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CBSE 12th Physics 2008 Unsolved Paper Outside Delhi

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TIME - 3HR. | QUESTIONS - 26

THE MARKS ARE MENTIONED ON EACH QUESTION

SECTION - A

Q.1. State two characteristic properties of nuclear force: *1 marks*

Q.2. How does the angle of minimum deviation of a glass prism vary, if the incident incident light replaced with red light? *1 marks*

Q.3. The instantaneous current and voltage of a.c. circuit are given by i = 10 sin 300 tA and v = 200 sin 300 tV.
**What is power dissipation in the circuit?** *1 marks*

Q.4. Why should the spring. suspension in a moving coil galvanometer have low torsional constant? *1 marks*

Q.5. Why does the bluish color predominate in a clear sky? *1 marks*

Q.6. Which orientation of an electric dipole in a uniform electric field would correspond stable equilibrium? *1 marks*

Q.7. Two lines, A and B, in the plot given show the variation of de-Broglie wavelength λ versus $1\sqrt{V}$, where is the accelerating potential difference, for two particles carrying the same charge. Which one of two represents a particle of smaller mass? *1 marks*
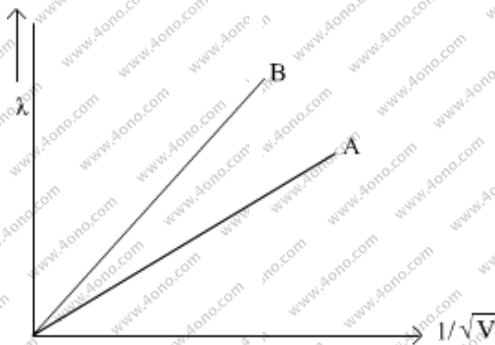

Q.8. State the reason, why GaAs is most commonly used in making of a solar cell. *1 marks*

SECTION - B

Q.9. Draw a labelled ray diagram of an astronomical telescope in the near point position. Write the expression for its magnifying power. *2 marks*

Q.10. The following figure show the variation of intensity of magnetization versus the applied magnetic field intensity, H for two magnetic materials A and B:
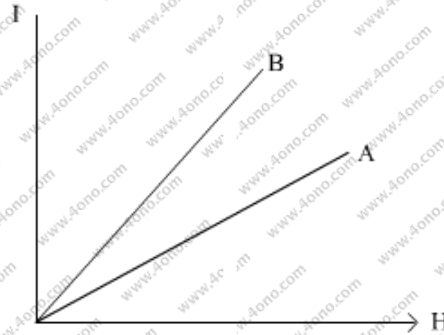
(a) **Identify the materials A and B.**

(b) **Why does the material B, have larger susceptibility than A, for a given field at constant temperature?** *2 marks*

Q.11. Two metallic wires of the same material have the same length but cross-sectional area is in the ratio 1:2 they are connected (i) in parallel. Compare the velocities of electrons in the two wires in both the cases (i) and (ii). *2 marks*

Q.12. Draw a block diagram of simple amplitude modulation. Explain briefly how amplitude modulation is achieved. *2 marks*

Q.13. Calculate the energy released in MeV in the following nuclear reaction: *2 marks*

$$^{238}_{92}U \rightarrow {}^{234}_{90}Th + {}^{4}_{2}He + Q[Mass\ of\ {}^{238}_{92}U = 238.05079u$$

$$Mass\ of\ {}^{238}_{92}U = 238.05079u$$

$$Mass\ of\ {}^{4}_{2}th = 234.043630u$$

$$Mass\ of\ {}^{4}_{2}He = 4.002600u$$

$$1\ u = 931.5\ MeV/c^2$$

Q.14. Using Ampere's circuital law, obtain an expression for the magnetic field along the axis of a current solenoid of length and having N number of turns . *2 marks*

Q.15. Derive an expression for the resistivity of a good conductor, in terms of the relaxation time of electrons. *3 marks*

Q.16. The circuit arrangement given below shows that when an a. C. passes through the coil the current flowing in the coil B. *2 mark*

Coil A   Coil B
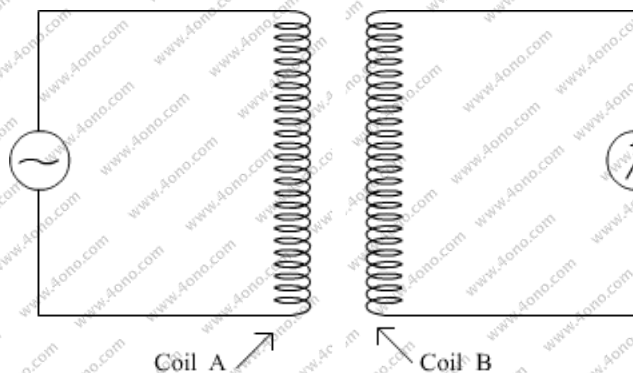
    (i) State the underlying principle involved.

    (ii) Mention two factors on which the current produced in the coil B depends.

Q.17. State one by which the phenomenon of interference can be distinguished from that of diffraction.

A parallel beam of light of wavelength 600 nm is incident normally con a slit 'a'. If the distance between the slits and the screen is 0.8 m and the distance of 2nd order maximum from the center of the screen is 15 mm, calculate the width of the slit. *2 marks*

Q.18. Two point charges, $q_1 = 10 \times 10^{-8}$ C and $q_1 = -2 \times 10^{-8}$ C are separated by a distance of 60 cm air.

  (i) Find at what distance from the 1st charge, q1, would the electric potential be zero.

  (ii) Also calculate the electrostatic potential energy of the system. *2 marks*

Or

Two point charges 4Q, Q are separated by 1m in air. At what point on the line joining the charges is the electric field intensity zero?
Also calculate the electrostatic potential energy of the system of charges, taking the value of charge, Q = 2 x 10^{-7}C.

SECTION - C

Q.19. What does the term LOS communication mean? Name the types of waves that are used for this communication. Which of the two height of height of transmitting antenna and height of receiving antenna can affect the range over which this mode of communication remains effective? *3 marks*

Q.20. Explain, why high frequency carrier waves are needed for effective transmission signals. A message signal of 12 kHz and voltage 20 V is used to modulate a carrier wave of frequency 12 MHz and peak voltage 30 V. calculate the
(i) modulation index (ii) side-band frequencies. *3 marks*

Q.21. Distinguish between unpolished and plane polarized light. An unpolished light is incident on the boundary between two transparent media. State the condition when the reflected wave is totally plane polarized find out the expression for the angle of incidence in this case. *3 marks*

.Q.22. Draw the labelled circuit diagram of a common-emitter transistor amplifier. explain clearly how to input and output signals are in opposite phase. *3 marks*

Or

State briefly the underlying principle of a transistor oscillator. Draw a circuit diagram showing how the feedback is accomplished by inductive coupling. Explain the oscillator action.

Q.23. The second member of Lyman series in hydrogen spectrum has wavelength 5400 Å. find the wavelength of the member. *3 marks*

Q.24. For what energy a proton, will the associated de-Broglie wavelength be 16.5 nm? *3 marks*

Q.25. To increase the current sensitivity a moving coil galvanometer by 50 %, its resistance is increased so that the new resistance becomes twice its its resistance becomes twice its initial resistance. By how fast does its voltage sensitivity change? *3 marks*

Q.26. The inputs A and B are inverted by using two NOT gates and their output are fed to the NOR gate as shown below. *3 marks*
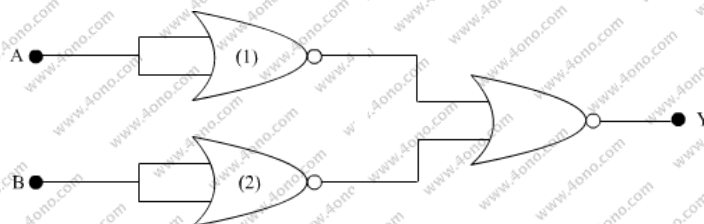
Analysis the action of the gates (1) and (2) and identify the gate of the complete circuit so obtained. Give its symbol and the truth table.

Q.27. A 100 μ capacitor in series with a 40 ohm resistance is connected to a 100 V_1 60 Hz supply calculate (i) the reactance (ii) the impedance (iii) maximum current in the circuit. *3 marks*

SECTION - D

Q.28. Derive an expression for the energy stored a parallel plate capacitor.
On charging a parallel plate capacitor to a potential V, the spacing between the plates is halved, and dialect medium of $\in_r$= 10 is introduced between the plates, without disconnecting the d.c. source. Explain, using suitable expressions, how the (i) capacitance, (ii) electric field and (iii) energy density of the capacitor change. *5 marks*

OR

(a) **Define electric flux. Write its SI units.**
(b) **The electric field components due to a charge inside the cube of side 0.1 m are as shown:**

0.1 m

0.1 m
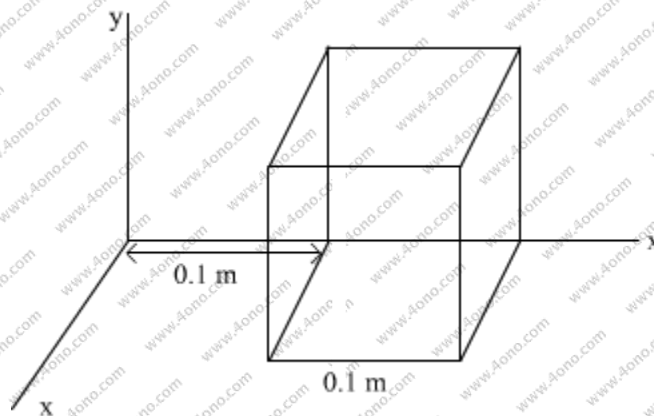
$$E_x = \alpha x, where\ \alpha = 500N/C\text{-}m$$
$$E_y = 0, E_z = 0.$$

Calculate (i) the flux through the cube, and (ii) the charge inside the cube.

Q.29. Derive the lens formula, $\frac{1}{f} = \frac{1}{v} - \frac{1}{u}$ for a concave lens, using the necessary ray diagram. Two lenses of powers 10 D and - 5D are placed in contact,

(i) **Calculate the power of the new lens.**

(ii) Where should an abject be held from the lens, so as to obtain a virtual image of magnification. *5 marks*

Or

(a) What are coherent sources of light? Two slits in Young's double slit experiment are illuminated by two different sodium emitting light of the same wavelength. Why is no interference pattern observed?

(b) Obtain the condition for getting dark and bright fringes in Young's experiment. Hence write the expression for the fringe width.

(c) If s is the size of the source and its distance from the plane of the two slits, what should be the interference fringe to be seen?

Q.30. An a.c. source generating a voltage $v = v_m \sin \omega t$ is connected capacitor of capacitance C. find the expression for the current, i, through it. Plot a graph of v and i versus t to show that the current is $\pi/2$ ahead of the voltage.

A resistor of 200 Ω and a capacitor of $15.0\ \mu F$ Fare connected in series to a 220 V, 50 Hz a.c. source. Calculate the current in the circuit and the *rms* voltage across the resistor and the capacitor. Is the algebraic sum of these voltages more than the source voltage? if yes, resolve the paradox. *5 marks*