



# PHYSICS

BOOKS - OSWAAL PUBLICATION

PHYSICS (KANNADA ENGLISH)

KARNATAKA II PUC APRIL 2020 CLASS -  
XII

**Part A Answer All The Following Questions**

1. Write the SI unit of electric flux



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2. Plot a graph of resistivity of a semiconductor as a function of absolute temperature.



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3. Give any one use of electromagnet



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4. What is the significance of Lenz's law ?



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5. How does capacitive reactance vary with frequency ?



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6. Arrange the following electromagnetic waves in ascending order of their wavelength:

Radio waves, Gamman rays, Infrared waves, X-rays



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7. Sky seen from earth appears blue because of



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8. Mention any two methods of increasing the resolving power of a microscope.



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9. Write the nuclear reaction equation-for  
alpha decay of  ${}_{92}^{238}\text{U}$



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10. Give the logic symbol, Boolean expression  
and truth table of a NOR gate.



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## Part B Answer Any Five Of The Following Questions

1. State and explain Coulomb's law in electrostatics.



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2. A parallel plate capacitor with air between the plates has capacitance  $C$ . What will be the capacitance if

(a) the distance between the plates is

doubled?

(b) the space between the plates is filled with a substance of dielectric constant 5?



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3. Give any two practical limitations of Ohm's law.



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4. In a region, an electric field  $\vec{E} = 5 \times 10^3 \hat{j} \text{ NC}^{-1}$  and a magnetic field of  $\vec{B} = 0.1 \hat{k} \text{ T}$  are applied. A beam of charged particles are projected along X-direction. Find the velocity of charged particles which move an deflected in this crossed fields.



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5. What is hysteresis? Define the terms 'coercivity' and 'retentivity' of a ferromagnetic



material.



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**6. Mention energy losses in a transformer .**



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**7. What is displacement current? Give the expression for it**



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8. An alpha particle, a proton and an electron are moving with equal kinetic energy. Which one of these particles has the longest de Broglie wavelength? Give reason.



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## Part C Answer Any Five Of The Following Questions

1. Derive the relation between electric field and electric potential.



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2. Derive the expression for energy stored in a charged capacitor.



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3. Give the principle of cyclotron and draw the neat labelled schematic diagram of cyclotron.



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4. Mention any three properties of diamagnetic substance.



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5. Obtain the relation between radius of curvature and focal length of a concave mirror with necessary ray diagram.



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6. Using Huygens principle, show that the angle of incidence is equal to angle of reflection during a plane wave front reflected by a plane surface.



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7. Define work function. Write Einstein's photoelectric equation and explain the terms.



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8. Give three differences between intrinsic and extrinsic semiconductors



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## Part D Answer Any Two Of The Following Questions

1. Derive  $\sigma = \frac{ne^2\tau}{m}$

where the symbols have their usual meaning.



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



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3. Derive an Expression for instantaneous induced emf in an A.C generator



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4. Obtain the expression for fringe width in the case of interference of light waves.



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



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6. What is Rectification? Describe with a circuit diagram the working of a p-n junction diode as half wave rectifier with input and output waveforms.



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## Part D Answer Any Three Of The Following Questions

1. Two point charges

$q_A = 5\mu C$  and  $q_B = -5\mu C$  are located at A

and B separated by 0.2m vacuum.

What is the electric field at the midpoint O of the line joining the charges? If a negative test charges of magnitude 2mC is placed at O, what is the force experienced by the test charge?



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2. (a) Three resistors  $3\Omega$ ,  $4\Omega$ , and  $12\Omega$  are connected in parallel. What is the effective resistance of the combination?

(b) If the combination is connected to a

battery of emf  $6\text{V}$  and internal resistance  $0.5\Omega$ , find the current drawn from the battery and terminal potential difference across the battery.



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**3.** A series LCR circuit contains a pure inductor of inductance  $5.0\text{H}$ , a capacitor of capacitance  $20\mu\text{F}$  and a resistor  $40\Omega$ . Find the resonant frequency of the circuit. Calculate the quality

factor (Q- factor ) of the circuit. What is the impedance at resonant condition?



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4. At what angle should a ray of light be incident on the face of a prism of refracting angle  $60^\circ$  so that it just suffers total internal reflection at the other face? The refractive index of the material of the prism is 1.524.



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5. A copper coin has a mass of 63.0g. Calculate the nuclear energy that would be required to separate all the neutrons and protons from each other. The coin is entirely made of  ${}_{29}^{63}\text{Cu}$  atoms.

Mass of  ${}_{29}^{63}\text{Cu}$  atom = 62.92960u

mass of proton = 1.00727u

Mass of neutron = 1.00866u

Avogadro's number =  $6.022 \times 10^{23}$



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