PHYSICS

BOOKS - R G PUBLICATION

H.S. Question papers of AHSEC,2019

Exercise

1. What did Meissner actually observe which is known as Meissner effect?

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2. A very interesting fact regarding electro-magnetic waves can be seen. with the help of a portable AM radio. What is it?

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3. Mention one similarity between Coulomb force and gravitational force acting between two stationary charges.

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4. Define 1 Henry.

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5. If the radius of the innermost orbit of hydrogen atom is $5.3x10^{-11}m$ what is the radius of the third orbit?

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6. If the work function of two metals X and Y are 4.17eV and $8.24x10^{-19}$J respectively, then for which metal lesser amount of energy will be required to emit an electron?

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7. Arrange the following communication methods/modes in descending order on the basis of their operating frequency.

(i) AM Radio transmission

(ii) Cellular communication

(iii) Sky wave propagation

(iv) Satellite communication

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8. The sparkle of a diamond can be explained by which phenomenon of light?

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9. (Attempt any ten of the following questions)

A magnetic dipole is oscillating in a magnetic field obeying the following expression. $d^2\frac{\theta}{dt^2} = -m\frac{B}{I}\theta$ What is the time period of oscillation and mention the nature of oscillation?

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10. (Attempt any ten of the following questions) You know that Ampere's circuital

law is mathematically expressed as given below.

$$\oint \vec{B} . \vec{dl} = \mu_0 i$$

Also you know that this law was cor rected by Maxwell and which known as Ampere-Maxwell law. Write the general form of the law and name the additional term.

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11. (Attempt any ten of the following questions) Explain in brief – "Infrared waves

are sometimes referred to as heat waves."

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12. (Attempt any ten of the following questions) Under what conditions Doppler effect is called (i) red shift and (ii) blue shift?

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13. (Attempt any ten of the following questions) Draw a neat diagram to show

lateral shift. of a ray refracted through a parallel-sided slab. Indicate the lateral shift in the diagram by a double-headed arrow.

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14. (Attempt any ten of the following questions) Define one coulomb charge. Two point charges at a distance r in air exert a force F on each other. At what distance will these charges experience the same force F in a medium of dielectric constant k?

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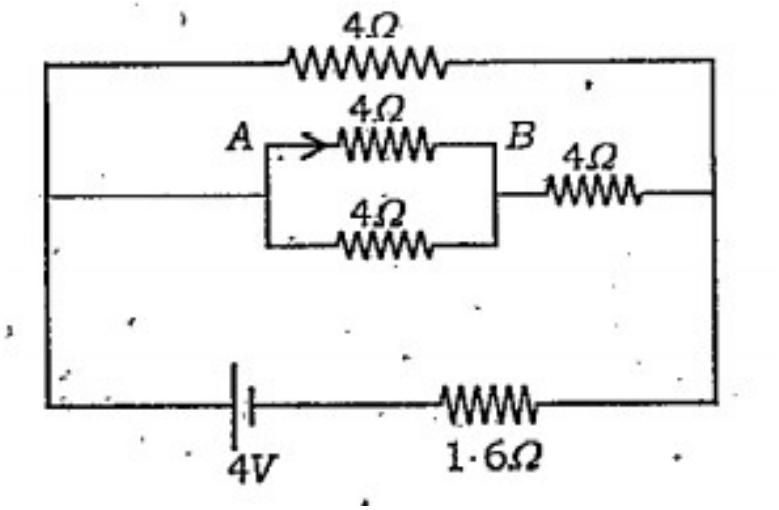
15. (Attempt any ten of the following questions) Find the value of current I flowing from A to B in the following circuit.



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16. State len's Law of electromagnetic induction. Establish that lenz's Law is the manifestation of Law of conservation of energy.

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17. What is modulation index? If the maximum amplitude of an amplitude modulated wave is 10V and the minimum amplitude is 2V, what is the value of modulation index?

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18. Obtain an expression for drift velocity of an electron in a conductor.

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19. Establish the relation between the focal length (f) and radius of curvature (R) for a spherical mirror.

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20. (Attempt any nine of the following questions) There is an electric dipole on the x-y plane. Its dipole moment is $4x10^{-9}Cm$. On . the same plane there is also a uniform electric field of magnitude $5x10^{4}NC^{-1}$. If the axis of the dipole makes an angle 30° with the electric field, calculate the magnitude of the torque acting on the dipole and also mention the di rection of torque.

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21. (Attempt any nine of the following questions) The capacity of a parallel plate capacitor with air is 18pF. When a dielectric material is inserted in the space between the plates, its capacity becomes 108. pF. Calculate the per mittivity of the material. What is the material?

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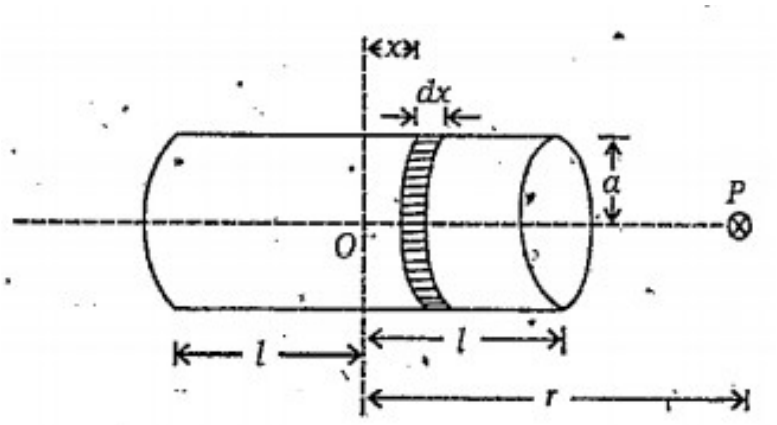
22. (Attempt any nine of the following questions)A current carrying solenoid is shown be low. Show that the magnetic field intensity at point P be

$B = \frac{\mu_0}{4\pi}\frac{2m}{r^3}$ Where the symbols have their usual meaning.



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23. (Attempt any nine of the following questions) Consider that the electric field amplitude of an electromagnetic wave is $E_0 = 120NC^{-1}$ and its frequency is v= 50Hz. Determine B_0, ω and k.

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24. Show that the total energy of an electro is

$$E = -\frac{e^2}{8\pi \in_0 r}$$

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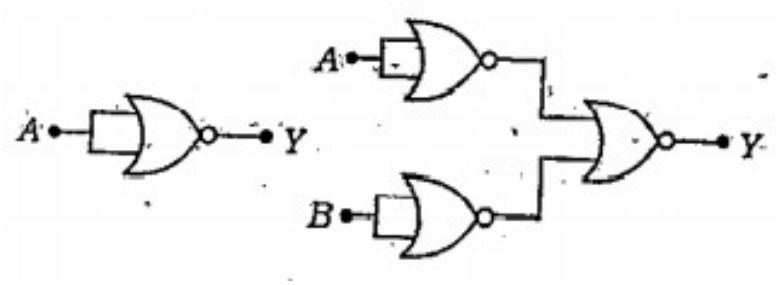
25. (Attempt any nine of the following questions)Name the only gate which is used in the following circuit. Write the truth table for each of the circuits. Identify the logic operation (i.e. I OR, AND, NOT etc.) performed by the circuits.



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26. Two long straight thin conductors carrying currents I_1 and I_2 respectively along the same direction are placed parallel to each other in air. Derive an expression for the force per unit length acting on any one of the conductors and hence define one ampere current.

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27. A far sighted person has his near point 50 cm. Find the power of lens he should use to see at 25 cm clearly.

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28. (Attempt any nine of the following questions) What are coherent sources? In a Young's double slit experiment the intensity of light at a point on the screen where path difference λ is K units. Find the intensity at a point where the path difference is $\frac{\lambda}{3}$.

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29. Explain the source of solar energy with the help of proton-proton cycle. What is the role of cadmium rods in a nuclear reactor?

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30. "The phenomenon of electro-magnetic induction has been technologically important application in the generation of alternating currents." Name the device which can generate alternating currents.

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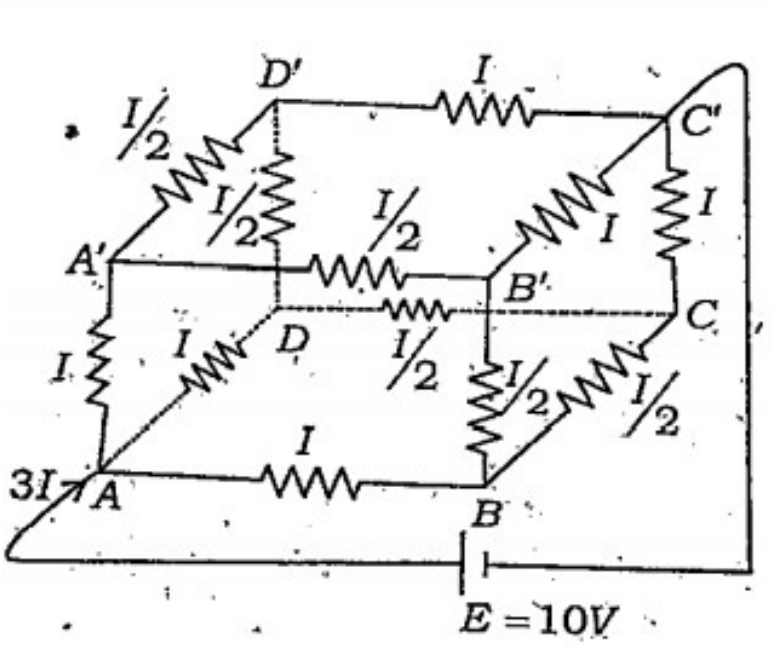
31. (Attempt any three of the following questions) State Kirchhoff's (i) Junction rule and (ii)Loop rule. Determine the equivalent resistance of the network given below and the total current going out of the battery. Given,

each resistor has resistance of 1ω.



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32. An a.c. source of e.m.f. $V_m \sin wt$ is connected with a circuit which contains an inductorL, a capacitor C and a resistor R in

series. Establish the differential equation of e.m.f and find the total impedance of the series LCR circuit. What is quality factor of the circuit.

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33. For refraction at spherical surface establish the following relation.

$$\frac{n_2}{v} - \frac{n_1}{u} = \frac{n_2 - n_1}{R}$$

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