JEE-Main-06-04-2024 (Memory Based)
[EVENING SHIFT]

Physics

Question: Energy associated with 10 helium gas atoms at temperature 'T' is (where KB = Boltzmann constant, R = universal gas constant)
Options:
(a) 15 RT
(b) 30 RT
(c) 30 K_BT
(d) 15 K_BT
Answer: (d)

Question: An object of weight 200 N is suspended through a chain of mass 10 kg from a branch of a tree. Calculate the force on chain applied by branch of tree
Options:
(a) 200 N
(b) 300 N
(c) 100 N
(d) 210 N
Answer: (b)

Question: While finding the refractive index of a glass slab, the travelling microscope is focused on ink dot on a white paper. When a glass slab of thickness 5.1 cm is placed on this inK dot, the microscope is raised through 1.7 cm. Then refractive index of glass slab is
Options:
(a) 3/2
(b) 4/3
(c) 2/3
(d) 2
Answer: (a)

Question: A p-type semiconductor has acceptor levels 6eV above the valence band. The maximum wavelength of light required to create a hole is
(Planck's constant , h = 6.6×10^{-34} J-s)
Options:
(a) 2060 nm
(b) 206 nm
(c) 206 Å
(d) 20.6 nm
Answer: (b)

Question: 2 open organ pipes one of 60 cm and one of 90 cm are in their 6^{th} and 5^{th} harmonic frequencies respectively, velocity of sound is 333 m/s find the difference in their frequencies

Options:

(a) 247 Hz

(b) 200 Hz

(c) 70 Hz

(d) 100 Hz

Answer: (a)

Question: The electric field in an electromagnetic wave is given by E = 600 sin (ωt - kx)N/C. Then the intensity of the wave if it is propagating along x-axis in free space (Gien $\varepsilon_0 = 9 \times 10^{-12}\ C^2\ N^{-1}\ m^{-2}$)

Options:

(a) 972 w/m^2

(b) 243 w/m^2

(c) 648 w/m^2

(d) 486 w/m^2

Answer: (d)

Question: Two spheres each of charge q, repel each other by 16 N. A Third identical, uncharged sphere touched by these both spheres one after another. The new force between the spheres is

Options:

(a) 16 N

(b) 6 N

(c) 2 N

(d) 20 N

Answer: (b)

Question: If threshold energy required to eject an electron from emitter is 10.56×10^{-20} J, then corresponding maximum value of wavelength is

Options:

(a) 1.875×10^{-7} m

(b) 1.875×10^{-6} m

(c) 187.5 Å

(d) 187.5 nm

Answer: (b)

Question: If 48 J heat is given to one mole of helium gas and increase in temperature is 2^o C. Work done is ($R = 8.3\ J\ K^{-1}\ mol^{-1}$)

Options:

(a) 12.5 J

(b) 23.1 J

(c) 25.2 J

(d) 48 J

Answer: (b)

Question: Energy of a photon is 2.5 eV and work function is 1.5eV. Find the stopping potential
Options:
(a) 2V
(b) 3V
(c) 1V
(d) 4V
Answer: (c)

Question: Current In an inductor from -2A to +2A in 0.2 second generating an induced emf of 1 volt. Find self inductance
Options:
(a) 5 mH
(b) 50 mH
(c) 10 mH
(d) 100 mH
Answer: (b)

Question: Weight of an object on the surface of the earth is 300 N. Find the weight at a depth of R/4
Options:
(a) 150 N
(b) 300 N
(c) 100 N
(d) 225 N
Answer: (d)

Question: Kinetic energy is increased 36 times of its initial Value find Percentage increase in momentum
Options:
(a) 100%
(b) 500%
(c) 1000%
(d) 700%
Answer: (b)

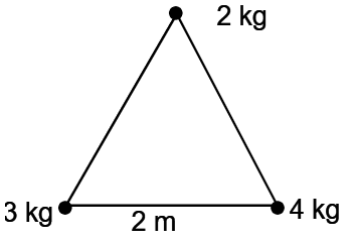
Question: Statement-1: Dimensional formula of specific heat capacity is $L^2\ T^{-2}\ K^{-1}$
Statement-2: Dimensional formula of gas constant is $M^1L^{-1}T^{-2}K^{-1}$
Options:
(a) Only statement 1 is correct
(b) Only statement 2 is correct
(c) Both are correct
(d) Both are incorrect
Answer: (a)

Question: A heat of 42 J was given to 1 mole of helium gas in a sealed tank. Find work done by the gas.
(Given R = 8.31 J/mol^{-k})
Options:
(a) 42 J

(b) Zero
(c) 84 J
(d) 21 J
Answer: (b)

Question: A ball is thrown vertically upwards and take time t_1. And if thrown vertically downward then take time t_2. Then if ball is just dropped how much time will take?
Options:
(a) $\sqrt{t_1 + t_2}$
(b) $\sqrt{t_1 - t_2}$
(c) $\sqrt{t_1/t_2}$
(d) $\sqrt{t_1 t_2}$
Answer: (d)

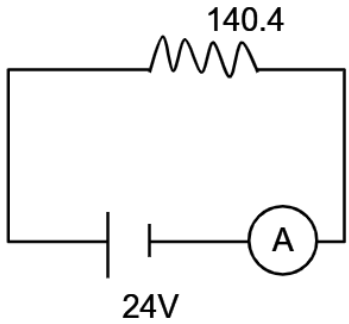
Question: Three point masses 2kg, 3kg and 4kg are placed at the vertices of an equilateral triangle. Find moment of inertia about centroid of triangle perpendicular to the plane.



Options:
(a) 12 kg-m^2
(b) 18 kg-m^2
(c) 9 kg-m^2
(d) 36 kg-m^2
Answer: (a)

Question: Pressure Difference between inside & outside the bubble is
Options:
(a) 2S/r
(b) S/r
(c) 4S/r
(d) 4Sr
Answer: (c)

Question: Ammeter A has coil of resistance 240 ohm and is shunted with resistance 10 ohm. Find reading of A (in mA)



Options:
(a) 100 mA
(b) 120 mA
(c) 140 mA
(d) 160 mA
Answer: (d)

Question: Focal length for a thin convex lens is 20 cm whose radii of curvature are 15 cm & 30 cm. Determine refractive index of lens
Options:
(a) 1.2
(b) 1.3
(c) 1.4
(d) 1.5
Answer: (d)