JEE-Main-27-01-2024 (Memory Based)
[EVENING SHIFT]

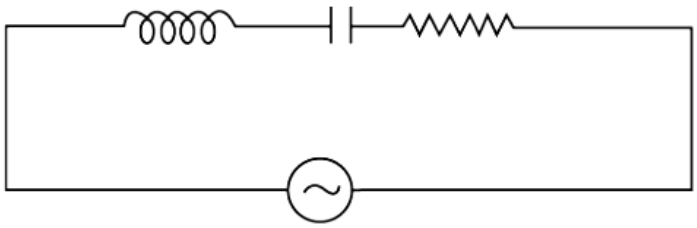
Physics

Question: Find Dimensions of [a/b^2] $\left(P+\frac{a}{V^2}\right)(V-b)=nRT$

Options:
(a) [$M^1 L^{-1} T^{-2}$]
(b) [$M^2 L^2 T^{-2}$]
(c) [$M^1 L^1 T^{-2}$]
(d) [$M^0 L^2 T^{-2}$]
Answer: (a)

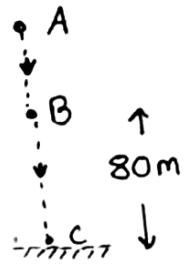
Question: Kinetic energy of 1 mole of oxygen is?
Options:
(a) 3735
(b) 6225
(c) 1245
(d) 2000
Answer: (b)

Question: An LCR series AC circuit with $L=\frac{100}{\pi}mH, C=\frac{10^{-3}}{\pi}F$ and R = 10Ω has ω = 50 Hertz. The voltage has RMS value of 230 volts. Find the power Factor of the circuit



Options:
(a) 0
(b) 1
(c) ½
(d) √3/2
Answer: (b)

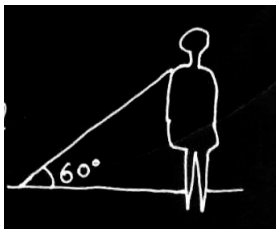
Question: An object is released from point A time from B to C is 2s . Find height AC?



Options:
(a) 45 m
(b) 100 m
(c) 125 m
(d) 160 m
Answer: (c)

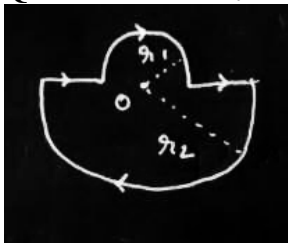
Question: Galvanometer shows deflection of $\pi/3$ where $I_1 = 200\ \mu A$ current is passed what will be the current when the deflection in galvanometer is $\pi/10$
Options:
(a) 600 µA
(b) 60 µA
(c) 20 µA
(d) 40 µA
Answer: (b)

Question: M rod = 12 kg. Find normal by shoulder? Ground is rough



Options:
(a) 30N
(b) 60N
(c) 15N
(d) 120N
Answer: (a)

Question: Find B_0? Current = 4A, $r_2 = 4\pi$ m, $r_1 = 2\pi$ m



Options:
(a) 2×10^{-7}
(b) 10^{-7}
(c) 4×10^{-7}
(d) 3×10^{-7}

Answer: (a)

Question: Calculate the Q-value of the following nuclear reactions in Mega electron volts
$C^{13} \rightarrow C^{12} + {}_0n^1$
Use the following data for masses
$C^{13} = 13.009$ u
$C^{12} = 12$ u
n = 1.008 u
Options:
(a) 0.93 MeV
(b) 1.93 MeV
(c) 2.93 MeV
(d) 3.93 MeV
Answer: (a)

Question: S1 : Moon takes less time to revolve around the earth as compared to earth around the sun
S2: Angular velocity of moon w.r. to earth is greater than angular velocity of earth w.r to sun
Options:
(a) Both are true and S2 is the correct explanation of S1
(b) Both are true and S2 is not the correct explanation of S1
(c) S1 is true, S2 is false
(d) S1 is false, S2 is true
Answer: (a)

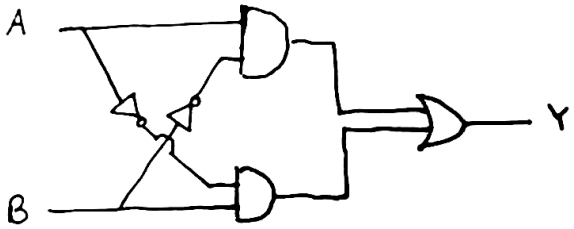
Question: Refractive index of a medium is 3 and speed of light in air is 3×10^8 m/s. Intensity of a beam incident on a non reflecting surface (r = 0) kept in the medium is I. Find the pressure on the surface. (consider normal incidence)
Options:
(a) $I/10^8$ N/m^2
(b) $2I/10^8$ N/m^2
(c) $3I/10^8$ N/m^2
(d) $4I/10^8$ N/m^2
Answer: (a)

Question: ϕ = 6.63 eV find threshold frequency?
Options:
(a) 1.6×10^{15} Hz
(b) 1.6×10^{16} Hz
(c) 3.2×10^{15} Hz
(d) 1.6×10^{14} Hz
Answer: (a)

Question: A bullet loses to ⅓ velocity while travelling 4 cm in a wooden block. it travels a further distance of $D \times 10^{-3}$ m and steps find D.
Options:
(a) 1
(b) 8
(c) 5
(d) 6

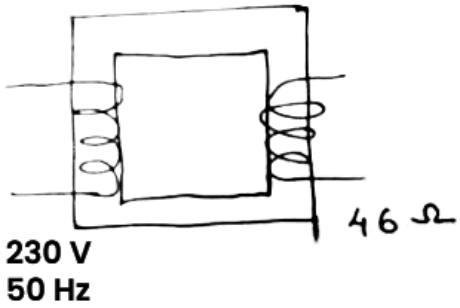
Answer: (5)

Question:



Truth table

Question:

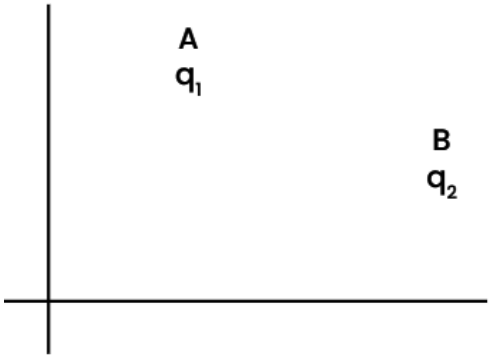


Turns ratio 10 : 1. Find power supplied.

Question: An Electron in Hydrogen atom emits a photon of Paschen Series with maximum possible energy. What is the wavelength of the photon?
Options:
(a) 821 nm
(b) 624 nm
(c) 1023 nm
(d) 121 nm
Answer: (a)

Question: Closed organ pipe of length 1.5 m and an open organ pipe of length 3.5 m produce a beat frequency of 7 in their fundamental mode. Find the speed of sound.
Options:
(a) 330 m/s
(b) 294 m/s
(c) 404 m/s
(d) 350 m/s
Answer: (b)

Question: Two charges of $q_1 = -4\mu C$ and $q_2 = 4\mu C$ are placed at the locations shown, in an electric field of
$\vec{E} = 0.2v / m\hat{i}$. Find the torque experienced by the dipole
Coordinate of A (1, 0, 3)
Coordinate of B = (2, 0, 4)
Electric field $\vec{E} = 2\hat{i}$



Options:
(a) 8×10^{-6} N-m
(b) 4×10^{-6} N- m
(c) 10^{-6} N - m
(d) 2×10^{-6} N - M
Answer: (a)

Question: Read the following assertion and reason and then choose the correct option.
Assertion: If a body regains its original shape and size after deforming force is removed its said to be a plastic body
Reason: The restoring force of a body depends on the interatomic distances
Options:
(a) Both Assertion and Reason are correct and reason explains assertion
(b) Both Assertion and Reason are correct but reason does not explain assertion
(c) Only Assertion is correct
(d) Only Reason is correct
Answer: (d)

Question: Read the following statement and then choose the correct option:
S1: Limiting value of static friction is dependent on area of contact and independent of nature of material
S2: Limiting value of kinetic friction is independent of area of contact and dependent on nature of material
Options:
(a) Both S1 and S2 are correct
(b) Both S1 and S2 are wrong
(c) Only S1 is correct
(d) Only S2 is correct
Answer: (d)

Question: An adiabatic process a gas follows the process
$P \propto T^3$. Find its adiabatic expound $\left(r = \frac{C_p}{C_v} \right)$
Options:
(a) 1.5
(b) 1.33
(c) 1.4
(d) 1.66
Answer: (a)