NEET-2020 Model Paper-4

Physics

1) The cyclotron frequency of an electron gyrating in a magnetic field of 1T is approximately

1. 280 M Hz
2. 2.8 G Hz
3. 28 M Hz
4. 28 G Hz

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2) The charge flowing through a resistance 'R' varies with time 't' as $Q = at - bt^2$, where 'a' & 'b' are positive constants. The total heat produced in 'R' is

1. $\frac{a^3R}{6b}$
2. $\frac{a^3R}{3b}$
3. $\frac{a^3R}{2b}$
4. $\frac{a^3R}{b}$

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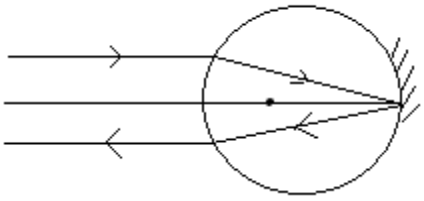
3) A sphere has its right half polished so as to act as a mirror. A parallel light ray is incident from left, reflects parallel to incident ray as shown. The refractive index of the material of the sphere is



1. 1.4
2. 1.5
3. 3
4. 2

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4) A block of mass 10 kg moving in x-direction with a constant speed of $10\,ms^{-1}$, is subjected to a retarding force $F = 0.1x\,J\,m^{-1}$ during its travel from $x_1 = 20\,m$ to $x_2 = 30\,m$. If final kinetic energy is

1. 475 J
2. 450 J
3. 275 J
4. 250 J

5) Which statement is incorrect regarding photo electric effect?

1. When light of appropriate frequency falls on metal surface, electron emission takes place instantaneously
2. When light of very low intensity falls on metal surface, no photo electric effect takes place
3. For light waves having same frequency but having different intensities, maximum K.E. of liberated photo electrons would be same
4. Light waves having same upper limit of wave length can use the photo electric effect to takes place

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6) The bob of a simple pendulum of length 'L' is released at time $t = 0$ from a position of small angular displacement at time 't' is

1. $x = a \sin\left(2\pi\sqrt{\frac{L}{g}}t\right)$
2. $x = a \cos\left(2\pi\sqrt{\frac{g}{L}}t\right)$
3. $x = a \sin\left(\sqrt{\frac{g}{L}}t\right)$
4. $x = a \cos\left(\sqrt{\frac{g}{L}}t\right)$

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7) The force required to separate two glass plates of area $10^{-2} m^2$ with a film of water of 0.05 mm thick between them, is (surface tension of water = $70 \times 10^{-3} Nm^{-1}$)

1. 28 N
2. 14 N
3. 50 N
4. 38 N

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8) A storage battery of e.m.f 8.0 V and internal resistance 0.5Ω is being charged by a 120 v d.c. supply using a series resistor of 15.5Ω. The terminal voltage of the battery during charging is

1. 11.5 V
2. 15.1 V
3. 10.6 V
4. 12.1 V

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9) A student measures the time period of 100 oscillations of a simple pendulum four times. The data set is 90 s, 95 s, 91 s and 92 s. If the minimum division in the measuring clock is 1 s, then the reported mean time should be

1. $92 \pm 5.0\ s$
2. $92 \pm 1.8\ s$
3. $92 \pm 3\ s$

4. $92 \pm 2\ s$

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10) A body cools from $80^0 C$ to $64^0 C$ in 5 min and same body cools from $80^0 C$ to $52^0 C$ in 10 min, what is the temperature of the surrounding?

1. $28^0 C$
2. $22^0 C$
3. $24^0 C$
4. $25^0 C$

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11) If the energy released in the fission of one nucleus is 200 MeV. Then the number of nuclei required per second in a power plant of 16 kW will be

1. 0.5×10^{14}
2. 0.5×10^{12}
3. 5×10^{12}
4. 5×10^{14}

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12) The rms value of the electric field of light coming from the Sun is $720\ NC^{-1}$. The average total energy density of the electromagnetic wave is

1. $4.58 \times 10^{-6}\ Jm^{-3}$
2. $6.37 \times 10^{-9}\ Jm^{-3}$
3. $81.35 \times 10^{-12}\ Jm^{-3}$
4. $3.3 \times 10^{-3}\ Jm^{-3}$

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13) A particle is projected with a velocity 'U' so that its horizontal range is twice the greatest height attained. The horizontal range is

1. $\frac{U^2}{g}$
2. $\frac{2U^2}{3g}$
3. $\frac{4U^2}{5g}$
4. $\frac{U^2}{2g}$

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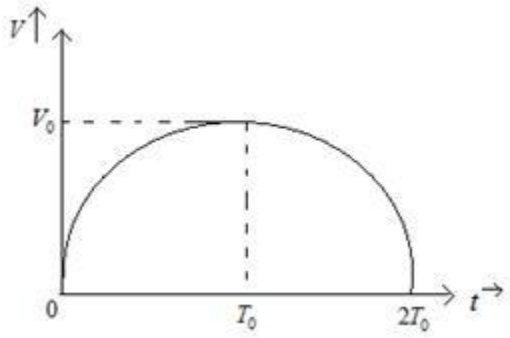
14) The velocity (V_0), time (t) of a particle is semicircle as shown in the figure. The average velocity of the particle in the time from $t_1 = 0$ to $t_2 = 2T_0$ is



1. $\frac{V_0}{4}$
2. $\frac{\pi V_0}{4}$
3. $\frac{\pi V_0^2}{4T_0}$
4. $\frac{\pi T_0}{4}$

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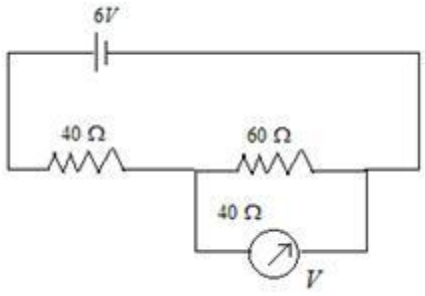
15) The reading of voltmeter in the circuit shown is



1. 6.25 V
2. 4.25 V
3. 3.25 V
4. 2.25 V

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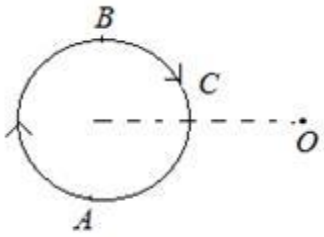
16) A small source of sound moves on a circle as shown in figure and an observer is sitting at 'O'. Let n_A, n_B, n_C be the frequencies heard when the source is at A,B and C respectively



1. $n_A > n_B > n_C$
2. $n_A = n_B > n_C$
3. $n_B > n_C > n_A$
4. $n_A > n_C > n_B$

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17) An ideal gas undergoes a quasi static, reversible process in which its molar heat capacity 'C' remains constant. If during this process the relation between pressure P and volume 'V' is given by PV^n = constant, then 'n' is given by (Here C_P and C_V are molar specific heat at constant pressure and volume respectively)

1. $\frac{C - C_P}{C - C_V}$
2. $\frac{C_P - C}{C - C_V}$
3. $\frac{C - C_V}{C - C_P}$
4. $\frac{C_P}{C_V}$

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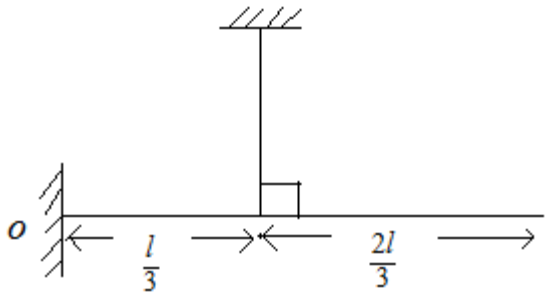
18) A rod of mass 'm' and length 'l' hinged in a vertical wall and kept horizontal by mass less vertical thread as shown. Tension in thread is



1. $\frac{3}{2}$ mg
2. $\frac{mg}{2}$
3. mg
4. 2 mg

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19) Three resistors of resistances $2\Omega, 3\Omega$ and 6Ω are available to be connected across a battery of internal resistance 1Ω and emf 4 volt by means of conducting wires. The maximum current that can be drawn through the cell by using all the given resistances is

1. 8 A
2. 2 A

3. 4 A
4. 3 A

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20) Three capacitors each of capacitance C and breakdown voltage ‘V’ are joined in series. The capacitance and breakdown voltage of the combination will be

1. $\frac{C}{3}, 3V$
2. $3C, \frac{V}{3}$
3. $3C, 3V$
4. $\frac{C}{3}, \frac{V}{3}$

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21) A neutron moving with a speed ‘V’ makes a head on collision with a stationary hydrogen atom in ground state. The minimum kinetic energy of the neutron for which inelastic collision will take place is

1. 10.2 eV
2. 12.1 eV
3. 16.8 eV
4. 20.4 eV

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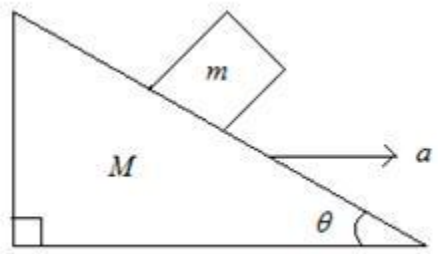
22) A block of mass ‘m’ is placed on a wedge of mass ‘M’. The acceleration with which the wedge should be moved so that the block will be at rest with respect to wedge is



1. $g \tan\theta$
2. $g \cot\theta$
3. $g \sin\theta$
4. $g \cos\theta$

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23) Two small magnets have their masses and lengths in the ratio 1:2. The maximum torques experienced by them in a uniform magnetic field are the same. For small oscillations, the ratio of their time periods is

1. $\frac{1}{\sqrt{2}}$
2. $\frac{1}{2\sqrt{2}}$

3. $\frac{1}{2}$
4. $2\sqrt{2}$

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24) An α - particle pass through a potential difference of $2\times10^{6}\ V$ and then it becomes incident on a silver foil. The charge number of silver is 47. The energy of incident particles will be (in joule)

1. 5×10^{-12}
2. 5.8×10^{-14}
3. 9.1×10^{-15}
4. 6.4×10^{-13}

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25) The activity of a radioactive sample is measured as N_0 counts per minute at $t=0$ and N_0/e counts per minute at $t=5$ min. The time (in minute) at which the activity reduces to half its value is

1. $\log_e \frac{2}{5}$
2. $\frac{5}{\log_e 2}$
3. $5\log_{10} 2$
4. $5\log_e 2$

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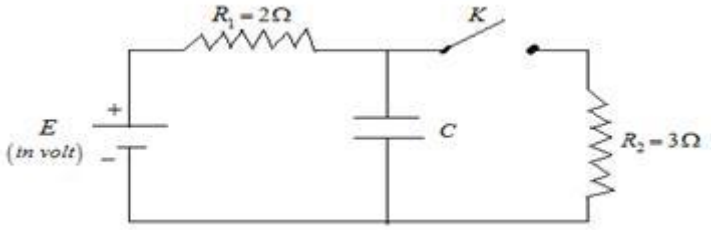
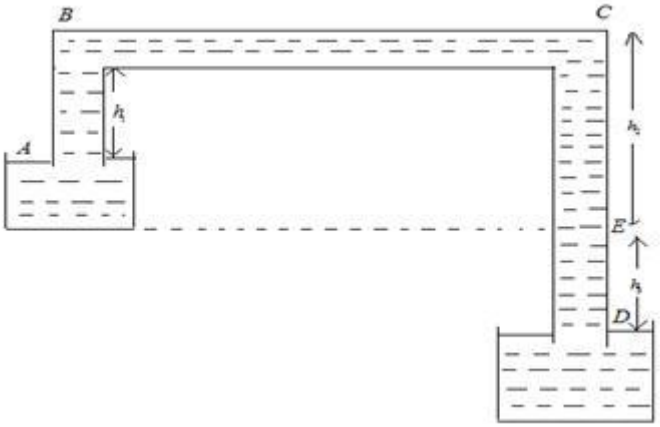
26) In the circuit shown in the figure 'K' is open. The charge on capacitor 'C' in steady is q_1. Now key is closed and at steady state charge on 'C' is q_2. The ratio of charges $\frac{q_1}{q_2}$ is



1. 1
2. $\frac{2}{3}$
3. $\frac{5}{3}$
4. $\frac{3}{5}$

27) In the siphon as shown, which of the options is not correct, if $h_2 > h_1, h_3 < h_1$?



1. $P_E < P_D$
2. $P_E < P_C$
3. $P_B < P_E$
4. $P_B > P_C$

28) Two stars are 10 light years away from the earth. They are seen through a telescope of objective diameter 30 cm. The wave length of light 600 nm. To see the stars just resolved by the telescope, the minimum distance between them should be (1 light year = 9.46×10^{15} m) of the order of

1. 10^{11} km
2. 10^{7} km
3. 10^{8} km
4. 10^{4} km

29) A wire can be broken by applying a load of 10 kg wt. The force required to break the wire of twice the diameter is

1. 10 kg wt
2. 80 kg wt
3. 20 kg wt
4. 40 kg wt

30) The number of possible natural oscillations of air column in a pipe closed at one end of length 85 cm whose frequencies lie below 1250 Hz are (velocity of sound in air = $340 ms^{-1}$)

1. 7
2. 6
3. 5
4. 4

31) A car of weight 'W' is an inclined road that rises by 100 m over a distance of 1 km

and applies a constant frictional force $\frac{W}{20}$ on the car while moving up hill on the road at a speed of $10\,ms^{-1}$ the car needs power 'P'. If it needs power $\frac{P}{2}$ while moving downhill at speed 'V' then value of 'V' is

1. $10\,ms^{-1}$
2. $15ms^{-1}$
3. $5ms^{-1}$
4. $20\,ms^{-1}$

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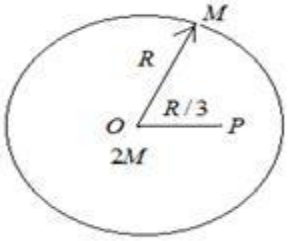
32) At the centre of a spherical shell of mass 'M' and radius 'R', a point mass 2 M is placed. Then gravitational potential at distance $\frac{R}{3}$ from the centre is



1. $\frac{-GM}{R}$
2. $\frac{-7GM}{R}$
3. $\frac{-3GM}{R}$
4. $\frac{+3GM}{R}$

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33) A telescope has an objective lens of focal length 200 cm and eyepiece with focal length 2 cm. If the telescope is used to see a 20 m tall building at a distance 2 km, the height of the image of the building formed by the objective lens is

1. 1 cm
2. 2 cm
3. 5 cm
4. 10 cm

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34) The velocity 'V' of a particle is given by the equation $V = 6t^2 - 6t^3$. Where 'V' is in ms^{-1} and 't' is time in seconds then

1. at $t = \frac{2}{3}$, velocity is minimum
2. minimum velocity is $2\,ms^{-1}$

3. minimum velocity is zero
4. at $t = 1$ sec, velocity is minimum

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35) A car moves at a constant speed on a road as shown in the figure. The normal force by the road on the car is N_A and N_B when it is at points 'A' and 'B' respectively. Then

1. $N_A = N_B$
2. $N_A > N_B$
3. $N_A < N_B$
4. insufficient information

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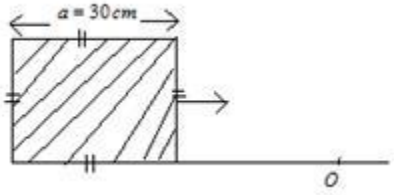
36) A cubical block of side 30 cm is moving with velocity $2\,ms^{-1}$ on a smooth horizontal surface. The surface has a bump at a point 'O' as shown in figure. The angular velocity (in $rads^{-1}$) of the block immediately after it hits the bump is



1. 9.4
2. 8.0
3. 5.0
4. 13.3

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37) The input resistance of a common emitter transistor amplifier, if the output resistance is $500\,K\Omega$, the current gain $\alpha = 0.98$ and power gain is 6.0625×10^6, is

1. $98\,\Omega$
2. $300\,\Omega$
3. $198\,\Omega$
4. $400\,\Omega$

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38) What is the minimum energy required to launch a satellite of mass 'm' from the surface of a planet of mass 'M' and radius 'R' in a circular orbit at an altitude 2R?

1. $\frac{GMm}{3R}$
2. $\frac{GMm}{2R}$
3. $\frac{5GMm}{6R}$
4. $\frac{2GMm}{3R}$

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39) A capacitance of $\left(\frac{10^{-3}}{2\pi}\right)F$ and an inductance of $\frac{100}{\pi}mH$ and a resistance of $10\ \Omega$ are connected in series with an AC voltage source of 220 V, 50 Hz. The phase angle of the circuit is

1. 90^0
2. 60^0
3. 45^0
4. 30^0

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40) Lenz's law is consequence of

1. Law of conservation of mass
2. Law of conservation of linear momentum
3. Law of conservation of angular momentum
4. Law of conservation of energy

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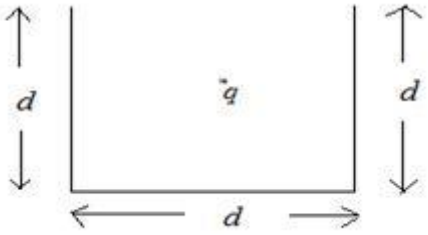
41) A charge is placed at the centre of the cubical vessel (with one face open) as shown in figure. The flux of the electric field through the surface of the vessel is



1. $\frac{q}{\epsilon_0}$
2. $\frac{q}{4\epsilon_0}$
3. zero
4. $\frac{5q}{6\epsilon_0}$

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42) A hydrogen atom in its irradiated by light of wave length 970Å. The number of lines present in the emission spectrum is

1. 6
2. 4
3. 3
4. 1

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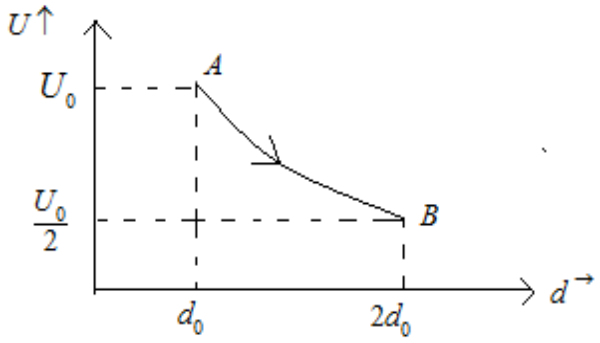
43) For a diatomic gas having ‘n’ moles a graph is drawn between internal energy (U) and density (d). When the gas changes from state ‘A’ to state ‘B’ the shape of the graph is hyperbolic. The work done by the gas is



1. $\frac{-U_0}{5}$
2. $\frac{-U_0}{2}$
3. $\frac{-U_0}{3}$
4. $-U_0$

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44) A square loop of wire, side length 10 cm and 1Ω resistance is placed at an angle of 45^0 with a magnetic field that changes uniformly from 0.1 T to zero in 0.7 seconds. The induced current in the loop is

1. 4.0 mA
2. 1.0 mA
3. 2.5 mA
4. 3.5 mA

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45) In Young’s double slit experiment the phase difference between the two waves reaching at the location of the third dark fringe is

1. 6π
2. 7π
3. 5π
4. π

NEET-4 Answers

Physics

1) 4	2) 1	3) 4	4) 1	5) 2	6) 4	7) 1	8) 1	9) 4	10) 3	11) 4	12) 1
13) 3	14) 2	15) 4	16) 3	17) 1	18) 1	19) 2	20) 1	21) 4	22) 1	23) 2	24) 4
25) 4	26) 3	27) 3	28) 2	29) 4	30) 2	31) 2	32) 2	33) 2	34) 3	35) 3	36) 3
37) 3	38) 3	39) 3	40) 4	41) 4	42) 1	43) 1	44) 2	45) 3			