CBSE 12th Physics 2009 Unsolved Paper

Outside Delhi

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TIME - 3HR. | QUESTIONS - 30

THE MARKS ARE MENTIONED ON EACH QUESTION

SECTION – A

Q.1. What is the electrostatic potential due to an electric dipole at an equatorial point? *1 marks*

Q.2. Name the EM waves used for studying crystal structure of solids. What is its frequency range? *1 marks*

Q3. An electron does not suffer any deflection while passing through a region of uniform magnetic field. What is the direction of the magnetic field? *1 marks*

Q.4. How would the angular separation of interference fringes in young's double slit experiment change when the distance between the slits and screen is doubled? *1 marks*

Q.5. Two thin lenses of power + 6D and -2D are in contact. What is the focal length of the? combination? *1 marks*

Q.6. The stopping potential in an experiment on photoelectric effect is 1. 5 V. what is the maximum kinetic energy of the photoelectron emitted? ***1 marks***

Q.7. Two nuclei have mass numbers in the ratio 1: 8 what is the ratio of their nuclear radii? *1 marks*

Q.8. Give the logic symbol of NOR gate. *1 marks*

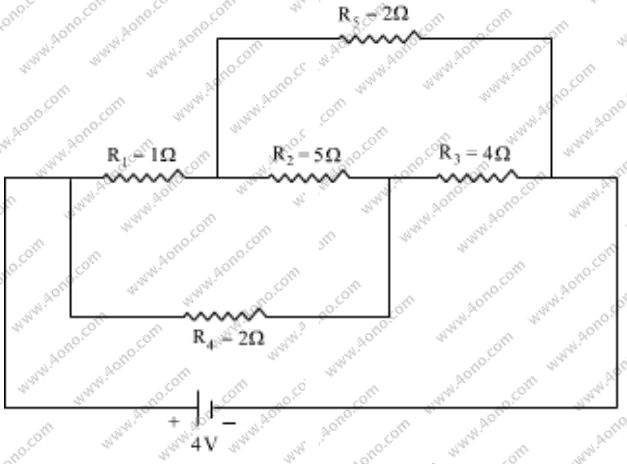
SECTION - B

Q.9. Draw 3 equipotential surfaces corresponding to a field that uniformly increases in magnitude but remains constant along Z-direction. How are these surfaces different from that of a constant electric field along Z-direction? *2 marks*

Q.10. Define electric flux. Write its S. I. unit.
A charge *q* is enclosed by a spherical of radius R. if the radius is to half, how would the electric flux through the surface change? *2 marks*

Q.11. Define refractive index of a transparent medium.
A ray of light passes through prism. Plot a graph showing the variation of the angle of deviation with angle of incidence. *2 marks*

Q.12. Calculte the current drawn from the battery in the given network. *2 marks*



Q.13. Answer the following questions: *2marks*

(a) Optical and radio telescopes are built on the ground while X-ray astronomy is possible only from orbiting the earth. why?

(b) The small ozone layer on top of the stratosphere is crucial for human survival. Why?

.Q.14. How does the resistivity of a conductor depend upon temperature electrical conductivity? *2 marks*

Q.15. Define the term 'linearly polarized light'.

When does the intensity of transmitted light become maximum, when a polaroid sheet is rotated between two crossed polaroid's''? *2 marks*

Q16. A wire of 15 ohm resistances is gradually stretched to double its original length. It is then cut into two equal parts. These parts are then connected in parallel across a 3. 0 volt battery. Find the current down from the battery. *2 marks*

Q.17. (a) The mass of a nucleus in its ground state is always less than the total mass of its constituents- neutrons and protons. Explain.

(b) Plot a graph showing the variation of potential energy a pair of nucleons as a function of their separation. *2 marks.*

Q.18. Write the function of (i) transducer and (ii) repeater in the context of communication system. *2 marks*

Or

(b) Write two factors justifying the need of modulation for transmission of a signal.

SECTION - C

Q.19. A positive point charge (+q) is kept in the vicinity of an uncharged conducting plate. Sketch electric field lines originating from the point on to the surface of the plate. Derive the expression for the electric field at the surface of a charged conductor. *3 marks*

Or

A parallel plate capacitor is charged by a battery. After some time, the battery is disconnected and a dielectric slab of dielectric constant K is inserted between the plates. How would (i) the capacitance, (ii) the electric field between the plates and (iii) the energy stored in the capacitor, be affected? justify your answer.

Q.20. (i) state the principle of working of a meter bridge.

(ii) In a meter bridge balance point is found at a distance *1* with resistance R and S as shown in the figure.

When an unknown resistance X is connected in parallel with the resistance S, the balance point shifts to a distance a l_2 find the expression for X terms of l_1 l_2 and S. *3 marks*

Q.21. (i) State faraday's law of electromagnetic induction.

(ii) A jet plane is travelling towards west at a speed of 1800 km/h. What is the voltage difference developed between the ends of the wing having a span of 25 m, if the earth's magnetic field at the location has a magnitude of 5×10^{-4}T and the angle is 30^0? *3 marks*

Q.22. In Young's double slit experiment, monochromatic light of wavelength 630 nm illuminates pair of slits and produces interference pattern in which two consecutive bright fringes are separated by 8. 1 mm. Another source of monochromatic light produces the interference pattern in which the two consecutive bright fringes are separated by 7. 2mm. Find the wavelength of light from the second source.

What is the effect on the interference fringes if the monochromatic source is replaced by a source of white light? *3 marks*

Q.23. Draw a schematic arrangement of the Geiger - Marsden experiment. How did the scattering of a - particles by a thin foil of gold provide an important way to determine an upper limit on the size of size of the nucleus? Explain briefly. *3 marks*

Q.24. Distinguish between sky space wave propagation. Give a brief description with the help of suitable diagrams indicating how these waves are propagated. *3 marks*

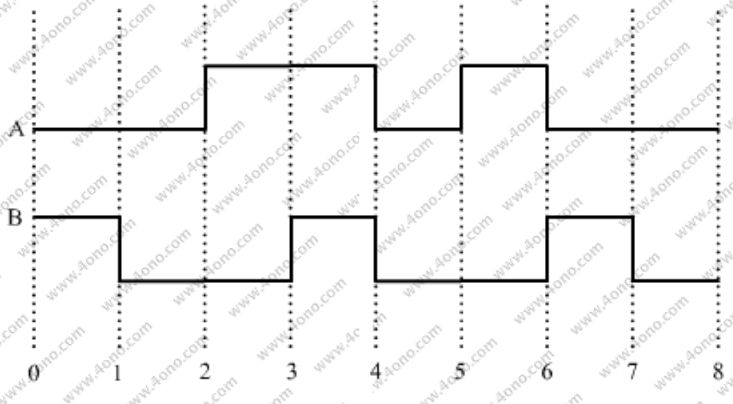
Q.25. Draw the output wave form (Y) of the. *3 marks*

(i) OR gate

(i) NOR gate

(iii) AND gate

(iv) NAND gate



Q.26. Give a circuit diagram of a common emitter amplifier using an N-P-N transistor. Draw the input and output waveforms of the signal. Write the expression for its voltage gain. *3 marks*

Q.27. Draw a plot showing the variation of binding energy par nucleon versus the mass number A. explain with the release of energy in the processes of nuclear fission and fusion. *3 marks*

SECTION - D

Q.28. Draw a schematic of a cyclotron. explain briefly how it works and how it is used to accelerate the charged particles.

(i) Show that time period of ions in a cyclotron is independent of both the speed and radius of circular path.

(ii). what is resonance condition? how it used to accelerate the charged particles? *5 marks*

OR

(a) Two straight long parallel conductors carry currents I_1 and I_2 in the same direction. deduce the expression for the force per unit length between them. Depict pattern of, magnetic field lines around them.

(b) A rectangular current carrying loop EFGH is kept in a uniform magnetic field as shown in the figure.

(i) what is the direction of the magnetic moment of the current loop?

(ii) when is the torque acting on the loop
(A) maximum, (B) Zero? *5 marks*

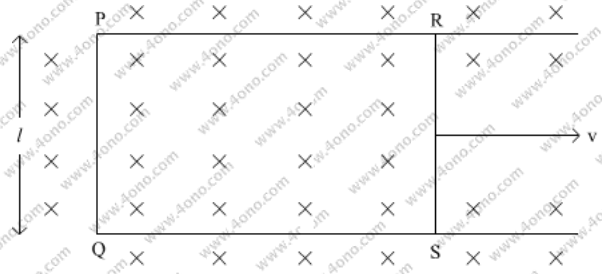
Q.29. (a) What are eddy currents? write their two applications.

(b) Figure shows a rectangular conducting loop PQSR in which arm RS of length '*i*' is movable. The loop is kept in a uniform magnetic field 'B' directed downward perpendicular to the plane of the loop. The are RS is moved with a uniform speed 'v' Deduce an expression for

(i) the *emf* induced across harm 'RS',

(ii) the external force required to move the arm, and

(iii) the power dissipated as heat. *5 marks*



OR

(a) State Lenz's law. Give one example to illustrate this law. The Lenz's is a consequence of the principle of conservation of energy. 'Justify this statement.

(b) Deduce an expression for the inductance of two long coaxial solenoids but having different radii and different number of turns.

Q.30. (a) (i) Draw a labelled ray diagram to show the formation of image in an astronomical telescope for a distant object.

(ii) write three distinct advantage of a reflecting type telescope over a refracting type telescope.

(b) (i) A convex lens of focal length 10 cm is placed coaxially 5 cm away from a concave lens of focal length 10 cm. If an object is placed 30 cm in front of the convex lens, find the position of the final image formed by the combined system. *5 marks*

Or

(a) With the help of a suitable ray diagram, derive the mirror formula for a concave mirror.

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