Question:

Product (A) and (B) are respectively :

Options:
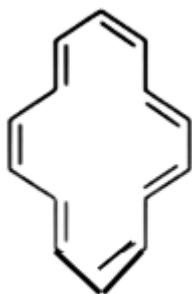

(a)

(b)

(c)

(d)
Answer: (a)

Question: Which of the following molecules is aromatic.
Options:

(a)

(b)

(c)
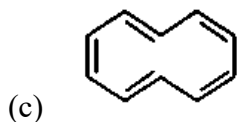
(d)

Answer: (d)

Question: Decreasing order of Acidic nature
Options:
(a) HCOOH
(b) $CH_3 - CH_2 - COOH$
(c) CH_3COOH
(d) $CH_3-CH_2-CH_2-COOH$
Answer: (d)

Question: Number of pi bonds present in the product formed by aldol condensation of Benzaldehyde and acetone ?
Options:
Answer: (5)

Question: Statement I :- Kjedhal method fails for pyridine
Statement II :- Kjedhal method pyridine is easily converted to N_2

Answer: (Ans: Both statements false)

Question: Carbon Atom's in Tyrosine is :
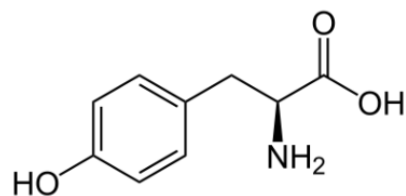
Options:
Answer: (9)

Question:

i) Sn / HCl
ii) NaNO$_2$ / HCl
iii) H$_2$O
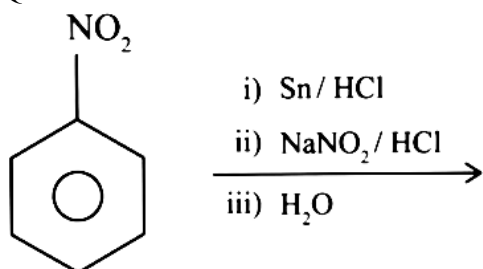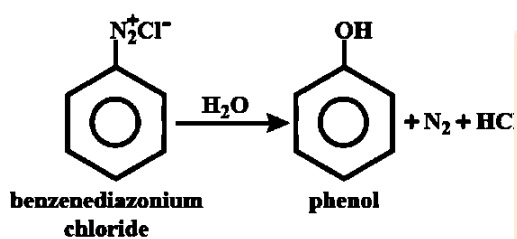
Options:
Answer:

Question: Which of the following easily reacts with NaOH
Options:
(a) C$_2$H$_5$OH
(b) C$_6$H$_5$OH
(c) (CH$_3$)$_3$C - OH
(d) PhCH$_2$ - OH
Answer: (a)

Question: What is the structure of carbocation ?
Options:
(a) Tetrahedral
(b) Trigonal Planar
(c) Diagonal
(d) Diagonal Pyramidal
Answer: (b)

Question:

(i) CAN Test	(a) Unsaturation
(ii) Baeyer's test	(b) Alcohol
(iii) Schiff test	(c) Phenol
(iv) Phthalein dye test	(d) Aldehyde

Options:
Answer: (ii-a iv-c iii-d)

Question: Statement - I :- In S_N2, stereospecific product is formed.
Statement - II :- In S_N1, racemic product is formed.

Select the correct option.

Options:
(a) Both Statement-I and Statement-II are correct
(b) Both Statement-I and Statement-II are incorrect
(c) Statement-I is correct and Statement-II is in correct
(d) Statement-I is incorrect, Statement-II is correct
Answer: (a)

Maths

Question: The term independent of x in the expansion of $\left[\sqrt{a}x^2 + \frac{1}{2x^3}\right]^{10}$ is 105, than a^3 is
Options:
(a) 2
(b) 8
(c) 9
(d) 6
Answer: (b)

Question: If the system of equations x + y -z = λ, 7x + 9y + μz = -3, 5x + y + 2z = -1 has infinitely many solutions then (2μ + 3λ) is

Question: The line segment joining the points. (5, 2) and (2, a) subtends an angle $\frac{\pi}{4}$ at the origin then the absolute value of the product of all possible values of a is
Options:
(a) 2
(b) -2
(c) 4
(d) -4
Answer: (d)

Question: Value of $\frac{3\cos 36^o + 5\sin 18^o}{5\cos 36^o - 3\sin 18^o}$ is $\frac{a\sqrt{5}-b}{c}$ where a, b, c are natural numbers and

gcd(a, c) = 1 then a + b + c is
Options:
(a) 50
(b) 51
(c) 52
(d) 53
Answer: (c)

Question: If $\alpha \neq a,\ \beta \neq b,\ \gamma \neq c,$ $\begin{vmatrix} \alpha & b & c \\ a & \beta & c \\ a & b & \gamma \end{vmatrix} = 0$. Find $\frac{a}{\alpha - a} + \frac{b}{\beta - b} + \frac{c}{\gamma - c}$
Options:
(a) 0
(b) 1
(c) 2
(d) 3
Answer: (a)

Question: If mean, mean deviation about mean, variance of 5 observations a, 25, a, b, c are $18, \ 4, \ \frac{136}{5}$ respectively then, find a

Question: Y = y(x) be the solution curve of the differential equation

$$\sec y \frac{dy}{dx} + 2x \sin y = x^3 \cos y, \ y(1) = 0$$ the y√3 is

Options:

(a) $\frac{\pi}{4}$

(b) $\frac{\pi}{12}$

(c) $\frac{\pi}{6}$

(d) $\frac{\pi}{3}$

Answer: (a)

Question: A be the region enclosed by parabola $y^2 = 2x$ and the line x = 2y then the maximum area a rectangle inscribed in the region A is
Options:
(a) 64√3
(b) 108√3
(c) 96√3
(d) 120√3
Answer: ()

Question: The number of ways five alphabets can be chosen from the alphabets of the words MATHEMATICS where the chosen alphabets are not necessarily distinct.
Options:
(a) 13540
(b) 13560
(c) 14210
(d) 17310
Answer: (b)

Question: The sum of all possible value of $\theta \in [\pi, 2\pi]$, for $\frac{1+i \cos \theta}{1-2i \cos \theta}$ is purely imaginary

Question: The no. of distinct real roots of the equation |x + 1||x + 3| - 4|x + 2| + 5 = 0 is
Options:
(a) 1
(b) 2
(c) 3

(d) 4
Answer: (2)

Question: The area of the region in the first quadrant circle $x^2 + y^2 = 8$ and outside the parabola $y^2 = 2x$ is
Options:

$\pi - \dfrac{2}{3}$ (a)

$\pi - \dfrac{1}{3}$ (b)

$\pi + \dfrac{1}{3}$ (c)

$\pi - \dfrac{4}{3}$ (d)

Answer: ()

Question: Shortest distance between the lines
$\dfrac{x-1}{2} = \dfrac{y-4}{3} = \dfrac{z-3}{4}$ and $\dfrac{x-2}{4} = \dfrac{y-4}{6} = \dfrac{z-7}{8}$ is $\dfrac{13}{\sqrt{21}}$ then the value of λ is

Options:

$\dfrac{23}{4}$ (a)

$\dfrac{27}{5}$ (b)

$\dfrac{21}{4}$ (c)

(d) $\dfrac{25}{2}$

Answer: (b)

Question: 2
          5   8   Find the sum of elements of 10th row
       11   14   17
Options:
(a) 1505
(b) 1438
(c) 1481
(d) 1745
Answer: (a)

Question: Bag X contains 5 one rupee coins, 4 five rupee coins. Bag Y contains 4 one rupee and 5 five rupee coins. Bag Z contains 3 one rupee coin and 6 give rupee coin. If 3 one rupee coin and 6 five rupee coin is selected at random, what is the probability it is drawn from bag y.
Options:
(a) ⅓
(b) ¼

(c) ⅕
(d) ⅙
Answer: (a)

Question: $\lim_{x \to 0^+} \frac{e^{\sqrt{\tan x}} - e^{\sqrt{x}}}{\sqrt{\tan x} - \sqrt{x}}$ is equal to
Options:
(a) 1
(b) ½
(c) 2
(d) $\frac{3}{2}$
Answer: (a)

Question: If a light ray emitting from the point source A(3, 10) gets reflected from the straight line 2x + y - 6 = 0 and then passes through the point B(7, 2). Then which of the following is/are true
Options:
(a) Equation of the incident ray is x + y - 13 = 0
(b) Equation of the incident is 3x - y + 1 = 0
(c) Equation of the incident ray is x - 2y - 3= 0
(d) Equation of the incident is x + 3y + 13 = 0
Answer: (b)

Question: For a given G.P. if sum of $T_2 + T_6 = \frac{70}{3}$ and product (T₃ × T₅) = 49 and

common ratio r > 1, then the sum of (T₄ + T₆ + T₈) is _____ .
Answer: (91)