TS SENIOR INTER

SUB: PHYSICS   **IMPORTANT QUESTIONS**

I   VERY SHORT QUESTIONS:

QUESTION NO:1

    1. What is sky wave propagation?

    2. Define modulation. Why is it necessary?

    3. Mention the various parts of the ionosphere?

QUESTION NO:2

    1. Mention the basic methods of modulation.

    2. Which type of communication is employed in Mobile Phones?

    3. Mention the frequency range of speech signals.

QUESTION NO:3

    1. Write the truth table of NAND gate. How does it differ from AND gate?

    2. What is a p-type semiconductor? What are the majority and minority charge carriers in it?

    3. Draw the circuit symbols for p-n-p and n-p-n transistors.

QUESTION NO:4

    1. What is optical density and how is it different from mass density?

    2. What is dispersion? Which colour gets relatively more dispersed?

    3. A small angled prism of 4^0 deviates a ray through 2.48^0. Find the refractive index of the prism.

QUESTION NO:5

    1. Define 'power' of a convex lens. What is its unit?

    2. The focal length of a concave lens is 30cm. Where should an object be placed   so that its image is $\frac{1}{10}$

      of its size?

    3. What focal length should the reading spectacles have a person for whom the least distance of distinct vision is 50 cm.

QUESTION NO:6

    1. What is hypermetropia? How can it be corrected?
    2. What is myopia? How can it be corrected?
    3. Two lenses of power and respectively, are placed in contact. Calculate the focal length of the

      combination.

QUESTION NO:7

    1. What is the force on a conductor of length 'L' carrying current 'i' placed in a magnetic field of induction

      B? When does it become maximum?

2. A circular coil of radius 'r' having 'N' turns carries a current 'i'. What is its magnetic moment?

3. What is the force on a charged particle of charge 'q' moving with a velocity 'V' in a uniform magnetic field of induction B? When does it become maximum?

QUESTION NO:8

1. What is the importance of Oersted's experiment?

2. State Ampere's law and Biot-savart's law.

3. What is the principle of a moving coil galvanometer?

QUESTION NO:9

1. What are the units of Magnetic moment, Magnetic induction and Magnetic field?

2. Define magnetic inclination (or) angle of dip.

3. What happens to compass needles at the Earth's poles?

QUESTION NO:10

1. Magnetic lines of force form continuous closed loops. Why?

2. Define magnetic declination.

3. State Gauss law for Magnetism?

QUESTION NO:11

1. A transformer converts 200V ac into 2000V ac. Calculate the number of turns in the secondary if the primary has 10 turns.

2. What is the phenomenon involved in the working of a transformer?

3. What type of transformer is used in a 6V bed lamp?

QUESTION NO:12

1. If the wavelength of electromagnetic radiation is doubled what happens to the energy of photon?

2. What are the applications of micro waves?

3. Give two uses of infrared rays ? Which animal can ditect infrared waves?

QUESTION NO:13

1. What is the relation between the amplitudes of the electric and magnetic fields in free space for an electromagnetic wave?

2. What is the principle of production of electromagnetic waves ?

3. Micro waves are used in Radars why?

QUESTION NO:14

1. Give examples of "Photosensitive substances" why they are called so?

2. What important fact did Millikan's experiment establish?

3. What is "Photo electric effect"?

QUESTION NO:15

1. State Heisenberg's Uncertainty principle ?

2. Write down Einstein's photo electric equation.

3. What is 'Work function"?

SAQ'S

QUESTION NO:16
1. Distinguish between half-wave and full-wave rectifiers.

2. What is rectification? Explain the working of a full wave rectifier.

3. Describe how a semi conductor diode is used as a half wave rectifier.

QUESTION NO:17
1. Derive an expression for potetial and kinetic energy of an electron in any orbit of a hydrogen atom

   according to Bohr's atomic model.

2. Explain the different types of spectral series.

3. What are the limitations of Bohr's theory of hydrogen atom?

QUESTION NO:18
1. Obtain an expression for the emf induced across a conductor which is moved in a uniform magnetic field which is perpendicular to the plane of motion.
2. Describe the ways in which Eddy currents are used to advantage.
3. The current in a circuit falls from 5A to 0A in 0.1s. If an average emf of 200V is induced, give an estimate of the self inductance of the circuit.

QUESTION NO:19
1. Obtain an expression for the magnetic dipole moment of a current loop ?
2. Derive an expression for the magnetic induction at the centre of a current carrying ciruclar coil using Biot-Savart law?
3. State and explain Biot-Savart law

QUESTION NO:20
1. Derive an expression for the electric potential due to point charge.
2. Derive an expression for the capacitance of a parallel plate capacitor
3. Derive expression for the potential energy of an electric dipole placed in a uniform electric field.

QUESTION NO:21
1. Explain the distance of closest approach and impact parameter.
2. Describe Rutherford atom model. What are the drawbacks of this model?
2. What is impact parameter and angle of scattering? How are they related to each other.

QUESTION NO:22
1. Explain behaviour of dieletrics in an external field.
2. Three capacitors of capacitances 2pF, 3pF and 4pF are connected in parallel
   (a) What is the total capacitance of the combination?
   (b) Determine the charge on each capacitor if the combination is connected to a 100V supply.
3. A 12pF capacitor is connected to a 50V battery. How much electrostatic energy is stored in the capacitor?

QUESTION NO:23
1. State Gauss's law in electrostatics and its importance.
2. State and explain Coulomb's inverse square law in electricity.
3. Define intensity of electric field at a point. Derive an expression for the intensity due to a point charge.

QUESTION NO:24
1. Derive the formula for equivalent capacitance in parallel combination.

2. Derive the formula for equivalent capacitance in series combination.
3. Three capacitors each of capacitance 9pF are connected in series.
    (a) What is the total capacitance of the combination?
    (b) What is the potential difference across each capacitor if the combination is connected to a 120V supply?

QUESTION NO:25
1. Does the principle of conservation of energy hold for interference and diffraction phenomena? Explain briefly?
2. Derive the expression for the intensity at a point where interference of light occurs. Arrive at conditions for maximum and zero intensity.
3. Explain Doppler effect in light. Distinguish between red shift and blue shift?

QUESTION NO:26
1. Derive an expression for the intensity of the electric field at a point on the equatorial plane of an electric dipole.
2. Derive an expression for the intensity of electric field at a point on the axial line of a dipole.
3. An electric dipole with dipole moment $4 \times 10^{-9} Cm$ is aligned at 30^0 with the direction of a uniform electric field of magnitude $5 \times 10^4 NC^{-1}$. Calculate the magnitude of the torque acting on the dipole.

QUESTION NO:27
1. Derive an equation for the couple acting on a electric dipole in a uniform electric field.
2. What is the force between two small charged spheres having charges $2 \times 10^{-7} C$ of and $3 \times 10^{-7} C$ placed 30cm apart in air?
3. ----------------

QUESTION NO:28
1. With a neat labelled diagram explain the formation of image in a simple microscope?
2. Define critical angle. Explain total internal reflection using a neat diagram?
3. Explain the formation of a rainbow?

QUESTION NO:29
1. A light ray passes through a prism of angle A in a position of minimum deviation. Obtain an expression for
  (a) The angle of incidence in terms of the angle of the prism and the angle of minimum deviation
  (b) The angle of refraction in terms of the refractive index of the prism.
2. Explain the formation of a mirage?
3. What is the position of the object for a simple micro scope? What is the maximum magnification of a simple microscope for a realistic focal length?

   LAQ'S
QUESTION NO:30
1. (i) What are beats? Obtain an expression for the beat frequency. Where and how are beats   made use of ?
   (ii) Two organ pipes of lengths 65cm and 70cm respectively, are sounded simultaneously. How many beats per second will be produced between the fundamental frequencies of the two pipes? (Velocity of sound=330m/s)
2. Explain the formation of stationary waves in stretched strings and hence deduce the laws of transverse waves in stretched string?
3. What are 'beats'? When do they occur? Explain their uses, if any?

QUESTION NO:31
1. (i) State the working principle of potentiometer explain with the help of circuit diagram how the potentiometer is used to determine the internal resistance of the given primary cell.
   (ii) A potentiometer wire is 5 m long and a potential difference of 6 V is maintained between its ends. Find the emf of a cell which balances against a length of 180 cm of the potentiometer wire.
2. (i) State Kirchhoff's laws for electrical network. Using these laws deduce the condition for balancing
     in a Wheatstone bridge.
   (ii) State the working principle of potentiometer explain with the help of circuit diagram. How the emf of two

primary cells are compared by using the potentiometer.

3. In a potentiometer arrangement a cell of emf 1.25V gives a balance point at 35.0cm length of the wire. If the cell is replaced by another cell and the balance point shifts to 63.0 cm what is the emf of the second cell ?

QUESTION NO:32

1. (i) Explain the principle and working of a nuclear reactor with the help of a labelled diagram.

   (ii) Calculate the energy released by fission from 2g of $_{92}^{235}U$ in KWh.Given that the energy released perr fission is 200 Mev.

2. Explain the source of stellar energy. Explain the carbon-nitrogen cycle, proton-proton cycle occuring in stars.

3. If one microgram of is completely destroyed in an atom bomb, how much energy will be released?

QUESTION NO:33

1. (i) How are stationary waves formed in closed pipes? Explain the various modes of vibrations and obtain relations for their frequencies?

   (ii) A closed organ pipe 70cm long is sounded. If the velocity of sound is 331m/s, what is the fundamental frequency of vibration of the air column?

2. (i) Explain the formation of stationary wave in an air column enclosed in open pipe. Derive the equations for the frequencies of the harmonics produced?

   (ii) A pipe 30cm long is open at both ends. Find the fundamental frequency. Velocity of sound in air is $330ms^{-1}$.