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+2 PHYSICS STUDY MATERIAL -

IMPORTANT TEN MARKS QUESTIONS

ENGLISH MEDIUM : VOLUME – 1 & 2

PRESENTED BY

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UNIT : 1 Electrostatics – ten marks questions

1. What is an electric dipole? Derive an expression for the electric field due to an electric dipole at a point on its axial line. *(M - 06, J - 06, M - 09, J - 10, O -10, M - 11)*
2. Derive an expression for electric potential due at a point to an electric dipole. Discus the special cases. *(O - 06, M - 08, J - 08, M - 10, O - 11, M - 13)*
3. Deduce an expression for equivalent capacitance of capacitors connected (i) parallel (ii) series. *(J - 07, O - 07)*
4. Principle, construction and working of Van de Graaff generator. What is its use? *(O - 08, O - 09, O - 12)*
5. Derive an expression for electric field due to an electric dipole at a point along the equatorial line. *(M - 07, J - 09)*
6. State Gauss's law. Applying this calculate electric field due to (i) an infinitely long straight charged with uniform charge density. *(J - 11, M - 12, J - 13)*
7. Explain the principle of a capacitor. Deduce an expression for the capacitance of a parallel plate capacitor. *(J -12)*
8. What is dielectric? Explain the effect of introducing a dielectric slab between the plates of a parallel plate capacitor.
9. State Gauss law using this find an expression for electric field due to uniformly charged spherical shell at a point (i)outside the shell (ii) on the surface (iii) inside the shell.

UNIT : 3 Effects of electric current– ten marks questions

1. Discuss the motion of a charged particle in a uniform magnetic field. Define magnetic Lorentz force. *(J - 10)*
2. Explain the principle, construction,working and limitations of a cyclotron. *(M - 07, O-10, O -11, J -13)*
3. Obtain an expression for the torque experienced by a current loop in a uniform magnetic field.
4. Obtain expression for a magnetic induction due at a point to infinitely long straight conductor carrying current. *(J - 06, O - 09, M -10, M - 06)*
5. Define ampere's circuit law. Applying it find the magnetic induction at a point due to a long solenoid carrying current. *(O - 06, J - 09)*
6. State Joule's law. Explain Joule's calorimeter experiment to verify Joule's law of heating. *(J - 07, J - 12)*
7. Deduce the relation for the magnetic induction, at a point along the axis of a current coil carrying current. *(O - 07, M – 08, M - 12)*
8. State Tangent law. Explain in detail the principle, construction and theory of a tangent galvanometer. *(J - 08)*
9. Deduce expression for the force on a current carrying conductor placed in a magnetic field. Find the magnitude of the force. *(O - 08, M - 09, J - 11, O -12)*
10. Obtain an expression for the force between two long parallel current carrying conductors. Hence define " ampere ''. *(M - 11)*
11. Explain the motion of a charged particle in a magnetic field. Deduce the period of rotation of it. *(M-13)*

UNIT : 4 Electromagnetic induction and Alternating current – ten marks questions

1. Principle, construction, theory of working of transformer of a transformer. Define its efficiency. Mention the energy losses. *(M - 06, M - 12)*
2. Describe principle, construction, and working of a single phase *Alternating Current* generator. **(***M - 07, M - 08, J - 07, O - 07 O - 10, J - 11, M -11, J - 12, J-13)*
3. Discuss with theory the method of inducing *e.m.f* in a coil by changing its orientation with respect to the direction of the magnetic field. *(J - 08, O- 09, J -10, O -11, M - 11, M-13)*
4. Obtain the phase relation between voltage and current in an *A.C* circuit containing a pure inductance. Draw the necessary graph. *(O - 08)*
5. What are eddy current? Explain their applications. How are they minimized? *(M - 09)*
6. In an ac circuit containing a capacitor, the instantaneous emf is e=Eosinωt. Obtain the expression for instantaneous current. Explain the phase relation between emf and current by graph. *(O - 06)*
7. Explain the mutual induction between two long solenoids. Obtain an expression for the mutual inductance.
8. A source of alternating emf is connected to a series combination of a resistor R, Inductor L, Capacitor C. Calculate the current, resultant voltage and the phase angle between the current and the voltage. *(J - 06, J – 09, O -12)*

UNIT : 5 Electromagnetic waves and wave optics – ten marks questions

1. Explain Raman scattering of light with the help of energy level diagram. *(M - 07, O - 07 M - 08, J - 11, M - 13)*
2. Write a note on (i) Nicol Prism (ii) Polaroid.
3. On the basis of wave theory, explain total internal reflection. Write the conditions for the total internal reflection to take place. **(***M - 06, J - 06)*
4. What is known as interference? Derive an expression for band with of interference fringes in Young's double slit experiment. *(O - 06, O - 11, O - 10, J - 07, J - 10, M - 09, M -11)*
5. Explain emission and absorption spectra. *(J - 09, M - 10, M - 12, J - 12, O -12, J-13)*
6. State Huygens's principle on the basis of wave theory. Prove the laws of reflection. *(O - 08)*
7. Explain theory of interference in thin transparent film due to reflected light and obtain the condition for the intensity to be maximum and minimum. *(J - 08, O - 09)*
8. What are called Newton's rings? Explain the experiment and theory of formation of the Newton's ring.
9. Discuss the theory of plane transmission grating.
10. Explain the refraction of a plane wave front at a plane surface and state laws of refraction.

Unit – 6 Atomic Physics - ten marks questions

1. State Bohr's postulates. Obtain an expression for the radius of n^{th} orbit of hydrogen atom based on the Bohr's Theory. *(M - 06 , M - 08, J - 09, M -12)*
2. Describe the J.J Thomson method for determine the specific charge of an electron. *(O - 09, M - 10, J - 10, O - 10, O – 11, J - 12)*
3. Explain the working ruby laser with the help of energy level diagram. *(O - 06, J - 07, M - 09, J -11, O -12, M - 13)*
4. How will you determine the wavelength of x-rays using Bragg's spectrometer. Write any five properties of x-rays. *(M - 07)*
5. Derive Bragg's law. Explain how a Bragg's spectrometer can be used to determine the wavelength of x-rays. *(J - 07)*
6. Draw a neat diagram of the He-Ne laser and explain its working with the help of energy level diagram. *(J - 06, M - 11, J - 13)*
7. Describe Millikan's oil drop experiment to determine the charge of an electron. *(J - 08, O - 08)*
8. Explain Sommerfeld atom model.
9. Give an account for principle of laser, laser action and characteristic laser.
10. Obtain an expression for the energy the electron of n^{th} orbit of hydrogen atom based on Bohr's theory.

Unit – 8 Nuclear Physics - ten marks questions

1. Describe the principle and action of a Bainbridge Mass spectrometer in determining the isotopic masses. *(J - 06, J - 07, J - 08, O - 06, M - 09, J - 10, O -10, J -11, O -12)*
2. Explain the construction and working of a *Geiger Muller* counter. *(M - 07, O - 07, J - 09, M -11, M - 13)*
3. What are cosmic rays? Explain the latitude effect and altitude effect regarding cosmic rays. *(M - 08,M - 10, J - 13)*
4. Obtain an expression for the amount of the radioactive substance present at any moment. Obtain the relation between half life period and decay constant. *(O - 08, O – 09, O -11, M – 12, J - 12)*
5. What is the nuclear reactor? Explain the function of *(i)* moderator *(ii)* control rod *(iii)* neutron reflector. Mention the uses of nuclear reactor. *(diagram not necessary)* *(M - 06)*
6. Compare the properties of alpha, beta and gamma rays.
7. Explain the stellar energy with proton-proton cycle and carbon-nitrogen cycle?

Unit – 9 Semi conductor devices - ten marks questions

1. With the circuit diagram, explain the working of a Bridge rectifier. Draw its input and output signals. What are the advantages. *(M - 06, J - 07 ,M -10, J -10, O - 11, J - 12)*
2. Explain with neat circuit diagram, the working of single stage CE amplifier. Draw the frequency response curve and discuss the result. *(J - 08, O - 08, M- 11, M - 13)*
3. Sketch the circuit of a Colpitt's oscillator and explain its working. *(J - 06, O - 06, M - 08, J - 09, J - 11, M - 12)*
4. With a circuit diagram, explain the working of an operational amplifier as a summing amplifier. *(M - 07)*
5. Explain the action of an operational amplifier as difference amplifier. *(O - 07)*
6. What meant by feed back? Derive an expression for voltage gain of an amplifier with negative feedback. *(M -09,J-13)*
7. What is operational amplifier? Explain its action as *(i)* inverting amplifier *(ii)* non-inverting amplifier. *(O - 09)*
8. With the help of neat circuit diagram, explain the output characteristic of an *NPN* transistor in *CE* mode and methods of finding the parameters. *(O -10, O -12)*
9. Describe the energy band structure of insulator, semi conductor and conductor.
10. Explain the characteristic and working of PN junction diode in forward and reverse bias.

Unit – 10 Communication Systems - ten marks questions

1. Make the analysis of amplitude modulated wave. Plot the frequency spectrum and band width. *(J - 06, O - 06, M - 08, M - 09, J - 10, O - 10,J – 12,M-13)*
2. With the help of a functional block diagram. Explain the operation of a super heterodyne *AM* receiver. *(J - 07, M - 11, M -12)*
3. With the help of a functional block diagram, explain the function of a monochrome TV receiver. *(M - 06, M - 07, M -10, J - 11, J - 13)*
4. With the help of block diagram, explain the function of various units in the monochrome television transmitter. *(J - 08, O - 08, O - 09)*
5. Explain the construction and working of a vidicon camera tube with neat diagram. *(J - 09)*
6. With the help of block diagram, explain the function of radar system. *(O - 07, O -11, O - 12)*

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