



PHYSICS

BOOKS - JEEVITH PUBLICATIONS

PHYSICS (KANNADA ENGLISH)

SUPER MODEL QUESTION PAPER

(WITH ANSWERS)

Part A

1. Name the apparatus to detect charge on a body



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2. Write the equivalent mathematical form for Ohm's law.



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3. Name the type of induced emf associated with a conductor moving in a static magnetic field.



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4. Give the mathematical form of Ampere's circuital law.



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5. Long distance radio broadcasts use short wave bands. Why ?



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6. A particle is accelerated by applying an electric field how does its de broglie wave length change ?



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7. What is the rest mass energy of a photon?



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8. Why are electromagnetic radiations due to ?



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9. Why are nuclear forces called exchange forces?



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10. What is amplitude modulation ?



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Part B

1. Define effective resistance of a number of resistors connected in a series or parallel combination



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2. State Kirchhoff's laws of Electrical network.



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3. State and explain Gauss's law in magnetism.



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4. Give the expression for Lorentz force acting on a moving electric charge in a combined

electric and magnetic field.



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5. Distinguish between HF chokes and LF chokes.



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6. Explain myopia or short sightness with a neat labelled diagram



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7. Distinguish between p type and n type semiconductors



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8. Draw block diagram of a receiver



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1. Derive an expression for electric potential energy of a system of charges in an electric field.



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2. Derive an expression for capacitance of a parallel plate capacitor



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3. Give any three practical application of high energetic charged particles obtained in a cyclotron



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4. Define self inductance of a solenoid. On what factors does it depend ?



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5. Show that voltage in an inductor leads the current by $\pi / 2$ rad for a pure inductor



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6. Write any three difference between interference and diffraction.



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7. Explain Werner Heisenberg's uncertainty principle (qualitative).



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8. Explain a typical p-n junction solar cell with a neat labelling



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9. Derive an expression for electrical conductivity.



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Part D

1. Obtain an expression for the force between two straight parallel conductor carrying current. Hence define ampere.



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2. Explain briefly how bar magnets act as equivalent solenoids.



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3. Derive refraction formula (for object in air and image in the denser medium) for refraction of light at a spherical surface



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4. State the law of radioactivity and hence, show that $N = N_0 e^{-\lambda t}$.



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5. Show that voltage gain in a transistor amplifier in CE mode is negative and hence obtain an expression for the voltage gain.



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6. An oil drop of 12 excess electrons is held stationary under a constant electric field of $2.55 \times 10^4 \text{ NC}^{-1}$ in Millikan's oil drop experiment. The density of the oil is $1.26 \times 10^3 \text{ kgm}^{-3}$. Estimate the radius of the drop ($g = 9.81 \text{ ms}^{-2}$, $e = 1.60 \times 10^{-19} \text{ C}$).



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7. Six lead - acid type of secondary cells each of emf 2.0V and internal resistance 0.015Ω are

joined in series to provide supply to a resistance of 8.5Ω . What is the current drawn from the supply and its terminal voltage?



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8. A secondary cell after long use has an emf of 1.9V and large internal resistance of $380\ \Omega$.

What maximum current can be drawn from the cell? Could the cell drive the starting motor of a car?



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9. A circuit containing an inductor of 80mH inductance and a capacitor of $60\mu\text{F}$ capacitance in series, is connected to a 230V , 50Hz supply. The resistance of the circuit is negligible.

Obtain the current amplitude and r.m.s value.



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10. A circuit containing an inductor of 80mH inductance and a capacitor of $60\mu\text{F}$

capacitance in series, is connected to a 230V, 50Hz supply. The resistance of the circuit is negligible.

Obtain the r.m.s values of potential drop across each element.



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11. A circuit containing an inductor of 80mH inductance and a capacitor of $60\mu F$ capacitance in series, is connected to a 230V, 50Hz supply. The resistance of the circuit is

negligible.

What is the average power transferred to the inductor?



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12. A circuit containing an inductor of 80mH inductance and a capacitor of $60\mu\text{F}$ capacitance in series, is connected to a 230V , 50Hz supply. The resistance of the circuit is negligible.

What is the average power transferred to the capacitor?



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13. A circuit containing an inductor of 80mH inductance and a capacitor of $60\mu\text{F}$ capacitance in series, is connected to a 230V , 50Hz supply. The resistance of the circuit is negligible.

What is the total average power absorbed by

the circuit (averaged over one complete cycle)?



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14. Calculate the distance between the centers of 4^{th} and 7^{th} bright fringes in an interference pattern produced in young's slit experiment. Give separation between the slits $= 1.1 \times 10^{-3}$, wavelength of light used $= 589.3nm$, and distance of the screen from the double slit $= 1.3m$.



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15. A 12.5eV electron beam is used to bombard gaseous hydrogen at room temperature. What series of wavelengths will be emitted.



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