



PHYSICS

BOOKS - FULL MARKS PHYSICS (TAMIL ENGLISH)

SAMPLE PAPER-2 (SOLVED)

Part I

1. Two identical conducting balls having positive charges q_1 and q_2 are separated by a

center to center distance r . If they are made to touch each other and then separated to the same distance, the force between them will be.

- A. less than before
- B. same as before
- C. more than before
- D. zero

Answer:



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2. Two plates are 1 cm apart and the potential difference between them is 10 V. the electric field between the plates is

A. $10NC^{-1}$

B. $250NC^{-1}$

C. $500NC^{-1}$

D. $1000NC^{-1}$

Answer: A::B::C::D



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3. A toaster operating at 240 V has a resistance of 120Ω . The power is

A. 400 W

B. 2W

C. 480 W

D. 240 W

Answer:



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4. Three wires of equal lengths are bent in the form of loops . One of the loops is circle, another is a semi - circle and the third one is a square. They are placed in a uniform magnetic field and same electric current is passed through them. Which of the following loop configuration will experience greater torque ?

A. circle

B. semi-circle

C. square

D. all of them

Answer:



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5. A bar magnet of magnetic moment M is cut into two parts of equal length. The magnetic moment of either part is

A. M

B. $2M$

C. $\frac{M}{2}$

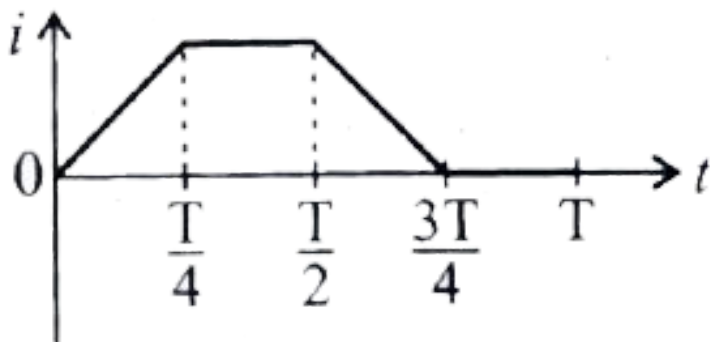
D. Zero

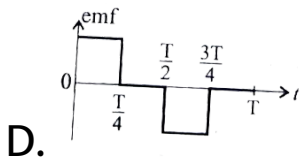
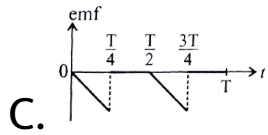
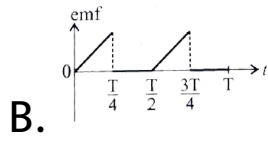
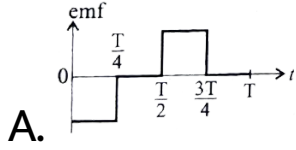
Answer:



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6. The current i flowing in a coil varies with time as shown in the figure. The variation of induced emf with time would be





Answer:



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7. Which of the following electromagnetic radiation is used for viewing objects through fog

A. microwave

B. gamma rays

C. X-rays

D. infrared

Answer:



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8. Stars twinkle due to

A. reflection

B. total internal reflection

C. refraction

D. polarisation

Answer:



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9. When a plane electromagnetic wave enters a glass slab, then which of the following will not change?

A. Wavelength

B. Frequency

C. Speed

D. Amplitude

Answer:



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10. In an electron microscope, the electrons are accelerated by a voltage of 14kV. If the voltage is changed to 224 kV, then the de Broglie wavelength associated with the electrons would

- A. increase by 2 times
- B. decrease by 2 times
- C. decrease by 4 times
- D. increase by 4 times

Answer:



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11. The charge of cathode rays is

A. positive

B. negative

C. neutral

D. not defined

Answer:



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12. The primary use of a zener diode is

A. Rectifier

B. Amplifier

C. Oscillator

D. Voltage regulator

Answer:



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13. In common - emitter amplifier the ratio $\frac{I_C}{I_E}$ is 0.98. The current gain will be

A. 49

B. 98

C. 4.9

D. 25.5

Answer:



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14. The internationally accepted frequency deviation for the purpose of FM broadcasts.

A. 75 kHz

B. 68 kHz

C. 80 kHz

D. 70 kHz

Answer:



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15. "Ski wax" is an application of nano product in the field of

A. Medicine

B. Textile

C. Sports

D. Automotive industry

Answer:



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1. The electric field lines never intersect .
Justify.



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2. A potential difference across 24Ω resistor is 12 V. What is the current through the resistor?



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3. State Coulomb's inverse law.



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4. State Lenz's law.



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5. What is angle of deviation due to reflection?



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6. What is photoelectric effect ?



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7. Define impact parameter.



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8. In a transistor connected in the common base configuration, $\alpha = 0.95$, $I_E = 1\text{mA}$. Calculate the value of I_C and I_B .



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9. What do you mean by Internet of Things?



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Part Iii

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



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2. Write down the various forms of expression for power in electrical circuit.



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3. The repulsive force between two magnetic poles in air is 9×10^{-3} N. if the two poles are equal in strength and are separated by a distance of 10 cm , calculate the pole strength of each pole .



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4. A 200 turn coil of radius 2 cm is placed coaxially within a long solenoid of 3 cm radius. If the turns density of the solenoid is 90 turns per cm, then calculate mutual inductance of the coil.



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5. 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.



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6. State the laws of refraction



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7. A proton and an electron have same de Broglie wavelength. Which of them moves

faster and which possesses more kinetic energy? Justify your answer.



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8. In alpha decay, why the unstable nucleus emits ${}^4_2\text{He}$ nucleus? Why it does not emit four separate nucleons?



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9. Distinguish between intrinsic and extrinsic semiconductors.



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Part Iv

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



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2. Explain the determination of the internal resistance of a cell using voltmeter.



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3. Calculate the magnetic induction at a point on the axial line of a bar magnet.



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4. Show mathematically that the rotation of a coil in a magnetic field over one rotation induces an alternating emf of one cycle.



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5. Write down the properties of electromagnetic waves.



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6. Derive the equation for acceptance angle and numerical aperture, of optical fiber.

Acceptance angle in optical fibre:



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7. Explain the effect of potential difference on photoelectric current.



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8. Explain the J.J. Thomson experiment to determine the specific charge of electron.



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9. Draw the circuit diagram of a half wave rectifier and explain its working.



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10. Fiber optic communication is gaining popularity among the various transmission media -justify.



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