



PHYSICS

BOOKS - FULL MARKS PHYSICS (TAMIL ENGLISH)

SAMPLE PAPER - 20 (UNSOLVED)

Part I

1. A parallel plate capacitor stores a charge Q at a voltage V . Suppose the area of the

parallel plate capacitor and the distance between the plates are each doubled then which is the quantity that will change ?

- A. Capacitance
- B. Charge
- C. Voltage
- D. Energy density

Answer: D



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2. How many electrons will have a charge of one coulomb ?

A. 6.25×10^{18}

B. 6.25×10^{19}

C. 1.6×10^{18}

D. 1.6×10^{19}

Answer: A



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3. A piece of copper and another of germanium are cooled from room temperature to 80 K. The resistance of

A. each of them increases

B. each of them decreases

C. copper increases and germanium decreases

D. copper decreases and germanium increases

Answer: D



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4. At Curie point, a ferromagnetic material becomes

- A. non magnetic
- B. diamagnetic
- C. paramagnetic
- D. antiferromagnetic

Answer: C



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5. In a series RL circuit, the resistance and inductive reactance are the same. Then the phase difference between the voltage and current in the circuit is

A. $\frac{\pi}{4}$

B. $\frac{\pi}{2}$

C. $\frac{\pi}{6}$

D. zero

Answer: A



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6. In an AC circuit containing only capacitance, the current

A. leads the voltage by 180°

B. remains in phase with the voltage

C. leads the voltage by 90°

D. lags the voltage by 90°

Answer: C



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7. If the amplitude of the magnetic field is $3 \times 10^{-6} \text{ T}$, then amplitude of the electric field for a electromagnetic waves is

A. 100 Vm^{-1}

B. 300 Vm^{-1}

C. $600Vm^{-1}$

D. $900Vm^{-1}$

Answer: D



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8. Speed of electromagnetic waves through vacuum is equal to

A. $\mu_0\epsilon_0$

B. $\sqrt{\mu_0\epsilon_0}$

C. $\frac{1}{\mu_0 \epsilon_0}$

D. $\frac{1}{\sqrt{\mu_0 \epsilon_0}}$

Answer: D



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9. Sparking of diamond is due to

A. reflection

B. dispersion

C. total internal reflection

D. high refractive index of diamond

Answer: C



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10. A light of wavelength 500 nm is incident on a sensitive plate of photoelectric work function 1.235 eV. The kinetic energy of the photo electrons emitted is be (Take $h = 6.6 \times 10^{-34}$ Js)

A. 0.58 eV

B. 2.48 eV

C. 1.24 eV

D. 1.16 eV

Answer: C



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11. In J.J. Thomson e/m experiment, a beam of electron is replaced by that of muons (particle with same charge as that of electrons but

mass 208 times that of electrons). No deflection condition is achieved only if

A. B is increased by 208 times

B. B is decreased by 208 times

C. B is increased by 14.4 times

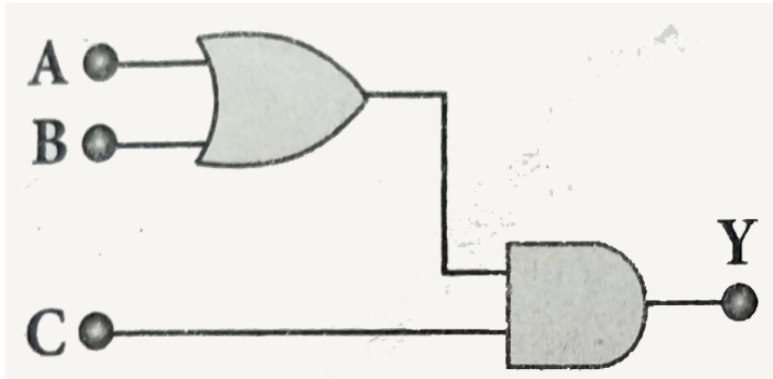
D. B is decreased by 14.4 times

Answer: C



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12. The output of the following circuit is 1 when the input ABC is



A. 101

B. 100

C. 110

D. 10

Answer: A



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13. In the middle of the depletion layer of reverse biased p-n junction, the

- A. electric field is zero
- B. potential is zero
- C. potential is maximum
- D. electric field is maximum

Answer: A



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14. The particular used for transmission of light signal through optical fibre is

- A. total internal reflection
- B. refraction
- C. dispersion
- D. interference

Answer: A



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15. Artificial radioactivity was discovered by_____

- A. Joliot and Irene curie
- B. Felix Bloch and Edward purcell
- C. Cormack and Hounsfield
- D. Wilhelm conrad - Rontgen

Answer: A



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Part II

1. What is meant by dielectric ?



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2. The resistance of a nichrome wire at $0^{\circ}C$ is 10Ω . If its temperature coefficient of resistance is $0.004/^{\circ}C$ find its resistance at boiling point of water. Comment on the result.



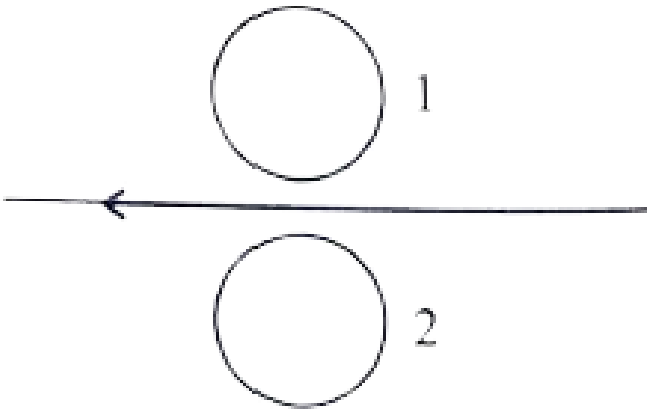
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3. State Coulomb's inverse law.



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4. Using Lenz's law, predict the direction of induced current in conducting rings 1 and 2 when current in the wire is steadily decreasing.



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5. What is Huygens' principle?



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6. 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 ?



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7. What is isotone? Give an example.



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8. What are intrinsic semiconductor?



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9. What is meant by skip distance?



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1. Write down Coulomb 's law in vector form and mention what each term represents .



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2. In a potentiometer arrangement a cell of emf 1.25 V givesn a balance point at 35 cm length of the wire. If the cell is replaced by another cell and the balance point shift to 63 cm, what is the emf of the second cell ?



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3. State Biot-Savart's law.



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4. Calculate the instantaneous value at 60° , average value and RMS value of an alternating current whose peak value is 20 A.



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5. Write down Maxwell equations in integral form.



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6. State Brewster's law.



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7. Calculate the energy equivalent of 1 atomic mass unit.





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8. Distinguish between intrinsic and extrinsic semiconductors.



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9. Distinguish between wireline and wireless communication? Specify the range of electromagnetic waves in which it is used.



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1. Derive an expression for electrostatic potential due to an electric dipole.



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2. Describe the microscopic model of current and obtain general form of Ohm's law.



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3. Deduce the relation for the magnetic induction at a point due to an infinitely long straight conductor carrying current.



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4. Derive an expression for phase angle between the applied voltage and current in a series RLC circuit .



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5. Write short notes on (a) microwave



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6. Explain the Young's double slit experimental setup and obtain the equation for path difference.



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7. When a 6000\AA light falls on the cathode of a photo cell and produced photoemission. If a stopping potential of 0.8 V is required to stop emission of electron, then determine the frequency of the light



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8. Discuss the spectral series of hydrogen atom.



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9. Explain the working principle of a solar cell.

Mention its applications.



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10. Give the applications of ICT in mining and agriculture sectors.



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