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India's Number 1 Education App

## PHYSICS

## BOOKS - FULL MARKS PHYSICS (TAMIL

## ENGLISH)

## SAMPLE PAPER-8

Part I

1. A thin conducting spherical shell of radius $R$
has a charge $Q$ which is uniformly distributed
on its surface . The correct plot for electroistatic potential due to this spherical shell is
A.

B.

c.

D.

2. The temperature coefficient of resistance of
a wire is 0.00125 per ${ }^{\circ} C$. At 300 K , its resistance is $1 \Omega$. The resistance of the wire will be $2 \Omega$ at
A. 1154 K
B. 1100 L
C. 1400 K
D. 1127 K

## Answer: D

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3. n resistances, each of $r \Omega$, when connected in parallel give an equivalent resistance of $\mathrm{R} \Omega$.

If these resistances were connected in series,
the combination would have a resistance in homs equal to
A. $n^{2} R$
B. $\frac{R}{n^{2}}$

## C. R/n

## D. nR

## Answer: A

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4. A thin insulated wire forms a plane spiral of
$N=100$ tight turns carrying a current $\mathrm{I}=8 \mathrm{~m}$

A ( milli ampere). The radii of inside and outside turns are equal to $\mathrm{a}=50 \mathrm{~mm}$ and $\mathrm{b}=$

100 mm , respectively. The magnetic induction at the center of the spiral is
A. $5 \mu T$
B. $7 \mu T$
C. $8 \mu T$
D. $10 \mu T$

Answer: B
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5. In an oscillaing L.C circuit.the maximum
charge on the capacitors is Q . The charge on
capacitor when the energy is stored equally between the lectric and magnetic field is

> А. $\frac{Q}{2}$
> в. $\frac{Q}{\sqrt{3}}$
> с. $\frac{Q}{\sqrt{2}}$
> D. $Q$

## Answer: C

6. The direction of induced current during electro magnetic induction is given by...
A. Faraday's law
B. Lenz's law
C. Maxwell's law
D. ampere's law

## Answer: B

7. In an electromagnetic wave in free space the rms value of the electric field is $3 \mathrm{~V} \mathrm{~m}^{-1}$. The peak value of the magnetic field is

$$
\begin{aligned}
& \text { A. } 1.414 \times 10^{-8} T \\
& \text { B. } 1.0 \times 10^{-8} T \\
& \text { C. } 2.828 \times 10^{-8} T \\
& \text { D. } 2.0 \times 10^{-8} T
\end{aligned}
$$

## Answer: A

8. Two point white dots are 1 mm apart on a black paper. They are viewed by eye of pupil diameter 3 mm approximately. The maximum distance at which these dots can be resolved by the eye is, (take wavelength of light, $\lambda=500$ nm)
A. 1 m
B. 5 m
C. 3 m

## D. 6 m

## Answer: B

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9. If two mirrors are kept at $60^{\circ}$ to each other
and a body is placed at the middle, then total
number of images formed is
A. six
B. four
C. five
D. three

Answer: A

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10. The threshold wavelength for a metal surface whose photoelectric work function is 3.313 eV is.
A. $4125 \AA$
B. $3750 \AA 8$
C. $6000 \AA$
D. $2062.5 \AA$

Answer: B

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11. Suppose an alpha particle accelerated by a potential of V volt is allowed to collide with a nucleus whose atomic number is $Z$, then the
distance of closest approach of alpha particle to the nucleus is

> A. $14.4 \frac{Z}{V} \AA$
> B. $14.4 \frac{V}{Z} \AA$
> C. $1.44 \frac{Z}{V} \AA$
> D. $1.44 \frac{V}{Z} \AA$

Answer: C
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12. The speed of the particle, that can take discrete values is proportional to

$$
\begin{aligned}
& \text { A. } n^{-3 / 2} \\
& \text { B. } n^{-1} \\
& \text { C. } n^{1 / 2} \\
& \text { D. } \mathrm{n}
\end{aligned}
$$

Answer: D

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13. Doping a semiconductor results in
A. The decrease in mobile carriers
B. The change in chemical properties
C. The change in the crystal structure
D. The breaking covalent bond

Answer: C

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14. The signals is affected by noise in communication system
A. At the transmitter
B. At the modulator
C. In the channel

D. At the receiver

Answer: C

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15. The technology used for stopping the brain
from processing pain is
A. Precision medicine
B. Wireless brain sensor
C. Virtual reality
D. Radiology

Answer: C

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## 1. Define Electric field .

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2. State the principle of potentiometer.
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3. Compute the intensity of magnetisation of
the bar magnet whose mass, magnetic moment and density are $200 \mathrm{~g} .2 \mathrm{~A} \mathrm{~m}^{2}$ and 8 g $\mathrm{cm}^{-3}$,respectively.

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4. What is displacement current?

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## 5. What is principle of reversibility?

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6. Calculate the de Broglie wavelength of a proton whose kinetic energy is equal to $81.9 \times 10^{-15} \mathrm{~J}$. (Given : mass of proton is 1836 times that of electron ).

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7. Give the symbolic representation of alpha decay, beta decay and gamma decay.

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8. Explain the need for a feedback circuit in a transistor oscillator.

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9. Give the factors that are responsible for transmission impairments.

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## Part lii

1. A water molecule has an electric dipole moment of $6.3 \times 10^{-30} \mathrm{~cm}$. A sample contains $10^{22}$ water molecules with all the dipole moments aligned parallel to the
external electric field of magnitude
$3 \times 10^{5} N C^{-1}$. How much work is required to
rotate all the water molecules from
$\theta=0^{\circ}$ to $90^{\circ} ?$

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2. What are the properties of an equipotential surface?
3. An element hobbyist is building a radio which reequires $150 \Omega$ in her circuit, but she has only $220 \Omega, 79 \Omega$ and $92 \Omega$ resistors available. How can she connect the available resistor to get desired value of resistance ?

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4. What is magnetic permeability ?
5. A Circular metal of are $0.03 m^{2}$ rotates in a uniform magnetic field of 0.4 T.The axis of rotation passes through the centre and perpendicular to its plane and is also parallel to the field .If the disc completes. 20 revolution in one second and the resistance of the disc is
$4 \Omega$.calculate the induced between the axis and the rim and induced curent flowing in the disc.

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6. Give the characteristics of image formed by
a plane mirror .

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7. An electron and an alpha particle have same kinetic energy. How are the de Broglie wavelengths associated with them related?

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8. Assuming $V_{C}$ esat $=0.2 V=0.2$ and $\beta=50$
,Find the minium base current $\left(I_{B}\right)$ required to drive transitor given in the figure to saturation.

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9. Write the advantages and disadvantages of robotic.

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## Part lv

1. Derive an expression for electrostatic potential energy of the dipole in a uniform electric field .
2. Deduce the relation for the magnetic induction at a point due to an infinitely long straight conductor carrying current.

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3. Obtain an expression for motional emf from

Lorentz force.

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4. State Ampere's circuital law.

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## 5. The resolving power of a microscope is

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6. Derive an expression for De Broglie wavelength.

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7. Explain the variation of average binding energy with the mass number by graph and discuss its features.

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8. State Boolean laws.Elucidate how they are used to simplify Boolean expressions with suitable example,
9. Modulation helps to reduce the antenna size in wireless communication-Explain.

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10. What are the possible harmful effects of usage of Nanoparticles? Why? Possible harmful effects of usage of Nanoparticles:
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