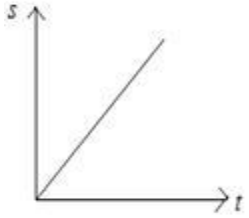
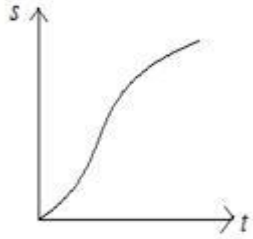
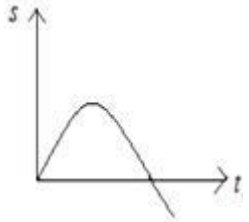
NEET-2020 Model Paper-2

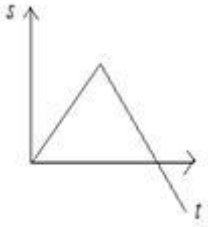
Physics

1) A particle is moving in x-y plane with $y = \frac{x}{2}$ and $V_x = 4 - 2t$. The displacement versus time graph of the particle would be

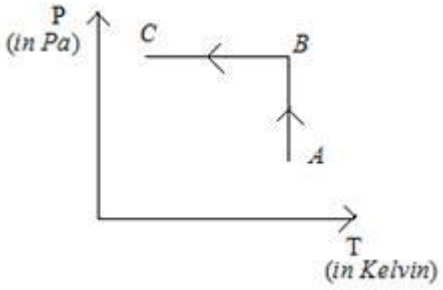
1. 

2. 

3. 

4. 

2) Ideal gas is taken through the process shown in the figure.



1. In process AB, heat is rejected
2. In process AB, work done by system is positive
3. In process AB, internal energy increases
4. In process AB internal energy decreases and in process BC, internal energy increases

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3) A concave mirror has a focal length 20 cm. The distance between the two positions of the object for which the image size is double the object size is
1. 60 cm
2. 40 cm
3. 30 cm
4. 20 cm

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4) Five very long, straight wires are bound together to form a small cable. Currents carried by the wires are $i_1 = 20A, i_2 = -6A, i_3 = 12A, i_4 = -7A, i_5 = 18A$. The magnetic induction at a distance of 10 cm from the cable is
1. 34 mT
2. $34\mu T$
3. $74mT$
4. $74\mu T$

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5) A body of mass 'm' is placed on the earth's surface. It is taken from the earth's surface to a height $h = 3R$. The change in gravitational potential energy of the body is
1. $\frac{2}{3}mgR$
2. $\frac{3}{4}mgR$
3. $\frac{mgR}{2}$
4. $\frac{mgR}{4}$

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6) An electric kettle takes 4A current of 220 V. How much time will it take to boil 1 kg of water from temperature 20^0C? The temperature of boiling water is 100^0C.
1. 4.2 min
2. 6.3 min
3. 8.4 min
4. 12.6 min

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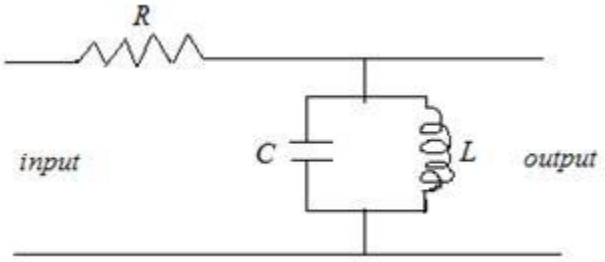
7) A steady current flows in a metallic conductor of non-uniform cross-section. The quantity/ quantities constant along the length of the conductor is / are
1. current , electric field and drift speed
2. drift speed only
3. current and drift speed
4. current only

8) The circuit shown below acts as



1. tuned filter
2. low pass filter
3. high pass filter
4. rectifier

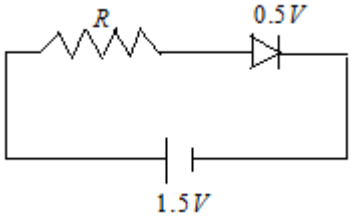
9) The displacement 'x' of a particle varies with time 't' as $x = ae^{-\alpha t} + be^{\beta t}$ where a, b, α and β are positive constants. The velocity of the particle will

1. go on decreasing with time
2. be independent of α and β
3. drop to zero when $\alpha = \beta$
4. go on increasing with time

10) Speed of sound wave is 'v'. If a reflector moves towards a stationary source emitting waves of frequency 'f' with speed 'U', the frequency of reflected wave will be

1. $\left(\frac{v-u}{v}\right)f$
2. $\left(\frac{v+u}{v}\right)f$
3. $\left(\frac{v-u}{v+u}\right)f$
4. $\left(\frac{v+u}{v-u}\right)f$

11) The diode used in the circuit shown in the figure has a constant voltage drop of 0.5 V at all currents and a maximum power rating of 100 mW. What should be the value of the resistor 'R', connected in series with the diode for obtaining maximum current



1. $\mathbf{1.5}\Omega$

2. $\mathbf{5}\ \Omega$
3. $\mathbf{6.67}\ \Omega$
4. $\mathbf{200}\ \Omega$

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12) A body is placed on a rough inclined plane of inclination θ. As the angle 'θ' is increased from 0^0 to 90^0 the contact force between the block and the plane

1. remains constant
2. first remains constant then decreases
3. first decreases then increases
4. first increases then decreases

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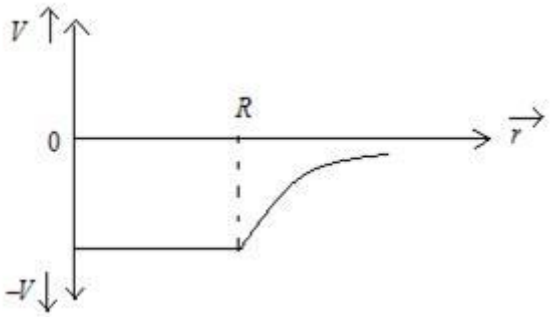
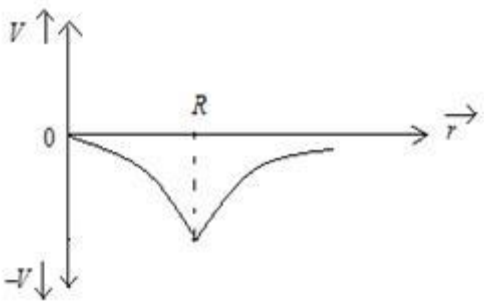
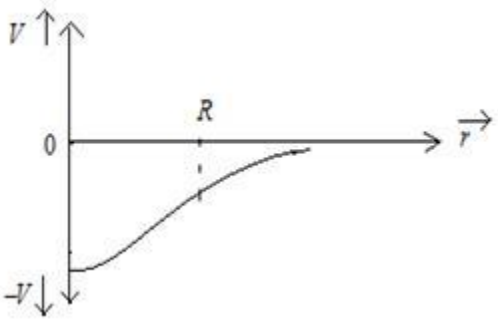
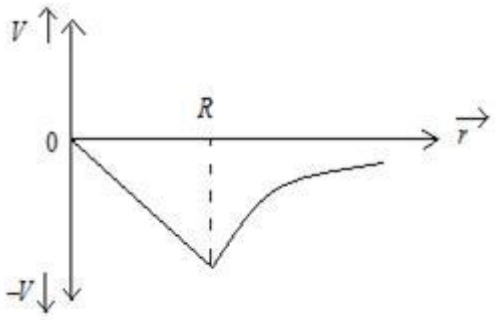
13) The graph showing the variation of gravitational potential of the earth (V) with distance (r) from the centre of the earth is (R = Radius of the earth)

1. 

2. 

3. 

4. 

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14) An ideal spring with spring constant ‘K’ is hung from the ceiling and a block of mass ‘M’ is attached to its lower end. The mass is released with the spring initially unstreched. Then the maximum extension in the spring is (g = acceleration due to gravity)

1. $\frac{4Mg}{K}$
2. $\frac{Mg}{K}$
3. $\frac{2Mg}{K}$
4. $\frac{3Mg}{K}$

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15) $\frac{E^2}{\mu_0}$ has the dimensions (E = electric field strength, μ_0 = permeability of free space)

1. MLT^{-4}
2. $M^2L^3T^{-2}A^2$
3. ML^3T^{-2}
4. $M^{-1}L^2TA^{-2}$

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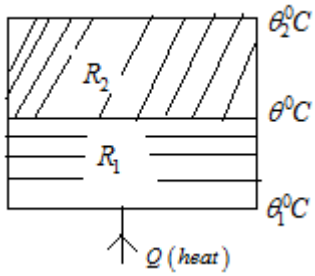
16) An open organ pipe of length ‘*l*’ is sounded together with another open organ pipe of length $l+x$ in their fundamental tones. Speed of sound in air is ‘V’. The beat frequency heard will be $(x << l)$

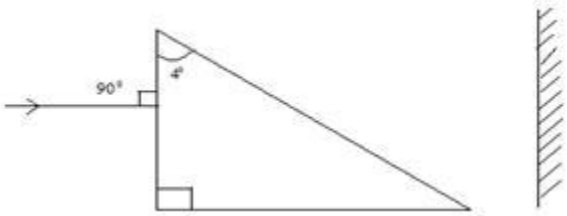
1. $\frac{Vx}{2l^2}$
2. $\frac{Vl^2}{2x}$
3. $\frac{Vx^2}{2l}$
4. $\frac{Vx}{4l^2}$

17) Consider the two insulating sheets with thermal resistance R_1 and R_2 as shown in figure. The temperature 'θ' is



1. $\frac{\theta_1 R_2 + \theta_2 R_1}{R_1 + R_2}$
2. $\frac{\theta_1 R_1 + \theta_2 R_2}{R_1 + R_2}$
3. $\frac{\theta_1 \theta_2 R_1 R_2}{(\theta_1 + \theta_2)(R_1 + R_2)}$
4. $\frac{(\theta_1 + \theta_2) R_1 R_2}{R_1^2 + R_2^2}$

18) A prism having an apex angle 4^0 and refractive index 1.5 is located infront of a vertical plane mirror as shown in figure. Through what total angle is the ray deviated after reflect from the mirror?



1. 2^0
2. 4^0
3. 176^0
4. 178^0

19) In a sample of a radioactive substance what fraction of the initial number of nuclei will remain undecayed after a time $t = \frac{T}{2}$ where T = half life period of radio a substance

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

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

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20) The voltage of clouds is $4\times10^{6}V$ with respect to ground. In a lightning strike lasting 100 ms, a charge of 4 C is delivered to the ground. The power of lighting strike is

1. 20 MW
2. 80 MW
3. 160 MW
4. 500 MW

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21) The potential field of an electric field $\vec{E}=\left(Y\hat{i}+x\hat{j}\right)$ is

$\vec{E}=\left(Y\hat{i}+x\hat{j}\right)$

1. $V=-xy$ + constant
2. $V=-(x+y)$ + constant
3. $V=-\left(x^{2}+y^{2}\right)$ + constant
4. V = constant

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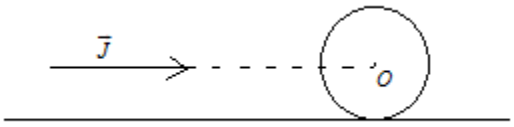
22) An impulse ‘J’ is applied on a ring of mass ‘m’ along a line passing through its centre ‘O’. The ring is placed on a rough horizontal surface. The linear velocity of ring once it starts rolling without slipping is



1. $\frac{J}{m}$
2. $\frac{J}{2m}$
3. $\frac{J}{3m}$
4. $\frac{J}{4m}$

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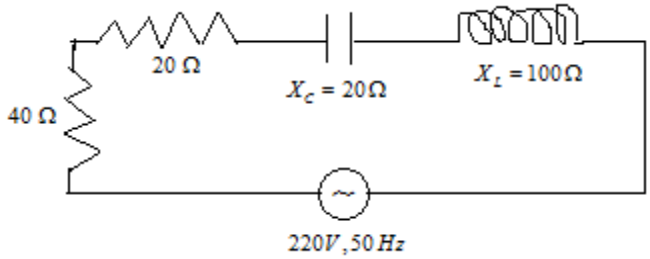
23) The power factor of the circuit shown in the figure is



1. 0.8
2. 0.6
3. 0.4
4. 0.2

---

24) The wavelength λ_e of an electron and λ_p of a photon of same energy E are related by

1. $\lambda_p \propto \lambda_e^2$
2. $\lambda_p \propto \lambda_e$
3. $\lambda_p \propto \sqrt{\lambda_e}$
4. $\lambda_p \propto \frac{1}{\sqrt{\lambda_e}}$

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25) A coil of 'Cu' wire (radius r, self inductance – L) is bent in two concentric turns each having radius $\frac{r}{2}$. The self inductance now

1. 6 L
2. 2 L
3. 4 L
4. $\frac{L}{2}$

---

26) de-Broglie wavelength of an electron in the n^{th} orbit is λ_n and the angular momentum is J_n, then

1. $J_n \propto \lambda_n$
2. $\lambda_n \propto \frac{1}{J_n}$
3. $\lambda_n \propto J_n^2$
4. $\lambda_n \propto \frac{1}{J_n^2}$

27) Which of the following statement is false for the properties of electromagnetic waves?

1. Both electric and magnetic field vectors attain the maxima and minima at the same place and the same time
2. The energy in electromagnetic wave is divided equally between electric and magnetic vectors
3. Both electric and magnetic field vectors are parallel to each other and perpendicular to the direction of propagation of wave
4. These waves do not require any material medium for propagation

Time varying electric, magnetic fields are perpendicular to each other and these two are $\perp^{er}$ to direction of propagation of a wave. (all these three (E,B,C) are mutually perpendicular.

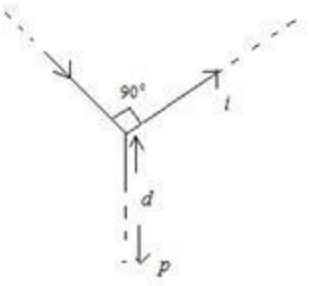
28) Capacity of an isolated sphere is increased 'n' times when it is enclosed by an earthed concentric sphere. The ratio of their radii is

1. $\frac{n^2}{n-1}$
2. $\frac{2n}{n+1}$
3. $\frac{2n+1}{n+1}$
4. $\frac{n}{n-1}$

29) A pump draws water from a reservoir and sends it through a horizontal pipe with speed 'v'. The power of the pump is proportional to

1. V
2. $V^{3/2}$
3. V^2
4. V^3

30) The magnetic field at 'P' due to the arrangement shown in the figure is



1. $\frac{2\mu_0 i}{\sqrt{2}\pi d}\otimes$

2. $\frac{\mu_0 i}{\sqrt{2}\pi d}\otimes$
3. $\frac{\mu_0 i}{\sqrt{2}\pi d}\left(1+\frac{1}{\sqrt{2}}\right)\otimes$
4. $\frac{\mu_0 i}{\sqrt{2}\pi d}\left(1-\frac{1}{\sqrt{2}}\right)\otimes$

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31) Two identical coaxial circular loops carry a current '*i*' each circulating in the same direction. If the loops approach each other
1. the current in each loop will decrease
2. the current in each loop will increase
3. the current in each loop will remain the same
4. the current in one loop will increase and in the other loop will decrease

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32) A monochromatic beam of light is used for the formation of fringes on the screen by illuminating the two slits in the young's double slit interference experiment. When a thin film of mica is interposed in the path of one of the interfering beams, then
1. the fringe width increases
2. the fringe width decreases
3. the fringe width remains the same but the pattern shift
4. the fringe pattern disappears

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33) A particle of mass m, moves with speed 'V' and collides head on with a stationary particle of mass m_2. The first particle continue to move in the same direction of $\frac{m_1}{m_2}$ is (e = coefficient of restitution)
1. < e
2. > e
3. = e
4. $> e^2$

---

34) 0.3 Kg of hot coffee, which is at $70^0 C$ is poured into a cup of mass 0.12 kg. If room temperature is $20^0 C$ then final equilibrium temperature is (Specific heat of coffee $S_{Coffee} = 4080\, J\, kg^{-1} k^{-1}$ and $S_{Cup} = 1020\, J\, kg^{-1} k^{-1}$)
1. $55.5^0 C$
2. $45.5^0 C$
3. $65.5^0 C$
4. $35.5^0 C$

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35) A particle performs S.H.M. in a straight line. In the first second, starting from rest, it travels a distance 'a' and in the second second it travels a distance 'b' in the same direction. The amplitude of the S.H.M. is
1. $a-b$

2. $\frac{2a-b}{3}$
3. $\frac{2a^2}{3a-b}$
4. $\frac{a^2-b^2}{2a}$

---

36) A current of 2 A is increasing at a rate of $4AS^{-1}$ through a coil of inductance 2H. The energy stored in the inductor per unit time in given instant is

1. $2JS^{-1}$
2. $8JS^{-1}$
3. $12JS^{-1}$
4. $16JS^{-1}$

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37) In old age arteries carrying blood in the human body become narrow resulting in an increase in the blood pressure. This follows from

1. Pascal's law
2. Bernoulli's Principle
3. Stoke's law
4. Archimede's Principle

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38) A gas mixture consists of 2 moles of oxygen and 4 moles of argon at temperature 'T'. Neglecting all vibrational modes, the total internal energy of the system is (R = Universal gas constant)

1. 4 RT
2. 9RT
3. 11RT
4. 15RT

---

39) Let K_1 be the maximum kinetic energy of photoelectrons emitted by light of wavelength λ_1 and K_2 correspond to wavelength λ_2. If $\lambda_1 = 2\lambda_2$ then

1. $2K_1 = K_2$
2. $K_1 = 2K_2$
3. $K_1 < \frac{K_2}{2}$
4. $K_1 > 2K_2$

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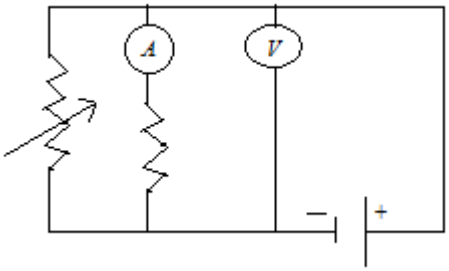
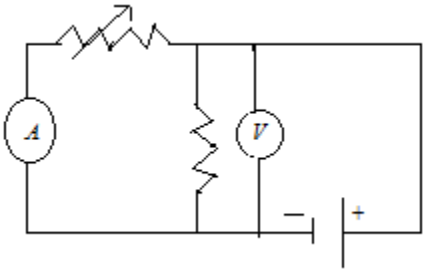
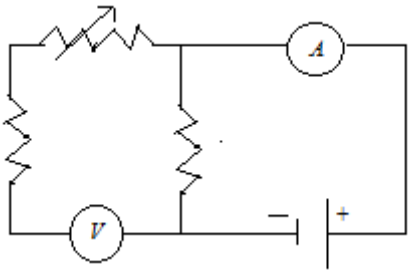
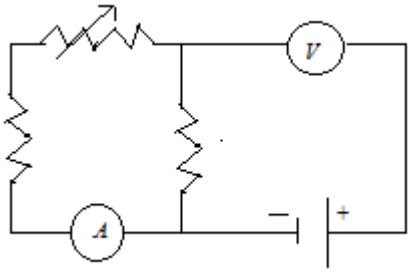
40) Express which of the following set-up can be used to verify ohm's law?

1. 

2. 

3. 

4. 

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41) The Sum, difference and cross product of two vectors $\vec{A}$ and i are mutually perpendicular is

1. $\vec{A}$ and $\vec{B}$ are perpendicular to each other and $|\vec{A}| = |\vec{B}|$
2. $|\vec{A}| = |\vec{B}|$ and their directions are arbitrary
3. $\vec{A}$ and $\vec{B}$ are perpendicular to each other
4. $\vec{A}$ and $\vec{B}$ are perpendicular but their magnitudes are arbitrary

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42) Which one of the following is a possible nuclear reaction?

1. ${}_5B^{10} + {}_2He^4 \rightarrow {}_7N^{13} + {}_1H^1$

2. $_{11}Na^{23} +_1 H^1 \rightarrow_{10} Ne^{20} +_2 He^4$
3. $_{93}Np^{239} \rightarrow_{94} Pu^{239} + \beta^- + \overline{V}$
4. $_7N^{11} +_1 H^1 \rightarrow_6 C^{12} + \beta^- + \overline{V}$

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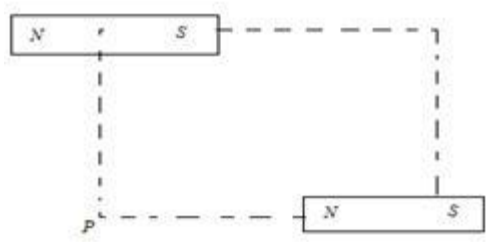
43) Two short magnets of magnetic moment $1000\ Am^2$ are placed as shown at the corners of a square of side 10 cm. The net magnetic induction at 'P' is



1. 0.1 T
2. 0.2 T
3. 0.3 T
4. 0.4 T

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44) A small steel ball falls through a syrup at a constant speed of $1.0\,ms^{-1}$. If the steel ball is pulled upwards with a force equal to twice its effective weight, how fast will it move upward?

1. $0.5\,ms^{-1}$
2. $1.0\,ms^{-1}$
3. $2.0\,ms^{-1}$
4. $2.5\,ms^{-1}$

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45) A rigid spherical body is spinning around an axis without any external torque. Due to temperature its volume increases by 3%. Then percentage change in its angular speed is

1. – 2 %
2. – 4 %
3. – 3 %
4. – 1 %

NEET-2 Answers

Physics

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