



PHYSICS

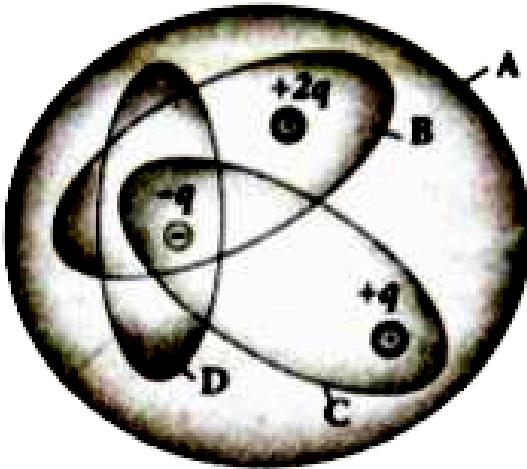
BOOKS - FULL MARKS PHYSICS (TAMIL ENGLISH)

SAMPLE PAPER -14 (UNSOLVED)

Part I

1. Four Gaussian surface are given below with charges inside each Gaussian surface . Rank

the electric flux through each Gaussian surface
in increasing order



A. $D < C < B < A$

B. $A < B = C < D$

C. $C < A = B < D$

D. $D > C > B > A$

Answer:



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2. A $4 \mu\text{F}$ capacitor is charged to 400 V and then its plates are joined through a resistance of $1 \text{ K } \Omega$. The heat produced in the resistance is

A. 0.16 J

B. 0.32 J

C. 0.64 J

D. 1.28 J

Answer:



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3. In a large building, there are 15 bulbs, of 40W, 5bulbs, of 100W, 5 fans of 80W and 1 heater of 1kW are connected. The voltage of electric mains is 220V. The minimum capacity of the main fuse of the builing will be

A. 14 A

B. $8A$

C. $10A$

D. $12A$

Answer:



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4. A wire of length l carries a current I along the Y direction and magnetic field is given by

$$\vec{B} = \frac{\beta}{\sqrt{3}} (\hat{i} + \hat{j} + \hat{k}) \text{ T. The magnitude of}$$

Lorentz force acting on the wire is

A. $\sqrt{\frac{2}{\sqrt{2}}}\beta Il$

B. $\sqrt{\frac{1}{\sqrt{3}}}\beta Il$

C. $\sqrt{2}\beta Il$

D. $\sqrt{\frac{1}{2}}\beta Il$

Answer:



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5. The magnetic field due to a current carrying circular coil on the axis, at a large distance r

from the centre of the coil, varies approximately as

A. $\frac{1}{r}$

B. $\frac{1}{r^{\frac{3}{2}}}$

C. $\frac{1}{r^3}$

D. $\frac{1}{r^2}$

Answer:



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6. A circular coil with a cross-sectional area of 4cm^2 has 10 turns/cm. It is placed at the centre of a long solenoid that has 15 turns/cm and a cross-sectional area of 10cm^2 . The axis of the coil coincides with the axis of the solenoid. What is their mutual inductance ?

A. $7.54\mu\text{H}$

B. $8.54\mu\text{H}$

C. $9.54\mu\text{H}$

D. $10.54\mu\text{H}$

Answer:



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7. Consider an oscillator which has a charged particle and oscillates about its mean position with a frequency of 300 MHz. The wavelength of electromagnetic waves produced by this oscillator is

A. 1 m

B. 10 m

C. 100 m

D. 1000 m

Answer:



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8. Which of the following has maximum frequency?

A. X-rays

B. IR rays

C. UV rays

D. Radio waves

Answer:



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9. A ray of light travelling in a transparent medium of refractive index n falls, on a surface separating the medium from air at an angle of incidents of 45° . The ray can undergo total internal reflection for the following n ,

A. $n=1.25$

B. $n=1.33$

C. $n=1.4$

D. $n=1.5$

Answer:



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10. The work functions for metals A,B and C are 1.92 eV, 2.0 eV and 5.0 eV respectively. The

metals which will emit photoelectrons for a radiation of wavelength 4100\AA is / are

- A. A only
- B. both A and B
- C. all these metals
- D. none

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. Doping a semiconductor results in

- A. The decrease in mobile charge carriers
- B. The change in chemical properties
- C. The change in the crystal structure
- D. The breaking of the covalent bond

Answer:



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13. Holes are charge carrier in

A. intrinsic semicondu

B. ionic solids

C. p-type semiconductor

D. metals

Answer:



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14. The frequency range of 3 MHz to 30 MHz is used for

A. Ground wave propagation

B. Space wave propagation

C. Sky wave propagation

D. Satellite communication

Answer:



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15. The laws of Robotics are

A. a robot may not injure a human being

B. a robot must obey the order given by
human

C. a root must protect its own existence

D. both b and c

Answer:



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1. Calculate the number of electrons in one coulomb of negative charge.



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2. What are ohmic and non ohmic devices ?



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3. Define Current sensitivity ?



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4. What for an inductor is used ? Given some examples.



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5. What is astigmatism?



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6. Write the expression for the de Broglie wavelength associated with a charged particle of charge q and mass m , when it is accelerated through a potential V .



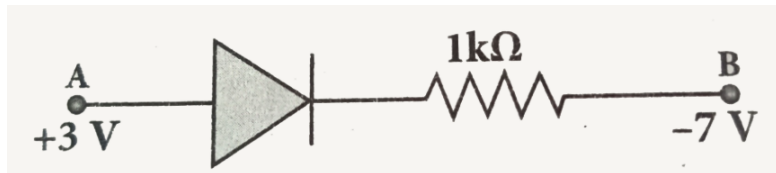
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7. Define curie.



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8. Consider an ideal junction diode. Find the value of current flowing through AB is



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9. Give any two examples for “Nano” in nature.

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1. Give the relation between electric field and electric potential .



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2. When two resistances connected in series and parallel their equivalent resistances are 15Ω and $\frac{56}{15}\Omega$ respectively. Find the individual resistances.



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3. State Biot-Savart's law.



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4. Two air core solenoids have the same length of 80 cm and same cross-sectional area 5cm^2 . Find the mutual inductance between them if the number of turns in the first coil is 1200 turns and that in the second coil is 400 turns.



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5. Write down the integral form of modified Ampere's circuital law.



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6. Differentiate between polarised and unpolarised light



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7. What should be the velocity of the electron so that its momentum equals of 4000\AA wavelength photon.



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8. Distinguish between avalanche and zener breakdown.



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9. Write down the advantages and limitations of frequency modulation (FM)? Advantages of FM



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10. Derive the expression for resultant capacitance when capacitors are connected in series and in parallel .



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1. Explain the equivalent resistance of a series and parallel resistor network.



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2. Find the magnetic induction due to a long straight conductor using Ampere's circuital law.



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3. Using Faraday's law of electromagnetic induction, derive an equation for motional emf.



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4. Obtain the equation for resolving of optical instrument.



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5. Explain in detail the nuclear force.



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6. Describe an experimental arrangement to study photoelectric effect.



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7. Write notes on Photodiode.



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8. What do you know about GPS? Write a few applications of GPS.



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9. Write the key components of robot.



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