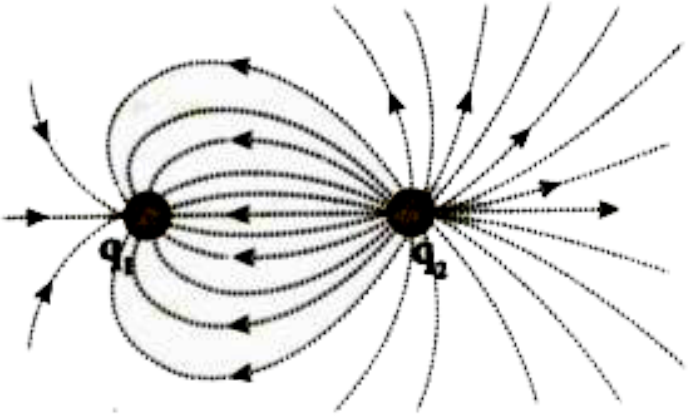
PHYSICS

BOOKS - FULL MARKS PHYSICS (TAMIL ENGLISH)

SAMPLE PAPER - 19 (UNSOLVED)

Part I

1. What is the ratio of the charges $\left|\frac{q_1}{q_2}\right|$ for the following electric field line pattern ?



A. $\frac{1}{5}$

B. $\frac{25}{11}$

C. 5

D. $\frac{11}{25}$

Answer: D

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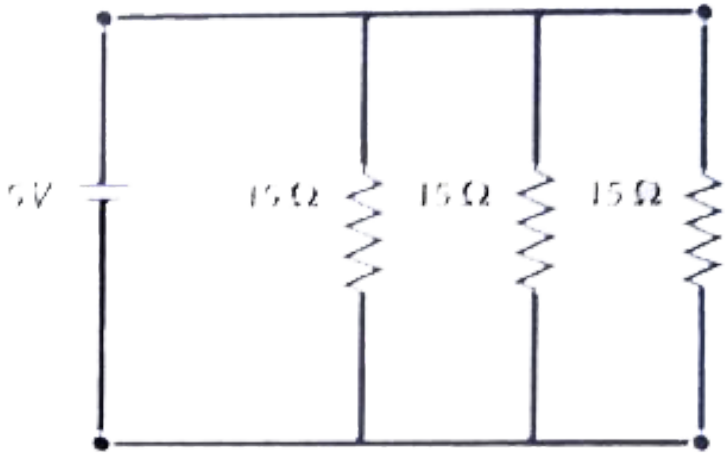
2. What is the current out of the battery?



A. 1A

B. 2A

C. 3A

D. 4A

Answer: A

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3. Good resistance coils are made of

A. copper

B. manganin

C. iron

D. aluminium

Answer: B

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4. A non-conducting charged ring of charge q. mass m and radius r is rotated with constant angular speed ω. Find the ratio of its magnetic moment with angular momentum is ..... .

A. $\frac{q}{m}$

B. $\frac{2q}{m}$

C. $\frac{q}{2m}$

D. $\frac{q}{4m}$

Answer: C

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5. In an electrical circuit, R, I, C and AC voltage source are all connected in series. When L is removed from the circuit, the phase difference between the voltage and current in the circuit, is $\frac{\pi}{3}$. Instead, if C is removed from the circuit, the phase difference is again $\frac{\pi}{3}$. The power factor of the circuit is

A. $\frac{1}{2}$

B. $\frac{1}{\sqrt{2}}$

C. 1

D. `sqrt3/2

Answer: C

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6. Which one of them is used to produce a propagating electromanetic wave?

A. an accelerating charge

B. a charge moving at constant velocity

C. a stationary charge

D. an uncharged particle

Answer: A

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7. In an electromagnetic wave the phase difference between electric field $\overrightarrow{E}$ and magnetic field $\overrightarrow{B}$ is .....

A. Perpendicular to cach other

B. Parallel to each other

C. at 45° to each other

D. can have any angle between them

Answer: A

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8. Light transmitted by Nicol prism is,

A. partially polarised

B. unpolarised

C. plane polarised

D. eliptically polarised

Answer: C

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9. Time image formed by an objective of a compound microscope is

A. virtual and diminished

B. real and diminished

C. real and enlarged

D. virtual and enlarged

Answer: C

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10. The threshold wavelength for a metal surface whose photoelectric work function is 3.313 eV is.....

A. 4125 Å

B. 3750 Å

C. 6000 Å

D. 2062.5 Å

Answer: B

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11. If an electron and a photon propagate in the form of waves having the same wavelength, it implies that they have the same

A. energy

B. momentum

C. angular momentum

D. velocity

Answer: B

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12. Atomic number of H-like atom with ionization potential 122.4 V for n = 1 is

A. 1

B. 2

C. 3

D. 4

Answer: C

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13. According to uncertainty principal for an electron, time measurement will become

uncertain if following is measured with high certainty

A. energy

B. momentum

C. location

D. velocity

Answer: A

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14. If the input to the NOT gate is A = 1011, its output is

A. 100

B. 1000

C. 1100

D. 11

Answer: A

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15. The particle of ZnO material is 30 nm. Based on the dimension it is classified as

A. Bulk material

B. Nanomaterial

C. Soft material

D. Magnetic material

Answer: B

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Part Ii

1. What is meant by electrostatic energy density ?

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2. State macroscopic form of Ohm's law.

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3. Compute the magnetic of the magnetic field of a long, straight wire carrying a current of 1 A at distance of 1m from it. Compare it with Earth's magnetic field .

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4. Define average value of an alternating current.

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5. What is meant by Fraunhofer lines?

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6. What is relative refractive index?

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7. Find the de Broglie wavelength associated with an alpha particle which is accelerated through a potential difference of 400 V. Given

that the mass of the proton is 1.67×10^{-27} kg.

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8. What is mean life of nucleus? Give the expression.

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9. Define cosmology?

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Part Iii

1. What are polar molecules ? Give examples.

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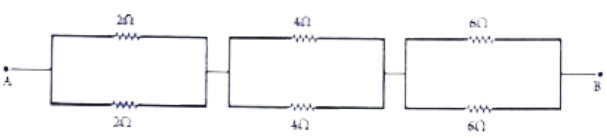
2. Calculate the equivalent resistance between

A and B in the given circuit.



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3. What do you mean by resonant frequency?

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

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5. Two independent monochromatic sources cannot act as coherent sources, why?

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6. A 150 W lamp emits light of mean wavelength of 5500Å. If the efficiency is $12\ \%$, find out the number of photons emitted by the lamp in one second.

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7. Write the properties of cathode rays.

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8. In the circuit shown in the figure, the BJT has a current gain (β) of 50. For an emitter - base voltage $V_{EB} = 600mV$. calculate the emitter - collector voltage V_{BC} (in volts).

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9. Write the advantages and disadvantages of robotic.

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Part Iv

1. Explain in detail the construction and working of a Van de Graaff generator.

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2. How the emf of two cells are compared using potentiometer ?

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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 that the total energy is conserved during LC oscillations.

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5. Write down the properties of electromagnetic waves.

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6. Prove laws of refraction using Hugyen's principle.

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7. Give the construction and working of photo emissive cell.

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8. Discuss the gamma decay process with example.

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9. State and prove De Morgan's Frist and second theorems.

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

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