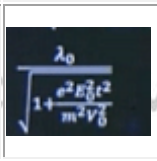
JEE MAIN 24 JANUARY 2025 SHIFT 1

PHYSICS QUESTION PAPER WITH ANSWER KEY

Q.No.	Questions	Answers
1	If I= I_A sincot + I_B coscot, then find rms value of current	I_{rms} $\frac{\sqrt{1^2A+1^2B}}{2}$
2	What is relative shift of focal length of a lens when optical power is increased from 0.1 D to 2.5 D	24/25
3	The electric flux through the shaded area of square plate of side a due to point charge placed at distance of a/2 from it as shown in figure, NQ/48 E_0. then N is	5
4.	In a square loop of side length $1/\sqrt{2}$ ma current of 5A is flowing. Find magnetic field at its centre in (μT)	8
5	Satellite A is launched in a circular orbit of radius R. Satellite B is launched in circular orbit of radius 1.03R. The period of B is greater than A by approximately	4.5%
6	An electron jumps from principle quantum state A to C by releasing photon of wavelength 2000 A and from state B to C by releasing a photon of wavelength 6000 A then find the wavelength of photon for transistor from A to B.	3000A
7.	For an ideal mono atomic gas undergoing an isobaric process, the ratio of ΔQ/ΔU is	5/3
8	An electron of mass m enters in a region of uniform electric field E = $-E_0k$ at t=0 with an initial velocity V= V_0t. If the de-Brogile wavelength is λ_0 initially, the de-Brogile wavelength at a time t is	
9	In a process pressure of the gas is directly proportional to temperature then choose the correct option. A: Process is isochoric B: Work done in process is zero. C: Internal energy increase with increase in temperature	A, B and C are correct
10.	If the distance two parallel plate of a capacitor is d, A is the area of each plate and E is the electric field, Find the energy stored in capacitor.	1/2 E^2 A^{E0d}
11	In YDSE, lights of wavelength 600 nm and 480 nm are used. What is the minimum order of bright fringe of 480 nm coincides with bright fringe of 600 nm.	5
12	A body of mass m is projected with a initial velocity v^0 at 45 degree with horizontal. Find its angular momentum at highest point about point of projection.	$\frac{m\ v_0^3}{4\sqrt{2}\ g}$

13	A plane convex lens of refractive index 1.5 and radius of curvature of curved surface of 20 cm present in air is having focal length of f_1. There is another plane convex lens of refractive index of 1.5 & ROC of 30 cm placed in liquid of RI of 1.2 having focal length of f_2 the f_1/f_2 is	1/3
14.	Acceleration of solid cylinder purely rolling an inclined plane of inclination of θ	2/3g sin θ
15.	Find the maximum possible velocity for the given angle of banking θ on a curved road of radius r having a coefficient of friction μ	$v_{max} = \sqrt{\frac{gr(\mu+\tan\theta)}{(1-\mu\tan\theta)}}$
16	In a parallel plate capacitor length and width are 3 cm and 1 cm respectively. Separation between plates is 3μm. By which of the following value capacitance increase by a factor of 10.	A and B
17	In SHM given by equation x= Asincot of time period 2 sec and amplitude 1 cm ratio of Distance/Displacement in first 1.25 sec is	$2\sqrt{2}+1$
18	A wire of resistance 9Ω is bent in form of an equilateral triangle. Find equivalent resistance between two vertices of a triangle.	2Ω
19	Work done required to break a drop of radius R to 27 drops of equal radius is 10J. Then work done to break drop of radius R in 64 drops of equal radii is XJ, then X is	15J
20	A particle moves on a straight line under the influence of a force $F = \alpha + \beta x^2$, where x is the displacement and β= -12 SI units. If the total work done for a displacement x= 1m is 12J then α is ____ SI units.	16