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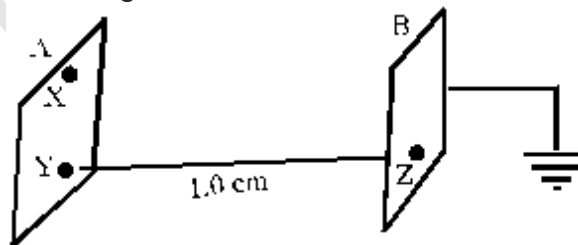
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PRACTICE PAPER**2013-14****Std:- XII****Sub: - Physics****Time:- 3 Hours****Date:-****Marks:- 70****General Instructions:**

- 1) All questions are compulsory.
- 2) Question numbers 1 to 8 carry 1 mark each.
- 3) Question numbers 9 to 18 carry 2 marks each,
- 4) Question numbers 19 to 27 carry 3 marks each.
- 5) Question numbers 28 to 30 carry 5 marks each.

1. A square coil ABCD is placed in YZ plane carrying current in clockwise sense .Find the direction and magnitude of the magnetic moment of the coil.
2. How will the intensity of maxima and minima, in the YDSE change, if one of the two slits is covered by a transparent paper which transmits only half of the light intensity?
3. State the steady value of the reading of the ammeter in the CR circuit if dc signal is applied across them.
4. A charge q is placed at the centre of a cube of side l .what is the electric flux passing through the two opposite faces of the cube?
5. A proton and an electron have same kinetic energy .Which one has greater de-broglie wavelength and why?
6. Two wires of equal length, one of copper and the other of manganin have the same resistance. Which wire is thicker?
7. Arrange the short wavelengths limits of the Lyman, Paschen and Balmer series in the hydrogen spectrum in the increasing order of their wavelengths.
8. State Ampere's circuital law modified by Maxwell.
9. Identify the part of the electromagnetic spectrum which is (i) suitable for radar systems used in aircraft navigation, (ii) produced in nuclear reactions (iii) used in water purifiers and(iv) used for taking photographs in foggy conditions

10. A plane electromagnetic wave travels in vacuum, along negative X direction. Write down the ratio of the magnitudes and the direction of its electric and magnetic field vectors.
11. Calculate the half period of a radioactive substance if its activity drops to $1/16$ th of its initial value in 30 years.
12. Two dipoles made from charges q and Q respectively, have equal dipole moments. Give the (i) ratio between the separations of these two pairs of charges (ii) angle between the dipole axis of these two dipoles.
13. Draw a schematic diagram of a Cassegrain reflecting telescope. State one advantage of reflecting telescope over a refracting telescope.
14. A solenoid is connected to a battery so that a steady current flows through it. If an iron is inserted into the solenoid will the current increase or decrease? Explain
15. Keeping the voltage of the charging source constant, what would be the percentage change in the energy stored in a parallel plate capacitor if the separation between its plates were to be decreased by 10 %?
16. Define: Reactance and Impedance.
17. Two identical plane metallic surfaces A and B are kept parallel to each other in air separated by a distance of 1.0 cm as shown in the figure.



Surface A is given a positive potential of 10V and the outer surface of B is earthed. (i) What is the magnitude and direction of the uniform electric field between points Y and Z? (ii) What is the work done in moving a charge of $20\mu\text{C}$ from point X and point Y?

OR

Two point charges, q_1 and q_2 , are located at points $(a, 0, 0)$ and $(0, b, 0)$ respectively. Find the electric field, due to both these charges, at the point, $(0, 0, c)$.

18. What is the power dissipated by an ideal inductor in ac circuit? Explain.
19. Suhasini's uncle advised by his doctor to have an MRI scan of his chest done.

Her uncle did not know much about the details and significance of this test. He also felt that it was too expensive and thought of postponing

it.

Suhasini learnt about her uncle's problems, she immediately decided to do something about it. She took the help of her family, friends and neighbors and arranged for the cost of the test. She also told her uncle that an MRI (Magnetic Resonance Imaging) scan of his chest would enable the doctors to know of the condition of his heart and lungs without causing any (test related) harm to him. This test was expensive because of its set up that needed strong magnetic fields (0.5 T to 3T) and pulses of radio wave energy.

Her uncle was convinced and had the required MRI scan of his chest done. The resulting information greatly helped his doctors to treat him well.

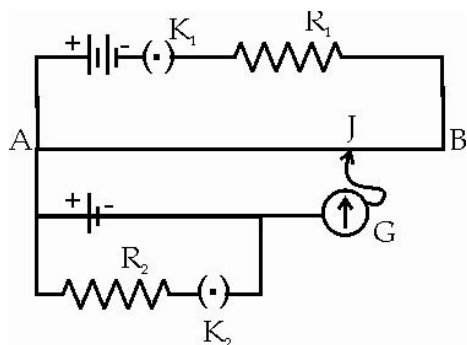
- (a) What according to you, are the values displayed by Suhasini and her family, friends and neighbours to help her uncle ? 1
- (b) Assuming that the MRI scan of her uncle's chest was done by using a magnetic field of 1.0 T, find the maximum and minimum values of force that this magnetic field could exert on a proton (charge = 1.6×10^{-19}) that was moving with a speed of 10^4 m/s. State the condition under which the force has its minimum value. 2

OR

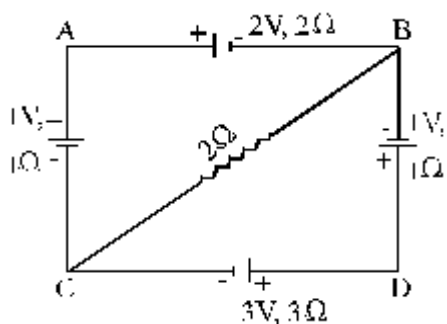
A straight thick long wire of uniform cross section of radius 'a' is carrying a steady current I. Use Ampere's circuital law to obtain a relation showing the variation of the magnetic field inside and outside of the field point from the centre of its cross section. Plot a graph showing the nature of this variation.

20. Draw the graph showing variation of binding energy per nucleon with the mass number of different nuclei. State two inferences from this graph.
21. Draw a schematic diagram of a cyclotron. State its principle and working in detail.
22. State Gauss theorem in electrostatics. Derive an expression for electric field intensity at a point near an infinitely long charged wire.
23. A double convex lens made of glass of refractive index 1.5 has its both surfaces of equal radii of curvature of 20 cm each. An object of 5 cm height is placed at a distance of 10 cm from the lens. Find the position and size of the image.
24. Define wave front. Using Huygens's principle draw figure showing propagation of a spherical wave front.
25. A charge is introduced in magnetic field at an angle θ . Find the expression for the time period and for the pitch. Describe its trajectory.
26. For the circuit shown here, would the balancing length increase, decrease or remain the same, if (i) R1 is decreased (ii) R2 is increased and (iii) Emf of driving

battery is decreased in comparison to the cell in the secondary circuit without any other change in each case in rest of the circuit .Justify your answer.



27. For the circuit shown here, Calculate the potential difference between points B and D



28. Distinguish the magnetic properties of Diamagnetic, Paramagnetic and ferromagnetic substances in terms of Susceptibility, Magnetic permeability .Give an example of each of these materials. Draw the field lines due to an external magnetic field near a Diamagnetic, Paramagnetic substances.

OR

State the principle of Moving coil galvanometer. With the help of a circuit, Show How MCG can be converted into an ammeter and a voltmeter. Derive the necessary mathematical expressions.

29. Describe an Astronomical telescope with the help of neat labeled Ray Diagram and find an expression for its magnifying power.

OR

Derive expressions for the fringe width in two slit interference experiment.

30. A series LCR circuit is connected to an ac source .Derive expression for the impedance, instantaneous current and its phase relationship to the applied voltage using PhasorDiagrams. Derive an expression for resonant frequency.

OR

What are Eddy currents? How are they produced? How can they be minimized? Give two applications of Eddy currents.

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