+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. 
   \( O - 06, M - 08, J - 08, M - 10, O - 11 \)

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.  
   \( J - 11, M - 12 \)

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 with a neat diagram.  
   \( M - 07, O-10, O -11 \)

3. Obtain an expression for the torque experienced by a current loop in a uniform magnetic field.  
   \( J - 06, O - 09, M - 10 \)

4. Obtain expression for a magnetic induction due at a point to infinitely long straight conductor carrying current.  
   \( J - 06, O - 09, M - 10 \)

5. Apply Biot – Savart law, obtain an expression for the magnetic induction at a point due to infinitely long straight conductor carrying current.  
   \( M - 06 \)

6. Define ampere’s circuit law. Applying it find the magnetic induction at a point due to a long solenoid carrying current.  
   \( O - 06, J - 09 \)

7. State Joule’s law. Explain Joule’s calorimeter experiment to verify Joule’s law of heating.  
   \( J - 07, J - 12 \)

8. Deduce the relation for the magnetic induction, at a point along the axis of a current coil carrying current.  
   \( O - 07, M – 08, M - 12 \)

   \( J - 08 \)

10. Deduce expression for the force on a current carrying conductor placed in a magnetic field. Find the magnitude of the force.  
    \( O - 08, M - 09, J - 11, O -12 \)

11. Obtain an expression for the force between two long parallel current carrying conductors. 
    Hence define “ ampere ”.  
    \( M - 11 \)
UNIT : 4  Electromagnetic induction and Alternating current
– ten marks questions

   Mention the energy losses.  
   
   (M - 06, M - 12)

   
   (M - 07, M - 08, J - 07, O - 07 O - 10, J - 11, M -11, J - 12)

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)

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)

Best wishes

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)

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)

   
   (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\textsuperscript{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)

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)

7. Describe Millikan’s oil drop experiment to determine the charge of an electron. (J - 08, O - 08)

8. Explain Sommerfeld atom model.


10. Obtain an expression for the energy the electron of n\textsuperscript{th} orbit of hydrogen atom based on Bohr’s theory.

Best wishes

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)

3. What are cosmic rays? Explain the latitude effect and altitude effect regarding cosmic rays. (M – 08, M - 10)

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.  \( (J - 08, M - 11) \)

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.  \( (M - 07, J - 12) \)

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.  \( (M - 09) \)

7. What is operational amplifier? Explain its action as (i) inverting amplifier (ii) non-inverting amplifier.  \( (O - 09) \)

8. What is called amplifier? With a circuit explain the working of transistor as amplifier. Explain the frequency response curve.  \( (O - 08, M - 11) \)

9. With the help of neat circuit diagram, explain the output characteristic of an NPN transistor in CE mode and methods of finding the parameters.  \( (J - 08, O -10, O -12) \)

10. Describe the energy band structure of insulator, semi conductor and conductor.

11. Describe the construction and working of a multimeter with a neat diagram. Explain how is it used as a voltmeter and ohm-meter.

12. Explain the characteristic and working of PN junction diode in forward and reverse bias.

Best wishes

Unit – 10 Communication Systems - ten marks questions

1. Make the analysis of amplitude modulated wave. Plot the frequency spectrum and band width.  \( (J - 06, O - 06, M - 08, M - 09, J - 10, O - 10, J - 12) \)

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.  \( (M - 06, M - 07, M - 10, J - 11) \)

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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