



PHYSICS

BOOKS - JEEVITH PUBLICATIONS

PHYSICS (KANNADA ENGLISH)

SUPPLEMENTARY EXAMINATION

QUESTION PAPER (WITH ANSWERS)

JULY-2017

Part A

1. How does the electrostatic force between two point charges change, when a dielectric medium is introduced between them ?



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2. State Kirchoff's junction rule.



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3. What is Lorentz force ?



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4. Write the relation connecting rms value and Peak value of alternating current.



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5. What is motional electromotive force ?



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6. Mention the power factor of a pure inductor or a capacitor.



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7. Define half life of a radiocative sample.



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8. Give the circuit symbol of AND-gate.



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9. Write any one advantage of light emitting diode.



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10. What is attenuation in communication system ?



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1. State and explain Gauss's theorem in Electrostatics.



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2. Define mobility. Mention its S.I. Unit



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3. What is ohmic device? Give one example.





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4. Write any two differences between diamagnetic and paramagnetic substances.



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5. The magnetic flux linked with a coil varies as $\phi = 3t^2 + 4t + 9$. Find the magnitude of the emf induced at $t = 2\text{S}$.



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6. Write Maxwell's equation for the speed of electromagnetic waves and explain the terms.



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7. What are de-Broglie Waves ? How does the de-Broglie wavelength vary with momentum of moving particle ?



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8. Draw the block diagram of generalised communication system.



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Part C

1. Obtain the relation between electric field and electric potential due to a point charge.



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2. Derive the relation $\vec{j} = \sigma \vec{E}$ with terms which has usual meaning.



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3. How is a galvanometer converted into a voltmeter?



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4. Mention any three application of eddy currents.



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5. Define critical angle. Write two conditions for total internal reflection.



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6. Write any three difference between interference and diffraction.



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7. Define the terms :

Threshold frequency



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8. Define the terms :

Work function.



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9. Define the terms :

Stopping potential.



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10. Explain the use Zener diode as a voltage regulator.



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Part D

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



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3. Show that a current carrying solenoid is equivalent to a bar magnet.



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4. Derive the lens maker's formula.



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5. Derive an expression for the total energy of an electron in stationary state of hydrogen atom. Assuming the expression for the radius.



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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. In a parallel plate capacitor with air between the plates, each has an area $8 \times 10^{-3} m^2$ and distance between the plates is 2 mm. Calculate the capacitance of the capacitor. If this capacitor is connected to a 50 V supply, what is the charge on each plate of the capacitor? (Absolute permittivity of free space $= 8.85 \times 10^{-12} Fm^{-1}$)



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8. Three resistor 4Ω , 6Ω and 8Ω , are combined in parallel. What is the total resistance of the combination ?



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9. Three resistor $4\ \Omega$, $6\ \Omega$ and $8\ \Omega$, are combined in parallel. If the combination is connected to a battery of emf $25\ \text{V}$ and negligible internal resistance, then determine

the current through each resistor and total current drawn from the battery.



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10. A sinusoidal voltage of peak value 285 V is applied to a series LCR circuit in which resistor of resistance 5 Ω , pure Inductor of Inductance 28.5 mH and capacitor of capacitance 800 μF are connected.

Find the resonant frequency.



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11. A sinusoidal voltage of peak value 285 V is applied to a series LCR circuit in which resistor of resistance 5 Ω , pure Inductor of Inductance 28.5 mH and capacitor of capacitance 800 μF are connected.

Calculate the impedance, current and power dissipated at the resonance.



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12. In young's double slit experiment distance between the slits is 0.5 mm. When the screen is kept at a distance of 100 cm from the slits, the distance of ninth bright fringe from the centre of the fringe system is 8.835 mm. Find the wavelength of light used.



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13. Calculate the Binding energy and binding energy per nucleon of an oxygen

nucleus (O_8^{16}) using the following data (MeV):

Mass of proton = 1.007825 u

Mass of neutron = 1.00865 u

Mass of oxygen nucleus = 15.995 u.



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