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

Physics

Question: Which of the following can't be explained by wave nature of Light?
Options:
(a) Diffraction
(b) Photoelectric effect
(c) Interterence
(d) Polarisation
Answer: (b)

Question: When a dc supply of 100 V is applied across an inductor then the current passes through it is 5A. Find the power across it in an AC source of peak voltage 200 V is applied across it given inductive reactance is $20\sqrt{3}\ \Omega$.
Options:
(a) 100 W
(b) 200 W
(c) 250 W
(d) 500 W
Answer: (c)

Question: Find the maximum speed in the case of an SHM where time period and amplitude are 3.14 sec and 0.06 m respectively.
Options:
(a) 0.06 m/s
(b) 3.14 m/s
(c) 0.12 m/s
(d) 0.24 m/s
Answer: (c)

Question: A bullet is fired which passes through a plywood. Find the loss in KE of the 50 g bullet if it enters at 100 m/s and exits at 40 m/s.
Options:
(a) 150 J
(b) 210 J
(c) 480 J
(d) 500 J

Answer: (b)

Question: Match the following.

Physical quantities	**Dimensional formula**
i) Torque	P) $M^1L^0T^{-2}A^{-1}$
ii) Magnetic moment	Q) $M^1L^2T^{-1}$
iii) Magnetic field	R) $M^1L^2T^{-2}$
iv) Angular momentum	S) $M^0L^2T^0A^1$

Options:

(a) i-R; ii-S; iii-P; iv-Q

(b) i-S; ii-P; iii-Q; iv-R

(c) i-P; ii-Q; iii-R; iv-S

(d) i-P; ii-R; iii-S; iv-Q

Answer: (a)

Question: Particles of mass m/2, m, 2m, 4m are having same momentum then which of the particle will have maximum kinetic energy?

Options:

(a) Particle of mass 4m

(b) Particle of mass 2m

(c) Particle of mass m

(d) Particle of mass m/2

Answer: (d)

Question: Minimum kinetic energy require for a body of mass m to go to infinity from earth's surface, is

Options:

(a) $\frac{GMm}{2R}$

(b) $\frac{GMm}{R}$

(c) $\frac{2GMm}{R}$

(d) Zero

Answer: (b)

Question: What is the expression of electric field on the surface of a uniformly charged spherical shell having surface charge density as σ and sodius R?

Options:

(a) $\frac{\sigma R}{\varepsilon_0}$

(b) $\frac{\sigma}{2\varepsilon_0}$

(c) $\frac{\sigma}{\varepsilon_0}$

(d) $\frac{\sigma}{4\varepsilon_0}$

Answer: (c)

Question: Find ratio of V_{RMS} of Helium & Oxygen at same temperature

Options:

(a) $\sqrt{2}$

(b) $2\sqrt{2}$

(c) 2

(d) $\sqrt{3}$

Answer: (b)

Question: A soup bubble of radius R is split into 1000 small bubbles. The ratio of surface energy of 1000 bubbles to the big bubble is

Options:

(a) 100 : 1

(b) 1 : 1

(c) 10 : 1

(d) 1 : 100

Answer: (c)

Question: Find ratio of Shortest wavelengths of Balmer series & Lyman Series

Options:

(a) 4 : 1

(b) 3 : 1

(c) 2 : 1

(d) 1 : 1

Answer: (a)

Question: Energy of incident photon is 2.48 eV and stopping potential 0.5 V. Find work function.

Options:

(a) 1 eV

(b) 2.98 eV

(c) 2.5 eV

(d) 1.98 eV

Answer: (d)

Question: A train is accelerating from rest with a constant acceleration “a” for a time t sec and attain a speed of 80 m/s, then for a time of 3t it runs with a constant speed. Find the average speed.

Options:

(a) 70 m/s

(b) 35 m/s

(c) 80 m/s

(d) 20 m/s

Answer: (a)

Question: A wire of resistance is stretched to a radius of r/2. Where 'r' is the initial radius. The new resistance of the wire is

Options:

(a) 4 R

(b) 16 R

(c) R/4

(d) R/16

Answer: (b)

Question: An infinite long wire having 10 A current passing through it along x axis. Find the magnetic field at 0.5 m above the origin

Options:

(a) $4\pi \times 10^{-6}$ T

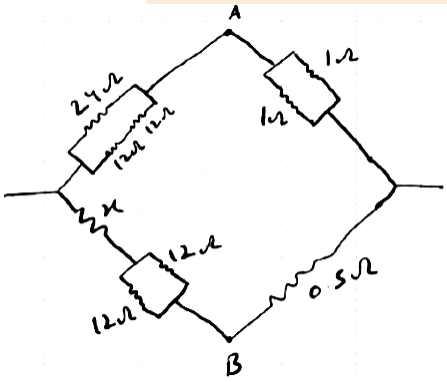
(b) $\frac{1}{4\pi} \times 10^{-6} T$

(c) 4×10^{-6} T

(d) 2×10^{-6} T

Answer: (c)

Question: Find the resistance x in figure, if it is provided that points A and B are at same potential



Options:

(a) 4 Ω

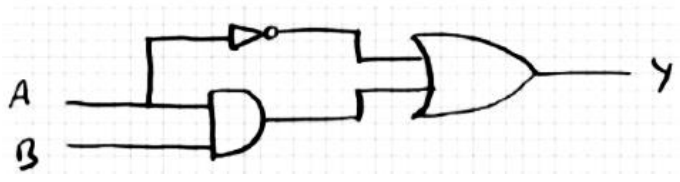
(b) 12 Ω

(c) 6 Ω

(d) 8 Ω

Answer: (c)

Question: Which will be the correct truth table for following circuit diagram?



Options:

(a)

A	B	Y
1	1	0
1	0	1
0	1	1
0	0	1

(b)

A	B	Y
1	1	1
1	0	0
0	1	1
0	0	1

(c)

A	B	Y
1	1	1
1	0	0
0	1	0
0	0	1

(d)

A	B	Y
1	1	0
1	0	1
0	1	1
0	0	0

Answer: (b)

Question: An electromagnetic wave travels in a medium with the speed 1.5×10^8 m/s. The relative permeability of medium is 2. Find the relative permeability.

Options:

(a) 1

(b) ½

(c) 2

(d) 3/2

Answer: (c)

Question: If the ratio of 8min & angle of prism is 1 & refractive index is √3 then find the value of angle of prism?

Options:

(a) π/2

(b) π/4

(c) π/6

(d) π/3

Answer: (d)

Question: Two masses M_1 & M_2, where $M_2 > M_1$ are connected by a string which passes ones a massless and frictionless pulley.

The masses accelerate at $\frac{g}{\sqrt{2}}$ m/s^2 in opposite directions, then find the ratio of M_1 & M_2

Answer: $3 - 2\sqrt{2}$

Question: The diameter of a wire is measured using a screw gauge of 100 division and pitch 1mm. Main scale reading is 1mm, circular scale reading is 42. Diameter is found to be x/50 mm then x is

Answer: 71

Question: A current carry coil of 100 turns, area 10 cm^2, current 5×10^{-5} A is placed in a magnetic field of strength 1T. Initially plane of the coil is perpendicular to the magnetic field. The work done in rotating the coil by 90^o is $x \times 10^{-6}$ J then find x.

Answer: 5