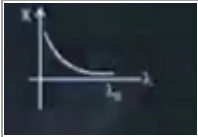
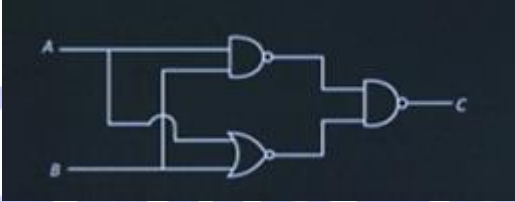
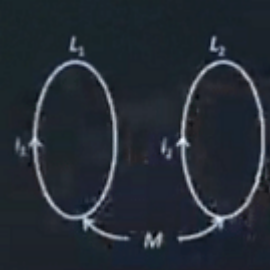


JEE MAIN 29 JANUARY 2025 SHIFT 1

PHYSICS QUESTION PAPER WITH ANSWER KEY

Q.No	Questions	Answers
1	Assertion: At the peak of mountain, time period of pendulum increases Reason: Time period of pendulum increases with decrease in g	Assertion is correct, Reason is correct
2	The velocity of a particle moving on a straight line varies with time as $v=At^2 Bt/C+ t^1$ where A, B, and C are constants. Find the dimension of ABC.	$L^2 T^{-3}$
3	A pendulum of mass $m/2$ is released from a given situation. Find the speed of another pendulum after the collision. ($e=1$)	$2/3 \sqrt{gl}$
4	The graph between wavelength (λ) of incident light and Kinetic Energy (K.E) of photoelectron in photoelectric effect is	
5	Identify the logic gate represented by circuit shown below. 	OR Gate
6	Statement I: Electromagnetic wave have both energy and momentum. Statement II: Rest mass of photon is zero.	Statement I is correct Statement II is incorrect
7	Two projectiles were launched from the same position simultaneously only same speed on of the projectile was launched at angle $(45 - \alpha)$ degree and other at an angle of $(45 + \alpha)$ degree. Find the ratio of maximum height of the projectile.	$\frac{1 - \sin 2\alpha}{1 + \sin 2\alpha}$
8	A river is flowing with speed 9km/hr. Boat is going downstream- speed of boat in still water is 27km/hr. A person in boat throws a ball upwards with speed 10 m/s. Find range of the ball as seen by an observer at bank of river.	20 m
9	Which of two physical quantities have same dimensions?	Angular momentum and Planck's constant
10	If radius of first Bohr's orbit of H-atom is a_0 Then find the radius of 2nd Bohrs orbit of H-atom.	$4a_0$

11	<p>Two coils having self-inductance L_1 and L_2 are placed closely such that they have a mutual inductance M. If they carry currents i_1 and i_2 as shown in the figure then the induced emf in coil 1 is</p> 	$-L_1 \left(\frac{di_1}{dt} \right) - M \left(\frac{di_2}{dt} \right)$																				
12	<p>An infinite solid cylinder wire of radius R carries a current I uniformly distributed along its area. The distance from the centre where the magnetic field is equal to $\mu_0 I / 4\pi R$ is</p>	$R/2$																				
13	<p>When a ball is kept under sea at depth 2.5 km. Find percentage change in its volume. If bulk modulus of water is 2×10^9 Pa.</p>	1.25%																				
14	<p>Heat given to 0.5 moles of a monoatomic gas at constant pressure is 500 J. Initial temperature of gas was 27 Degree Celsius. Find value of ΔV and ΔT.</p>	300 J, 48 degree Celsius																				
15	<p>Assertion: A negative potential is required to stop the photoelectron. Reason: Speed of electron decreases when a negative potential is applied in a photo cell.</p>	Assertion is correct Reason is also correct																				
16	<p>If an electric dipole of dipole moment P is placed in an electric field E with $P \parallel E$. It is rotated slightly (and slowly) and released. Find the time period of oscillation of the dipole (moment of inertia of the dipole is I).</p>	$T = 2\pi \sqrt{I/PE}$																				
17	<p>In an adiabatic process of a closed system, work done by the gas depends explicitly on</p>	Change in temperature																				
18	<p>A particle is able to complete the vertical circular motion with speed $n\sqrt{gR}$ at the top most point. Find the ratio of $\frac{KE(\text{Bottom})}{KE(\text{Top})}$</p>	$n^2 + 4$ <hr/> n^2																				
19	<p>Match the correct option for List-I and List-II, where symbols have usual meanings.</p> <table border="1" data-bbox="279 1429 1133 1684"> <thead> <tr> <th></th> <th>List-I</th> <th></th> <th>List-II</th> </tr> </thead> <tbody> <tr> <td>(A)</td> <td>Electric field inside the spherical shell</td> <td>(i)</td> <td>$\frac{\sigma}{2\epsilon_0}$</td> </tr> <tr> <td>(B)</td> <td>Electric field just outside the spherical shell</td> <td>(ii)</td> <td>$\frac{\sigma}{\epsilon_0}$</td> </tr> <tr> <td>(C)</td> <td>Electric field inside the charged parallel plate capacitor</td> <td>(iii)</td> <td>Zero</td> </tr> <tr> <td>(D)</td> <td>Electric field of infinite charge sheet</td> <td>(iv)</td> <td>$\frac{2\sigma}{\epsilon_0}$</td> </tr> </tbody> </table>		List-I		List-II	(A)	Electric field inside the spherical shell	(i)	$\frac{\sigma}{2\epsilon_0}$	(B)	Electric field just outside the spherical shell	(ii)	$\frac{\sigma}{\epsilon_0}$	(C)	Electric field inside the charged parallel plate capacitor	(iii)	Zero	(D)	Electric field of infinite charge sheet	(iv)	$\frac{2\sigma}{\epsilon_0}$	<p>A (iii) B (ii) C (ii) D (i)</p>
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20	<p>In a hydraulic lift, the two sides have areas $A_1 = 25 \text{ cm}^2$ and $A_2 = 100 \text{ cm}^2$. If a force of 100 N is applied normally on the area A_1, then the force on the area A_2 is ____ N.</p>	400 N																				