



PHYSICS

BOOKS - JEEVITH PUBLICATIONS

PHYSICS (KANNADA ENGLISH)

SUPER MODEL QUESTION PAPER -3

Part A

1. Define surface charge density .



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2. What is a potentiometer?



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3. Define magnetic moment.



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4. What is dynamo effect ?



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5. Write an expression for the energy stored in an inductor .



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6. State the principle of superposition of waves .



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7. What is nuclear fusion ?



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8. Write the symbol for a zener diode.



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9. What is an amplifier?



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10. What is attenuation in communication system ?



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Part B

1. Write two properties of an electric charge .



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2. Mention the factors on which electrical resistivity of a conductor depend.



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3. Mention energy losses in a transformer .



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4. What is displacement current? Give the expression for it



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5. State Brewster's law



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6. Write any two limitations of Bohr's theorem.



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7. State the law of radioactive decay.

Plot a graph showing the number (N) of undecayed nuclei as a function of time (t) for a given radioactive sample having half life $T_{1/2}$.

Depict in the plot, the number of undecayed nuclei at (i) $t = 3T_{1/2}$ and (ii) $t = 5T_{1/2}$.



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8. Draw a neat labelled block diagram of an AM transmitter.





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Part C

1. Derive the expression for effective of number of capacitors connected in parallel .



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2. State and explain Biot-Savart's law and give its mathematical equation in vector form.



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3. Write three properties of diamagnetic and ferromagnetic materials



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4. Write the expression for the magnetic field at a point on the axis of a long solenoid carrying current and give the meaning of the symbols used.



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5. What is the relation between focal length of a spherical mirror and its radius of curvature ?



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6. Using Bohr's postulates obtain the expression for Bohr radius .



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7. Define half life of a radioactive element and deduce the expression for the same .



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8. Distinguish between p type and n type semiconductors



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1. Obtain an expression for the electric field intensity at a point on the equatorial line of an electric dipole.



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2. Derive the expression for current when number of cells are connected in parallel .



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3. Draw Wheatstone bridge and write the condition for balance.



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4. Define co-efficient of self-induction. Derive an expression for the energy stored in an inductor.



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5. What is constructive and destructive interference? Explain with an example .



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6. What is amplification? With a circuit diagram, explain the working of npn transistor as an amplifier in CE configuration.



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7. A cylindrical capacitor has two co-axial cylinders of length 15 cm and radii 1.5 cm and 1.4 cm. The outer cylinder is earthed and the inner cylinder is given a charge of $3.5 \mu\text{C}$. Determine the capacitance of the system and the potential of the inner cylinder. Neglect end effects (i.e., bending of field lines at the ends).



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8. Two long and parallel straight wires A and B carrying currents of 8.0 A and 5.0 A in the same direction are separated by a distance of 4.0 cm. Estimate the force on a 10 cm section of wire A.



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9. A coil of inductance 0.50 H, and resistance 100Ω is connected to a 240V, 50Hz ac supply
What is the maximum current in the coil?





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10. A coil of inductance 0.50 H , and resistance 100Ω is connected to a 240V , 50Hz ac supply

What is the time lag between the voltage maximum and the current maximum?



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11. An object of size 3.0cm is placed 14cm in front of a concave lens of focal length 21cm .

Describe the image produced by the lens.

What happens if the object is moved further away from the lens?



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12. An electron and a photon each have a wavelength of 1.00 nm . Find (i) their momentum (ii) the energy of the photon and (iii) K.E of electron



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