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**Class 12**



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# **COMPULSORY QUESTIONS**

**SUBJECT:**

**PHYSICS**

**MR. SS PRITHVI**

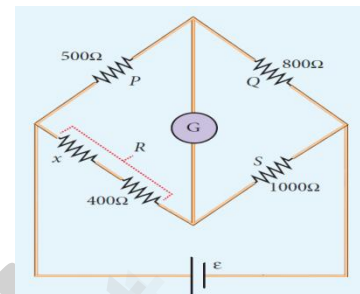
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## First mid term

1	The electric field lines will never intersect. Justify.
2	Two electric bulbs marked 20 W – 220 V and 100 W – 220 V are connected in series to 440 V supply. Which bulb will get fused?
3	A potential difference across 24 ohm resistor is 12 V. what is the current through the resistor? {repeated}
4	A sample of HCl gas is placed in the uniform electric field of magnitude $3 \times 10^{-4} \text{ NC}^{-1}$ . The dipole moment of each HCl molecule is $3.4 \times 10^{-30} \text{ cm}$ . calculate the maximum torque experienced by each HCl molecule. {repeated}
5	If the resistance of coil is $3 \Omega$ at $20^\circ \text{ C}$ and $\alpha = 0.004 / ^\circ \text{C}$ then determine its resistance at $100^\circ \text{C}$ . {repeated}
6	A coil of a tangent galvanometer of diameter 0.24 m has 100 turns. If the horizontal component of Earth's magnetic field is $25 \times 10^{-6} \text{ T}$ then, calculate the current which gives a deflection of $60^\circ$ . {repeated}
7	Why is it safer to sit inside a bus during lightning than In oprn air or under a tree? {Repeated}
8	Determine the number of electrons flowing per second through a conductor, when a current of 32 A flows through it.
9	A parallel plate capacitor has square plates of side 5 cm and separated by a distance of 1 mm. (a) Calculate the capacitance of this capacitor. {repeated}
10	Define drift velocity. Write its unit.
11	The resistance of nichrome wire at 0 degree celsius is 10

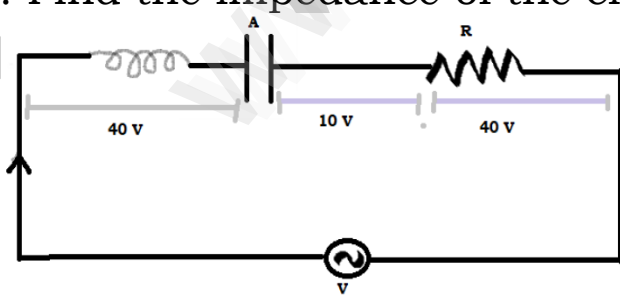
	ohm. If its temperature coefficient of resistance is $0.004/^{\circ}\text{C}$ , Find its resistance at boiling point of water. comment on the result.
12	Resistance of a material at $20^{\circ}\text{C}$ and $40^{\circ}\text{C}$ are $45\ \Omega$ and $85\ \Omega$ respectively. Find its temperature coefficient of resistivity.
13	Derive an expression for energy stored in capacitor.
14	The temperature coefficient of resistance of a wire is $0.00125\ \text{per } ^{\circ}\text{C}$ . At $20^{\circ}\text{C}$ , its resistance is $1\ \Omega$ . The resistance of the wire will be $2\ \Omega$ at what? {asked from book back 1 mark question}{repeated}
15	In a meter bridge experiment, the value of resistance in the resistance box connected in the right gap is $10\ \Omega$ . The balancing length is $l_1 = 55\ \text{cm}$ . Find the value of unknown resistance. {repeated}
16	How many $160\ \Omega$ resistor in parallel are required to carry out a current of $5\text{A}$ on a $100\ \text{V}$ line?
17	A $3.0\ \text{m}$ wire carrying a current of $10\text{A}$ is placed inside a solenoid perpendicular to its axis. The magnetic field inside the solenoid is given to be $0.277\ \text{T}$ . what is the magnetic force on the wire?
18	Calculate the no of electrons in one coulomb of negative charge.
19	Consider a point charge $+q$ placed at the origin and another point charge $-2q$ placed at a distance of $9\ \text{m}$ from the charge $+q$ . Determine the point between the two charges at which electric potential is zero. {repeated}
20	What is the value of $x$ when the Wheatstone's network is balanced? $P = 500\ \Omega$ , $Q = 800\ \Omega$ , $R = x + 400$ , $S = 1000\ \Omega$ {EXAMPLE 2.24}



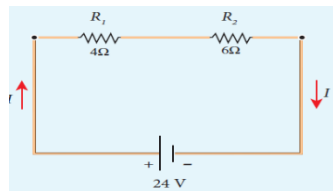
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## QUARTERLY

1	A wire of length $l$ carrying a current $I$ along the Y direction is kept in a magnetic field given by $\vec{B} = \frac{\beta}{\sqrt{3}}(\hat{i} + \hat{j} + \hat{k})T$ . Calculate the magnitude of Lorentz force acting on the wire. { book back 1 m r k }
2	An object is placed at a certain distance from a convex lens of focal length 20 cm. Find the object distance if the image obtained is magnified 4 times.
3	The angle of minimum deviation for an equilateral prism is $37^\circ$ . Find the refractive index of the material of the prism.
4	A coil of a tangent galvanometer of diameter 0.24 m has 100 turns. If the horizontal component of Earth's magnetic field is $25 \times 10^{-6} T$ then, calculate the current which gives a deflection of $60^\circ$ .
5	In a meter bridge experiment, the value of resistance in the resistance box connected in the right gap is 10 Ohm. The balancing length is $l_1 = 55$ cm. Find the value of unknown resistance. {repeated}
6	If the relative permeability and relative permittivity of a medium are 1.0 and 2.25 respectively, find the speed of the electromagnetic wave in this medium.
7	A parallel plate capacitor filled with mica having $\epsilon_r = 5$ is connected to a 10 V battery. The area of each parallel plate is 6

	cm <sup>2</sup> and separation distance is 6 mm. (a) Find the capacitance and stored charge. (b) After the capacitor is fully charged, the battery is disconnected and the dielectric is removed carefully. Calculate the new values of capacitance, stored energy and charge.
8	The equation for an alternating current is given by $i = 77 \sin 314t$ . Find the peak current, frequency, time period and instantaneous value of current at $t = 2$ ms. {REPEATED}
9	In a Wheatstone's bridge $P = 100 \Omega$ , $Q = 1000 \Omega$ and $R = 40 \Omega$ . If the galvanometer shows zero deflection, determine the value of $S$ .
10	Compute the speed of the electromagnetic wave in a medium if the amplitude of electric and magnetic fields are $3 \times 10^4 \text{ NC}^{-1}$ and $2 \times 10^{-4} \text{ T}$ respectively.
11	Find the heat energy produced in a resistance of $10 \text{ OHM}$ when $5 \text{ A}$ current flows through it for 5 minutes.
12	Dielectric strength of air is $3 \times 10^6 \text{ V m}^{-1}$ . Suppose the radius of a hollow sphere in the Van de Graff generator is $R = 0.5 \text{ m}$ , calculate the maximum potential difference created by this Van de Graaff generator.
13	An inductor of inductance $L$ , a capacitor of capacitance $C$ and a resistor of $R$ are connected in series to AC source of potential difference $V$ volt as shown in the figure. Potential difference across $L, C$ and $R$ is $40\text{V}$ , $10\text{V}$ and $40\text{V}$ respectively. The amplitude of current flowing through LCR series circuit is $10\sqrt{2} \text{ A}$ . Find the impedance of the circuit.
	
14	Why are dish antennas curved ?
15	The self-inductance of an air-core solenoid is $4.8 \text{ mH}$ . If its core is replaced by iron core, then its self-inductance becomes $1.8 \text{ H}$ .

	Find out the relative permeability of iron.
16	An ideal transformer has 460 and 40,000 turns in the primary and secondary coils respectively. Find the voltage developed per turn of the secondary if the transformer is connected to a 230 V AC mains. The secondary is given to a load of resistance 104 $\Omega$ . Calculate the power delivered to the load.
17	An electron moving perpendicular to a uniform magnetic field 0.500 T undergoes circular motion of radius 2.50 mm. What is the speed of electron?
18	From the given circuit, Find i) Equivalent emf of the combination ii) Equivalent internal resistance iii) Total current iv) Potential difference across external resistance v) Potential difference across each cell
19	A stepdown transformer connected to a main supply of 220V is used to operate 11V.88W lamp. Calculate voltage transformation ratio.
20	A coil of a tangent galvanometer of diameter 0.24 m has 100 turns. If the horizontal component of Earth's magnetic field is $25 \times 10^{-6}$ T then, calculate the current which gives a deflection of $60^\circ$ .
21	A series RLC circuit which resonates at 400 kHz has 80 $\mu$ H inductor, 2000 pF capacitor and 50 $\Omega$ resistor. Calculate (i) Q-factor of the circuit (ii) the new value of capacitance when the value of inductance is doubled and (iii) the new Q-factor.
22	If the relative permeability and relative permittivity of a medium are 1.0 and 2.25 respectively, find the speed of the electromagnetic wave in this medium.
23	Where the object to be placed to form image as 4 times of the object for the convex lens having focal length 20 cm.
24	The magnetic flux passing through a coil perpendicular to its plane is function of time and is given by $\phi = (2t^3 + 4t^2 + 8t + 8)$ wb. If the resistance of the coil is 5 $\Omega$ , determine the induced current through the coil at a time $t=3$ second.
25	The relative magnetic permeability of the medium is 2.5 the relative electrical permittivity of the medium is 2.25. Compute

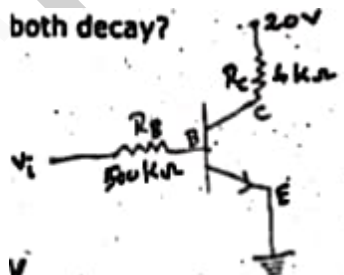
	the refractive index of the medium.
26	A copper wire of cross-sectional area $0.5 \text{ mm}^2$ carries a current of $0.2 \text{ A}$ . If the free electron density of copper is $8.4 \times 10^{28} \text{ m}^{-3}$ then compute the drift velocity of free electrons. {repeated}
27	Consider a point charge $+q$ placed at the origin and another point charge $-2q$ placed at a distance of $9 \text{ m}$ from the charge $+q$ . Determine the point between the two charges at which electric potential is zero. {repeated}
28	A cell supplies a current of $0.9 \text{ A}$ through a $2 \Omega$ resistor and a current of $0.3 \text{ A}$ through a $7 \Omega$ resistor. Calculate the internal resistance of the cell.
29	Pure water has refractive index $1.33$ . What is the speed of light through it?
30	A parallel plate capacitor has square plates of side $5 \text{ cm}$ and separated by a distance of $1 \text{ mm}$ . Calculate the capacitance of this capacitor.
31	Light travels from air into a glass slab of thickness $50 \text{ cm}$ and refractive index $1.5$ . What is the time taken by the light to travel through the glass slab?
32	Calculate the equivalent resistance for the circuit which is connected to $24 \text{ V}$ battery and also find the potential difference across each resistors in the circuit.
	
33	In cyclotron the velocity of the revolving ions in the spiral path is gradually increased along with the radius of the path. Give the reason for it.
34	Find the impedance of a series $RLC$ circuit if the inductive reactance, capacitive reactance and resistance are $184 \Omega$ , $144 \Omega$ and $30 \Omega$ respectively. Also calculate the phase angle between voltage and current.

## 2<sup>nd</sup> MID TERM

1	Calculate the cut off wavelength of x-rays accelerating potential 20,000V.
2	Calculate the time required for 60% of a sample of radon undergoes decay. $T_{1/2}$ of radon = 3.8 days.
3	Calculate the distance upto which ray optics is a good approximation for light of wavelength 500 nm falls on an aperture of width 0.5 mm.
4	Calculate the cut-off wavelength and cut-off frequency of x-rays from an x-ray tube of accelerating potential 20,000 V.
5	The radius of the 5th orbit of hydrogen atom is 13.25 Å. Calculate the de broglie wavelength of the electron orbiting in the 5th orbit. <b>[repeated]</b>
6	A diffraction grating consists of 4000 slits per centimeter. It is illuminated by a monochromatic light. The second order diffraction maximum is produced at an angle of 30°. What is the wavelength of the light used?
7	A radioactive sample has a half-life of 10 minutes. Calculate its mean life.
8	The wavelength of light is 450 nm. How much phase it will differ for a path of 3mm?

9	Two light sources with amplitude 5 units and 3 units respectively - interface with each other. Calculate the ratio of maximum and minimum intensities.
10	How many photons per second emanate from a 50mW laser of 640 nm ?
11	A microscope has an objective and eyepiece of focal length 5 cm and 50 cm respectively with tube length 30cm. Calculate the magnification (m) at near point.
12	An object is placed in front of a concave mirror of focal length 20 cm. The image formed is three times the size of the object. Calculate two possible distances of the object from the mirror.
13	What is myopia ? what is it's remedy ?
14	A radiation of wavelength 300 nm is incident on a silver surface. Will photoelectrons be observed? [work function of silver = 4.7 eV] [repeated]
15	A proton and a deuteron have the same velocity. What is the ratio of their de-broglie wavelengths ?
16	Give the reason for colourful appearance on the read/writable side of a CD.
17	Calculate the distance upto which ray optics is a good approximation for light of wavelength 500 nm falls on an aperture of width 0.5 mm.
18	A microscope has an objective and eyepiece of focal lengths 5 cm and 50 cm respectively with tube length 30 cm. Find the magnification of the microscope in the (a) near point and (b) normal focusing.
19	Differentiate nuclear fission and nuclear fusion.
20	Calculate the number of nuclei of carbon-14 undecayed after 22,920 years if the initial number of carbon-14 atoms is 10,000. The half-life of carbon-14 is 5730 years.

21	Half lives of two radioactive elements A and B are 20 minutes and 40 minutes respectively. Initially, the samples have equal number of nuclei. Calculate the ratio of decayed numbers of A and B nuclei after 80 minutes.
<b>HALF YEARLY</b>	
1	A spherical stone and a spherical metallic ball of same size and mass are dropped from the same height. Which one, a stone or a metal ball, will reach the Earth's surface first? Justify your answer. Assume that there is no air friction.
2	A dipole is formed by two charges of $5\ \mu\text{C}$ and $-5\ \mu\text{C}$ at a distance of 8 mm. Find the electric field at a) a point 25 cm away from center of dipole along its axial line b) a point 20 cm away from center of dipole along its equatorial line
3	Calculate the cut-off wavelength and cut-off frequency of x-rays from an x-ray tube of accelerating potential 20,000 V.
4	What is the focal length of the combination if the lenses of focal lengths $-70\text{ cm}$ and $150\text{ cm}$ are in contact? What is the power of the combination?
5	Give the symbolic representation of (i) alpha decay and (ii) beta decay
6	Obtain an expression for drift velocity.
7	Calculate the energies of the photons of X - rays wavelength $0.1\text{ nm}$ .

8	Two resistors when connected in series and parallel, their equivalent resistances are $15\ \Omega$ and $56/15\ \Omega$ respectively. Find the values of the resistances.
9	Two materials X and Y are magnetised whose values of intensity of magnetization are $500\ \text{Am}^{-1}$ and $2000\ \text{Am}^{-1}$ respectively. If the magnetizing field is $1000\ \text{Am}^{-1}$ , then which one among the sematerials can be magnetized?
10	UV light of wavelength $1800\ \text{\AA}$ is incident on a lithium surface whose threshold wavelength $4965\ \text{\AA}$ . Calculate the maximum Kinetic energy of the electron emitted in eV.
11	Determine the wavelength of light emitted from LED which is made up of GaAsP semiconductor whose forbidden energy gap is $1.875\ \text{eV}$ . Mention the colour of the light emitted. (Take $h = 6.6 \times 10^{-34}\ \text{Js}$ )
12	<p>In the circuit shown in the figure; the input voltage <math>V_i = 20\text{V}</math>, <math>V_{BE} = 0\text{V}</math> and <math>V_{CE} = 0\text{V}</math> and <math>I_B</math>, <math>I_C</math> and <math>\beta</math>.</p> 
13	The self - inductance of an air core solenoid is $4.8\text{mH}$ . If its core is replaced by iron core, then its self - inductance becomes $1.8\text{H}$ . Find out the relative permeability of iron.
14	Calculate the time required for 60% of a sample of radon undergo decay. Given $T_{1/2}$ of radon = 3.8 days.

15	If the resistance of a coil is $3\Omega$ at $20^\circ\text{C}$ : Find the resistance at $100^\circ\text{C}$ . (Given $\alpha = 0.004/^\circ\text{C}$ )
16	A proton and an electron have same de Broglie wavelength. Which of them moves faster and which possesses more kinetic energy?
17	Prove the Boolean Identity $AC + ABC = AC$ and give its circuit description.
18	Let the magnetic moment of a bar magnet be $\vec{P}_m$ whose magnetic length is $d = 2l$ and pole strength is $q_m$ . Compute the magnetic moment of the bar magnet when it is cut into two pieces (a) along its length (b) perpendicular to its length.
19	The equation for an alternating current is given by $i = 77 \sin 314 t$ . Find the peak current, frequency of current.
20	A monochromatic light of wavelength of $500 \text{ nm}$ strikes a grating and produces fourth order maximum at angle of $30^\circ$ . Find the number of slits per centimetre.
21	Compute the current in the wire if a charge of $120\text{C}$ is flowing through a copper wire in 1 minute.
22	Calculate the cut - off wavelength and cut-off frequency of x-rays from an x-rays tube of accelerating potential $20,000\text{V}$ .
23	

	If the focal length is 150 cm for a lens, what is the power of the lens?
24	Resistance of a material at 20°C and 40°C are 45 and 85 respectively. Find its temperature coefficient of resistivity.
25	Find the ratio of the intensities of lights with wavelength 500 nm and 300nm which undergo Rayleigh scattering.
26	i) Why does sky appear blue? ii) What is the reason for reddish appearance of sky during sunset and sunrise?
27	The self-inductance of an air-core solenoid is 4.8 mH. If its core is replaced by iron core, then its self-inductance becomes 1.8 H. Find out the relative permeability of iron.

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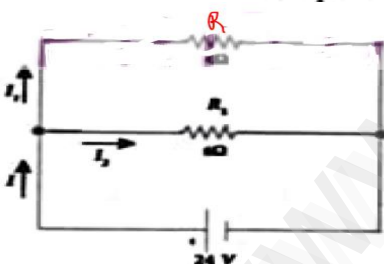
## REVISION 1 & 2

1	Consider a point charge $+q$ placed at the origin and another point charge $-2q$ placed at a distance of 9 m from the charge $+q$ . Determine the point between the two charges at which electric potential is zero. {repeated}
2	An electron is accelerated through a potential difference of 81V. What is the de Broglie wavelength associated with it? To which part of electromagnetic spectrum does this wavelength correspond?
3	Calculate the cut-off wavelength and cutoff frequency of x-rays from an x-ray tube of accelerating potential 20,000 V.
4	The resistance of a moving coil galvanometer is made twice its original value in order to increase current sensitivity by 50%. Find the percentage change in voltage sensitivity for a parallel plate capacitor.
5	Find the power of a lens whose focal length is 150 cm? [repeated]
6	In a transistor connected in the common base configuration, $\alpha = 0.95$ , $I_{mAE} = 1$ . Calculate the values of $I_C$ and $I_B$ .
7	The radius of the 5th orbit of hydrogen atom is 13.25 Å. Calculate the de broglie wavelength of the electron orbiting in the 5th orbit.[repeated]

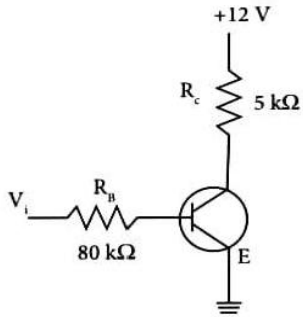
8	Calculate the distance upto which ray optics is a good approximation for light of wavelength 500 nm falls on an aperture of width 0.5 mm. [repeated]
9	<p><b>For more materials like this join us on YOUTUBE: <a href="#">CLICK HERE</a></b></p> <p>In a nuclear fission 0.1% mass is converted into energy calculate the energy released by the fission of 1kg mass.</p>
10	The self-inductance of an air core solenoid is 4.8 mH. If its core is replaced by iron core, then self-inductance becomes 1.8H. Find out the relative permeability of iron. [repeated]
11	Determine the number of electrons flowing per second through a conductor, when a current of 32A flows through it. [repeated]
12	Calculate the electric flux through the rectangle of sides 5 cm and 10 cm kept in the region of a uniform electric field $100 \text{ NC}^{-1}$ . The angle $\theta$ is $60^\circ$ . If $\theta$ becomes zero, what is the electric flux?
13	An electric power of 2 MW is transmitted to a place through transmission lines of total resistance $R = 40 \Omega$ , at two different voltages. One is lower voltage (10 kV) and the other is higher (100 kV). Calculate and compare power losses in these two cases.
14	Find the (i) angular momentum (ii) velocity of the electron revolving in the 5th orbit of hydrogen atom. ( $h = 6.6 \times 10^{-34} \text{ Js}$ , $m = 9.1 \times 10^{-31} \text{ kg}$ ).
15	The equation for an alternating current is given by $i = 77 \sin 314t$ . find the peak current, frequency, time period and instantaneous value of current at $t = 2 \text{ ms}$ .

16	Write down the properties of electromagnetic waves.
17	Simplify the Boolean identity $AC + ABC = AC$
18	What is the focal length of the combination if the lenses of focal lengths $-70$ cm and $150$ cm are in contact? What is the power of the combination?
	Define refractive index. Light travelling through transparent oil enters into glass of refractive index $1.5$ . If the refractive index of glass with respect to the oil is $1.25$ . What is refractive index of the oil.
19	4303A. Determine the maximum energy In Nuclear fission reaction what is the total energy released in $100^{\text{th}}$ step in Kwh. Assume number of nuclei undergo present is $2.5 \times 10^{40}$ .
20	Light of frequency $7.21 \times 10^{14}$ Hz is incident on a metal surface. Electrons with maximum speed of $6.0 \times 10^5$ m/s are ejected from the surface. What is the threshold frequency for photoemission of electrons?
21	In a transistor connected in the common base configuration $\alpha = 0.95$ , $I_E = 1$ mA. Calculate $I_C$ and $I_B$ .
22	Draw the circuit diagram of half wave rectifier and explain its working
23	

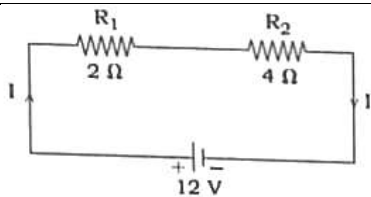
	A 500 $\mu\text{H}$ inductor, $\frac{80}{\pi^2}$ pF capacitor and 628 $\Omega$ resistor are connected to form a series RLC circuit. Calculate the resonant frequency of this circuit at resonance.
24	Compute the binding energy of ${}^4_2\text{He}$ nucleus using the following data. Atomic mass of Helium atom MA (He) = 4.00260 u and that of hydrogen atom, mH = 1.00785 u.
25	<b>For more materials like this join us on YOUTUBE: <a href="#">CLICK HERE</a></b>  33. A 400mH coil of negligible resistance is connected to an AC circuit in which an effective current of 6mA is flowing . Find out the voltage across the coil if the frequency is 1000Hz.
26	What is the value of x when the Wheatstone's network is balanced? P=500 $\Omega$ Q=800 $\Omega$ R=x +400 $\Omega$ S=1000 $\Omega$
27	A monochromatic light is incident on an equilateral prism at an angle 30° and is emergent at an angle of 75°. What is the angle of deviation produced by the prism?
28	Find the heat energy produced in a resistance of 10 $\Omega$ when 5A current flows through it for 5 minutes.
29	Pure water has refractive index 1.33. What is the speed of light through it ?
30	Derive an expression for the De-broglie wavelength of electron

31	A cell supplies a current of 0.9 A through a $2\ \Omega$ resistor and a current of 0.3 A through a $7\ \Omega$ resistor. Calculate the internal resistance of the cell.
32	Show that the mass of radium ( $^{226}_{88}\text{Ra}$ ) with an activity of 1 curie is almost a gram. Given $T_{1/2} = 1600$ years.
33	In Nuclear fission reaction what is the total energy released in $100^{\text{th}}$ step in Kwh. Assume number of nuclei undergo present is $2.5 \times 10^{40}$ .
34	A parallel plate capacitor has square plates of side 5 cm and separated by a distance of 1mm. Calculate the capacitance of this capacitor. ( $\epsilon_0 = 8.85 \times 10^{-12}\ \text{N}^{-1}\text{m}^{-2}\text{C}^2$ )
35	Pure water has refractive index 1.33. What is the speed of the light through it?
36	Calculate the equivalent resistance in the following circuit and also find the values of current $I$ , $I_1$ and $I_2$ in the given circuit.
	
37	Calculate the disintegration energy when stationary $^{232}_{92}\text{U}$ nucleus decays to thorium $^{228}_{90}\text{Th}$ with the emission of $\alpha$ -particle. The atomic masses are of $^{232}_{92}\text{U} = 232.037156\text{u}$ , $^{228}_{90}\text{Th} = 228.028741\text{u}$ and $^4_2\text{He} = 4.002603\text{u}$ .
38	


	In Young's double slit experiment, 62 fringes are seen in visible region for sodium light of wavelength 5893 Å. If violet light of wavelength 4359 Å is used in place of sodium light, then what is the number of fringes seen?
39	How many photons of frequency $10^{14}$ Hz will make up 19.86 J of energy?
40	A spherical conductor of radius 10 cm has a charges of $3.2 \times 10^{-7}$ C distributed uniformly. Find the magnitude of electric field at a point 15 cm from the centre of the sphere.
41	Light frequency $7.21 \times 10^{14}$ Hz is incident on a metal surface. Electrons with maximum speed of $6.0 \times 10^5$ m/s are ejected from the surface. What is the threshold <u>frequency</u> for photo emission of electrons?
42	A ray of light strikes a glass plate at an angle $60^\circ$ . If the reflected and refracted rays are perpendicular to each other, the refractive index of glass?
43	The half-life of $^{210}\text{Bi}$ sample is 5 days. Calculate the decay constant.
44	Calculate the radius of $^{197}_{79}\text{Au}$ nucleus.
<b>PUBLIC AND PTA</b>	
1	Calculate the magnetic field inside a solenoid when the number of turns is halved and length of the solenoid and the area remain the same.
2	

	<p>In the circuit shown in the figure, the input voltage <math>V_i = +5\text{ V}</math>, <math>V_{BE} = +0.8\text{ V}</math> and <math>V_{CE} = +0.12\text{ V}</math>. Find the values of <math>I_B</math>, <math>I_C</math> and <math>\beta</math>.</p> 
3	<p>In a magnetic field of <math>0.05\text{ T}</math>, area of a coil changes from <math>101\text{ cm}^2</math> to <math>100\text{ cm}^2</math> without changing the resistance which is <math>2\Omega</math>. What is the amount of charge that flow during this period?</p>
4	<p><b>For more materials like this join us on YOUTUBE: <a href="#">CLICK HERE</a></b></p> <p>Charges of <math>+\frac{10}{3} \times 10^{-9}\text{ C}</math> are placed at each of the four corners of a square of side <math>8\text{ cm}</math>. Find the potential at the intersection of the diagonals.</p>
5	<p>A spherical stone and a spherical metallic ball of same size and mass are dropped from the same height. Which one, a stone or a metal ball, will reach the earth's surface first? Justify your answer. Assume that there is no air friction.</p>
6	<p>A dipole is formed by two charges of <math>5\text{ }\mu\text{C}</math> and <math>-5\text{ }\mu\text{C}</math> at a distance of <math>8\text{ mm}</math>. Find the electric field at</p> <ol style="list-style-type: none"> <li>a point <math>25\text{ cm}</math> away from center of dipole along its axial line</li> <li>a point <math>20\text{ cm}</math> away from center of dipole along its equatorial line</li> </ol>
7	<p>Two materials X and Y are magnetised whose intensity of magnetisation are <math>500\text{ Am}^{-1}</math> and <math>2000\text{ Am}^{-1}</math> respectively. The magnetising field is <math>1000\text{ Am}^{-1}</math>. What is the ratio between the susceptibilities of the two material ?</p>

8	Modulation helps to reduce the antenna size in wireless communication - Explain.
9	If an electric field of magnitude $570 \text{ NC}^{-1}$ is applied in the copper wire, find the acceleration experienced by the electron.
10	What is total internal reflection? Give the condition for the total internal reflection takes place.
11	Dielectric strength of air is $4 \times 10^6 \text{ Vm}^{-1}$ . Suppose the radius of a hollow sphere in the Van de Graaff generator is $R=0.4 \text{ m}$ , calculate the maximum potential difference created by this Van de Graaff generator.
12	${}^{92}\text{U}^{235}$ nucleus emits $2\alpha$ particles, $3\beta$ particles and $2\gamma$ particles. What is the resulting atomic number and mass number ?
13	Find the impedance of a series RLC circuit, if the inductive reactance, capacitive reactance and resistance are $184 \Omega$ , $144 \Omega$ and $30 \Omega$ respectively. Also calculate the phase angle between voltage and current.
14	Calculate the equivalent resistance for the circuit which is connected to $12 \text{ V}$ battery and also find the potential difference across $2 \Omega$ and $4 \Omega$ resistors in the circuit.



15	Light travels from air into a glass slab of thickness 50 cm and refractive index 1.5. What is the speed of light in the glass slab and what is the time taken by the light to travel through the glass slab ?
16	If the resistance of coil is $3\ \Omega$ at $20^\circ\text{C}$ and $\alpha = 0.004/^\circ\text{C}$ then, determine its resistance at $100^\circ\text{C}$ .
17	Calculate the amount of energy released in joules when 1 kg of $^{235}\text{U}_{92}$ undergoes fission reaction.
18	The radius of the 5th orbit of hydrogen atom is 13.25 Å. Calculate the de broglie wavelength of the electron orbiting in the 5th orbit.
19	A coil of a tangent galvanometer of diameter 0.24m has 100 turns. If the horizontal component of Earth's Magnetic field is $25 \times 10^{-6}\text{ T}$ then, calculate the current which gives a deflection of $60^\circ$ .
20	A wire of resistance $10\ \Omega$ is stretched uniformly to thrice its original length. Calculate the resistance of the stretched wire.
21	Four point charges $+q$ , $+q$ , $-q$ and $-q$ are to be arranged respectively at the four corners of a square PQRS of side $r$ . Find the work needed to assemble this arrangement.

22	When an inductor is connected to a 230 V d.c. source, a current of 2 A passes through it. When the same inductor is connected to a 230 V, 50 Hz a.c. source, the amount of current decreases (i.e, 1 A). Why?
23	Calculate the magnetic field at the centre of a square loop which carries a current of 1.5 A, length of each loop is 50 cm.
24	A circular coil of radius 5 cm and 50 turns carries a current of 3 ampere. Find the magnetic dipole moment of the coil.
25	A proton and an electron have same de Broglie wavelength. Which of them moves faster and which possesses more kinetic energy?
26	What should be the velocity of the electron so that its momentum equals that of 4000 Å wavelength photon
27	<p><b>For more materials like this join us on YOUTUBE: <a href="#">CLICK HERE</a></b></p> <p>Capacitors P and Q have identical cross sectional areas A and separation d. The space between the capacitors is filled with a dielectric of dielectric constant <math>\epsilon_r</math> as shown in the figure. Calculate the capacitance of capacitors P and Q.</p> 
28	What is skip distance and skip zone in sky wave propagation?

29	The light of wavelength 590nm, 596nm are used in turn to study the diffraction taking place at a single slit of aperture $2 \times 10^{-4}$ m. The distance between the slit and the screen is 1.5m. Calculate the separation between the positions of first maximum of the diffraction pattern obtained in the two cases.
30	Draw the circuit diagrams of transistor in CB and CC modes.
31	What are the advantages and disadvantages of FM.

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