PAPER SOLUTION

From Meerut

JEE MAIN 2025

JAN	SHIFT
23	2nd

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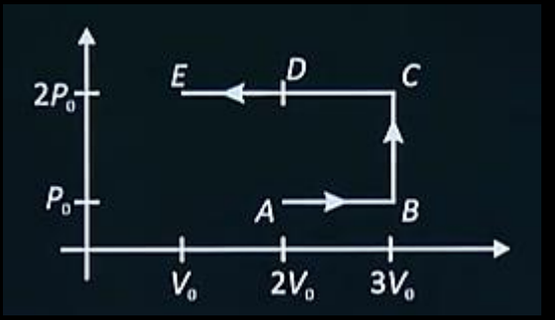
#Q. Find total work done from A to E



A $-3P_0V_0$

B $3P_0V_0$

C $2P_0V_0$

D $5P_0V_0$

Ans. (A)

#Q. If angle of prism = angle of min deviation. Given μ = $\sqrt{3}$, then angle of prism?

Ans. 60

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#Q. Statement 1 : Graph of frequency f of X ray and atomic number Z of heavy nucleus is straight line, in X ray emission.

Statement 2 : Graph of square root of frequency $\sqrt{f}$ of X ray and atomic number Z of heavy nucleus is straight line, X ray emission.

(A) Statement 1 is correct and statement 2 is correct

(B) Statement 1 is incorrect and statement 2 is correct

(C) Statement 1 is correct and statement 2 is incorrect

(D) Statement 1 is incorrect and statement 2 is incorrect

Ans. (B)

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#Q. In a series LCR circuit, inductance L = 100 mH and capacitance C = 10 nF. The angular frequency of the source when current has maximum amplitude in the circuit is :

A $\frac{10^4}{2\pi}\text{rad/s}$

B $\frac{10^5}{2\pi}\text{rad/s}$

C 10^5rad/s

D 10^6rad/s

Ans. (None)

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#Q. A Satellite is nine times closer to earth compared to moon. Time period of moon is 27 days then period of Satellite is :

A 3 days

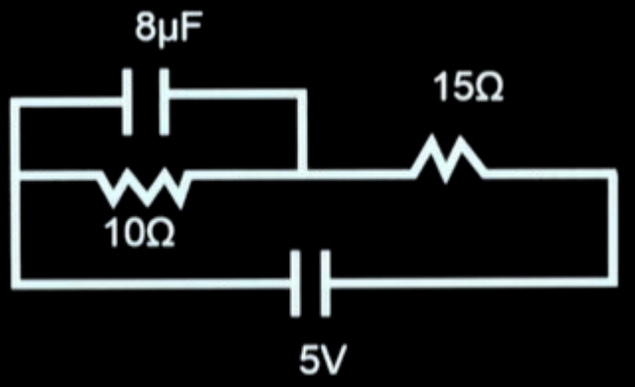
B 9 days

C 1 day

D $3\sqrt{3}$ days

Ans. (C)

#Q. Find charge on capacitor in steady state.



Ans. 16

#Q. The energy is a system varies with position and time as $E(x, t) = x^3 e^{-\beta t}$, where $\beta = 0.3\ sec^{-1}$. Given that the % error in x = 1.2% and that the % error in t = 1.6% error in E at t = 5 sec.

Ans. 6

#Q. Two charges + 7C and – 4C are located at (–7, 0, 0) and (7, 0, 0), find electrostatic potential energy of the system. ($K = \frac{1}{4\pi\varepsilon_0} = 9 \times 10^9$ SI units)

A -6×10^9 J

B -18×10^9 J

C 18×10^9 J

D 6×10^9 J

Ans. (B)

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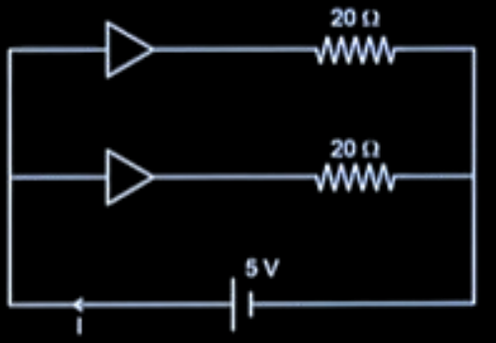
#Q. Two ideal diodes are connected in circuit as shown. Find current through battery.



(A) 0.3 A

(B) 1 A

(C) 0.5 A

(D) 0.25 A

Ans. (C)

#Q. Find the wavelength in (nm) of incident radiation where work function is 4.12 eV and stopping potential is 4V. (hc = 1242 eV)

Ans. 153

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#Q. In an electromagnetic wave of frequency 20 MHz, value of electric field is 9.3 V/m then magnitude of magnetic field at the instant is :

A 3.1×10^{8}

B 27.9×10^{8}

C 3.1×10^{-8}

D 18.6×10^{-6}

Ans. (C)

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#Q. A particle of mass m is projected at angle 60° with horizontal. If initial kinetic energy is KE_0 and kinetic energy at maximum height is $\frac{KE_0}{x}$, Find value of x.

Ans. 4

#Q. A thin lens has a focal length f in air. The new focal length of lens when it is dipped into a fluid of refractive index μ. :

A $f^1 = \frac{\mu(\mu_l - 1)f}{\mu_l - \mu}$

B $f^1 = \frac{\mu(\mu_l + 1)f}{\mu_l - \mu}$

C $f^1 = \frac{\mu(\mu_l - 1)f}{\mu_l + \mu}$

D $f^1 = \frac{\mu(1 - \mu_l)f}{\mu_l + \mu}$

Ans. (A)

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#Q. Match the correct dimensions

(a)	Magnetic field	(i)	ML^2
(b)	Permittivity of free space	(ii)	$M^{-1}L^{-3}T^4A^2$
(c)	Moment of inertia	(iii)	$MT^{-2}A^{-1}$
(d)	Velocity	(iv)	LT^{-1}

A (a) → (iii), (b) → (ii), (c) → (i), (d) → (iii)

B (a) → (iii), (b) → (iv), (c) → (iv), (d) → (iv)

C (a) → (iii), (b) → (ii), (c) → (i), (d) → (iv)

D (a) → (i), (b) → (ii), (c) → (iii), (d) → (iv)

Ans. (C)

#Q. The temperature of a body of mass m and specific heat capacity s is raised slowly from T_1 to T_2. The change is entropy of the system is :

A $ms\,In\left(\frac{T_2}{T_1}\right)$

B ms

C $ms\,In\left(\frac{T_1}{T_2}\right)$

D Zero

Ans. (A)

#Q. A moving coil galvanometer who coil resistance G = 30Ω , shows full scale deflection when the current through it is 20 mA. The galvanometer is converted to an ammeter of range 3 A by using a shunt, then resistance s is :

A 0.2 Ω

B 2 Ω

C 0.8 Ω

D 1.2 Ω

Ans. (A)

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#Q. Torque on a uniform disk of mass 2 Kg, radius 1 m is given as $\tau(t) = 5t^2 - 8t$. If the disk was initially at rest, find power by torque at t = 1 s.:

A 5 w

B 3 w

C 7 w

D 9 w

Ans. (C)

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#Q. During charging of capacitor of 2.5 mF in DC circuit, the displacement current is found to be 0.25 mA then find rate of change of voltage V w.r.t. time $\frac{dV}{dt}$.

(A) 1 V/s

(B) 10 V/s

(C) 100 V/s

(D) 0.1 V/s

Ans. (D)

#Q. A satellite of mass m is moving in circular orbit at a heigh R from surface of Earth (mass M, radius R). If the angular momentum of the Satellite is $m\sqrt{NGMR}$, find N.

Ans. 2