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Notes Physics 10th

Unit 10: 1- write features of simple harmonic motion. Ans: i) A body executing simple harmonic motion always vibrates about a fixed position. ii)Its acceleration is always directed towards the mean position. iii) Its velocity is maximum at the mean position and zero at the extreme position. **2-** What is restoring force? Ans: A restoring force always pushes or pulls the object performing oscillatory motion towards the mean position. **3-** Explain Hooke's law. Ans: In horizontal mass-spring system, if the spring is stretched through a small displacement from its mean position, then according to Hooke's law, force F is directly proportional to the increase in length of spring x. i.e Fα-x and F=-kx **4-** Define simple pendulum. Ans: A simple pendulum consists of a small bob of mass m suspended from a light string of length ℓ, fixed at its upper end. **5-** Define wave motion. Ans: A wave is disturbance in the medium which causes the particles of the medium to undergo vibratory motion about their mean position in equal intervals of time. **6-** Define mechanical waves. Ans: Waves which require any medium for their propagation are called mechanical waves. **7-** Name types of mechanical waves. Ans: There are two types of mechanical waves: i) longitudinal waves ii) transverse waves. **8-** Define electromagnetic wave with example. Ans: Waves that do not require any medium for their propagation. Examples: radio waves, TV waves, X-rays etc. **9-** Define transverse wave and give example. Ans: Waves in which particles of the medium vibrate about their mean position perpendicular to the direction of propagation of the waves, are called transverse waves. Example: waves on the surface of water, light waves. **10-** Define longitudinal waves. Ans: Waves in which particles of the medium move back and forth along the direction of propagation of wave. **11-** Define crest and troughs. Ans: Crest: In transverse waves, the highest points of the particles of the medium from the mean position. Troughs: In transverse waves, the lowest points of the particles of the medium from the mean position. **12-** Define diffraction of waves. Ans: The bending or spreading of waves around the sharp edges or corners of obstacles is called diffraction. **13-** Define ripple tank. Ans: A ripple tank is a device to produce water waves and to study their characteristics such as reflection, refraction and diffraction. **14-** What is damped oscillations? Ans: The oscillations of a system in the presence of some resistive force are damped oscillations. **15-** Define vibration. Ans: One complete round trip of a vibrating body about its mean position is called one vibration. **16-** Define frequency. Ans: The number of vibrations of a vibrating body in one second is called its frequency. Unit of frequency is hertz (Hz). **17-** Define amplitude. Ans: The maximum displacement of a vibrating body on either side from its mean position is called its amplitude.

Unit 11: 18- Define pitch. Ans: Pitch is the characteristic of sound by which we can distinguish between a shrill and a grave sound. It depends upon the frequency. **19-** On what factors does the loudness of sound depend? Ans: Loudness of sound depends upon following factors: i) Amplitude of the vibrating body ii) Area of the vibrating body iii) Distance from the vibrating body. **20-** Define quality of sound. Ans: The characteristic of sound by which we can distinguish between two sounds of same loudness and pitch is called quality. **21-** Write two characteristics of sound. Ans: i) loudness ii) pitch iii) quality **22-** Define intensity of sound. Ans: Sound energy passing per second through a unit area, held perpendicular to the direction of propagation of sound wave, is called intensity of sound. Its unit is watt per square meter (Wm^{-2}). **23-** Define echo or reflection of sound. Ans: When sound is incident on the surface of a medium, it bounces back into the first medium. This phenomenon is called echo or reflection of sound. **24-** Differentiate b/w musical sounds and noise. Ans: The sounds having pleasant effect on our ears are called musical sounds. The sounds with jarring effect on our ears are called noise. **25-** what are main sources of noise pollution? Ans: Transportation equipment and heavy machinery are the main sources of noise pollution. **26-** Define acoustic protection. Ans: The technique or method used to absorb undesirable sounds by soft and porous surfaces is called acoustic protection. **27-** Define ultra sound. Ans: Sound of frequency higher than 20,000 Hz which are inaudible to normal human ear are called ultrasound or ultrasonic waves. **28-** Write two uses of ultrasound.

Or write two uses of ultrasound in medical field. Ans: i) Ultrasonic waves are used to diagnose and treat different ailments. ii) Powerful ultrasound is being used to remove blood clots formed in the arteries. **29-** What is SONAR? Ans: Ultrasound is used to locate underwater depths or is used for locating objects lying in deep on the ocean floor. This technique is called SONAR. **30-** What is silent whistle? Ans: Some people use silent whistle to call dogs whose frequency lies between 20,000 Hz to 25,000 Hz. It is silent for human but not for dogs, because the audible frequency range for dogs is much higher.

Unit 12: 31- Differentiate b/w regular and irregular reflection. Ans: Regular reflection: The reflection by smooth surfaces of objects is called regular reflection. Irregular reflection: The reflection by rough surfaces of objects is called irregular reflection. **32-** Write laws of refraction. Ans: i) The incident ray, the refracted ray, and the normal at the point of incidence all lie in the same plane. ii)The ratio of the sin of the angle of incidence "i" to the sin of the angle of refraction "r" is always equal to a constant. i.e $\frac{Sin\ i}{\sin r} = constant = n$. **33-** Write laws of reflection. Ans: i) The incident ray, the reflected ray, and the normal at the point of incidence all lie in the same plane. ii) The angle of incidence is equal to the angle of reflection. i.e. $\angle$i=$\angle$r. **34-** Explain spherical mirror. Ans: A mirror whose polished, reflecting surface is a part of a hollow sphere of glass or plastic is called a spherical mirror. **35-** Define concave and convex mirror. Ans: Concave mirror: A spherical mirror whose inner curved surface is reflecting is called concave mirror. Convex mirror: A spherical mirror whose outer curved surface is reflecting is called convex mirror. **36-** What is Snell's law. Write its formula. Ans: The ratio of the sin of the angle of incidence 'i' to the sin of the angle of refraction 'r' is always equal to a constant. i.e. $\frac{Sin\ i}{\sin r} = constant = n$ **37-** Define endoscopy. Ans: A medical procedure using any type of endoscope is called endoscopy. **38-** Define critical angle. Ans: The angle of incidence for which the angle of refraction becomes 90^o is called critical angle. **39-** Define Prism. Ans: prism is a transparent object (made of optical glass) with three rectangular faces and two triangular faces. **40-** What is principal focus or focal point? After reflection from a mirror, rays of light parallel to the principal axis converge to a point F. This point is called Principal Focus. **41-** Define simple microscope. Ans: A simple microscope is a convex lens which is used to produce magnified images of small objects. **42-** Define power of lens and write its formula. Ans: Power of a lens is defined as "reciprocal of its focal length in metres". Formula: P= $\frac{1}{f}$. **43-** What is meant by the term nearsightedness or short-sightedness, and how can this defect be corrected? Ans: In short sightedness, a person cannot see distant objects clearly without the aid of spectacles. This defect can be corrected by using suitable diverging lenses. **44-** What is meant by the term farsightedness or long-sightedness, and how can this defect be corrected? Ans: In farsightedness, a person cannot see nearby objects clearly. This defect can be corrected by using suitable converging lenses. **45-** What is total internal reflection? Ans: When the angle of incidence becomes larger than the critical angle, no refraction occurs. The entire light is reflected back into the denser medium. This is known as total internal reflection of light.

Unit 13: 46- Define electrostatic induction. Ans: Electrostatic induction is the process of charging a conductor without any contact with the charging body. **47-** How can you find presence of charge on a body? Ans: For detection of type of charge on a body, electroscope is first charged either positively or negatively. Suppose electroscope is positively charged. Now in order to detect the type of charge on a body, bring the charged body near the disk of the positively charged electroscope. If the divergence of the leaves increases, the body carries positive charge. If the divergence decreases, the body has negative charge. **48-** Define electroscope. OR What is the use of electroscope? Ans: The gold leaf electroscope is a sensitive instrument, which is used to detect charges on a body. **49-** Explain Coulomb's law of electrostatics and write its mathematical form. Ans: Coulomb's law states that the force of attraction or repulsion between two charged bodies is directly proportional to the product of the charges and inversely proportional to the square of the distance between them. Formula: F= $k\frac{q_1\ q_2}{r^2}$. **50-** Define field intensity, and write its unit. Ans: The strength of an electric field at any point in space is known as electric field intensity. Its SI unit is Newton per Coulomb (NC^{-1}). **51-** Write two features of electric field lines OR Electric lines of force. Ans: i) Field lines are always directed from positive charge towards negative charge. ii) The spacing between the field lines

shows the strength of electric field. **52-** Define electric potential. Ans: Electric potential at a point in an electric field is equal to the amount of work done in bringing a unit positive charge from infinity to that point. Its SI unit is volt. **53-** Define volt. Ans: If one joule of work is done against the electric field in bringing one coulomb positive charge from infinity to a point in the electric field then the potential at that point will be one volt. **54-** What are the uses of capacitors? Ans: i) They are used for tuning transmitters ii) for receivers and transistor radios iii) in fans & AC iv) in motor & washing machines. **55-** Define capacitance. Ans: Capacitance is the ability of a capacitor to store electric charge. Its SI unit is farad (F). **56-** What is unit of capacitance? Write its definition. Ans: SI unit of capacitance is farad (F). Farad: If one coulomb of positive charge given to one of the plates of the capacitor, develops a potential difference of one volt, then its capacitance will be one farad. **57-** Define capacitor and write its formula. Ans: Capacitor is a device which is used to store electric charge. Formula: $C=\frac{Q}{V}$. **58-** Differentiate b/w watt and kilowatt-hour. Ans: Watt: If an object works one joule in one second, then its power will be one watt. Kilowatt-hour: The amount of energy obtained by a power of one kilowatt in one hour is known as kilowatt-hour.

Unit 14: 59- Differentiate b/w Galvanometer & Ammeter. Ans: Galvanometer: Galvanometer is a sensitive instrument which detects current in a circuit. Ammeter: Ammeter is an electrical instrument which measures larger current i.e. 1A to 10A. **60-** Define conventional current. Ans: Current flows from positive to negative terminal of a battery, due to flow of positive charges is called conventional current. **61-** Define unit of current. Ans: Unit of current is Ampere. Ampere: If a charge of one coulomb passes through a cross-sectional area in one second, then current is one ampere. **62-** Potential difference: Potential difference across the two ends of a conductor causes the dissipation of electrical energy into other forms of energy as charges flow through the circuit. SI unit of potential difference is volt. **63-** Define electromotive force (e.m.f). Ans: It is the energy supplied by a battery to a unit positive charge when it flows through the closed circuit. **64-** Define ohmic and non-ohmic materials. Ans: Ohmic materials: Materials that have a constant resistance over a wide range of voltages, are said to be ohmic. Non-ohmic: Materials having resistance that changes with voltage or current are non-ohmic. **65-** Define Joule's law. Ans: The amount of heat generated in a resistance due to flow of charges is equal to the product of square of current I, resistance R and the time duration t. **66-** Define electric power. Ans: The amount of energy supplied by current in unit time is known as electric power. **67-** Define unit of power. Ans: Unit of power is watt. Watt: If an object works one joule in one second, then its power will be one watt. **68-** Differentiate b/w direct current and alternating current. OR Differentiate b/w DC and AC. Ans: Direct current: The current which does not change its direction of flow is known as direct current or DC. The current derived from a cell or battery is DC. Alternating current: The current which changes its direction of flow after regular intervals of time is known as alternating current or AC. For example current produced by AC generator. **69-** Explain earth-wire. Ans: Connecting the metal casing of the appliance to Earth (a wired connection to the bare ground) is called earthing. Earthing protects the user from electric shock. **70-** Define circuit breaker. Ans: The circuit breaker acts as a safety device in the same way as a fuse. It disconnects the supply automatically if current exceeds the normal value. **71-** Define electric current and write its formula. Ans: The rate of flow of electric charge through any cross-sectional area is called current. Formula: $I=\frac{Q}{V}$. **72-** Define resistance and write its unit. Ans: Resistance is a measure of opposition to the flow of current through a conductor. Its SI unit is ohm. **73-** Define Ohm's law and write its formula. Ans: Ohm's law states that the current I passes through a conductor is directly proportional to the potential difference V applied across its ends, provided the temperature and physical state of the conductor do not change. Formula: $V=IR$. **74-** Define insulator with example. Ans: Material, through which current cannot flow, is called insulator. Examples: glass, wood, plastic etc.

Unit 15: **75-** Define electromagnet. Ans: Type of temporary magnet, which is created when current flows through a coil, is called an electromagnet. **76-** State Fleming's left hand rule. Ans: Stretch the thumb, forefinger and the middle finger of the left hand mutually perpendicular to each other. If the forefinger points in the direction of the magnetic field, the middle finger in the direction of the current, then the thumb would indicate the direction of the force acting on the conductor. **77-** State right hand grip rule. Ans:

Grasp a wire with your right hand such that your thumb is pointed in the direction of current. Then curling finger of your hand will point in the direction of the magnetic field. **78-** Define electromagnetism. Ans: Electromagnetism is the study of magnetic effects of current. **79-** Define electromagnetic induction. Ans: The process of generating an induced current in a circuit by changing the number of magnetic lines of force passing through it, is called electromagnetic induction. **80-** Define Lenz's law. Ans: The direction of an induced current in a circuit is always such that it opposes the cause that produces it. **81-** Define AC generator. Ans: AC generator is device that converts mechanical energy into electrical energy. **82-** How does an AC generator work? Ans: If a coil is rotated in a magnetic field, a current will be induced in the coil. When a coil rotates in a magnetic field, the induced current in it continuously changes. This is the basic principle on which an AC generator works. **83-** Write two factors that affect the induced e.m.f. Ans: i) Speed of relative motion of the coil and the magnet ii) Number of turns of the coil. **84-** Differentiate b/w step up and step down transformer. Ans: Step-up transformer: If the secondary voltage Vs is larger than the primary voltage Vp, the transformer is called a step-up transformer. Step-down transformer: If the secondary voltage Vs is smaller than the primary voltage Vp, the transformer is called a step-down transformer. **85-** What is the use of relay? Ans: A relay is an electrical switch, which is used to control a large current with the help of a small current.

Unit 16: 86- Define thermionic emission. Ans: The process of emission of electrons from hot metal surfaces is called thermionic emission. **87-** Factors that enhance thermionic emission. Ans: i) As temperature increases, thermionic emission increases. ii) As number of free electrons increases, thermionic emission increases. **88-** What is the use of electron gun in Cathode-Ray Oscilloscope (CRO). Ans: In CRO, electron gun is used to produce high speed electron beam. **89-** Write components of Cathode-Ray Oscilloscope (CRO). Ans: i) The electron gun with control gird ii) The deflecting plates iii) A fluorescent screen. **90-** write a note on electron gun. Ans: In CRO, electron gun is used to produce high speed electron beam. Electron gun also has an electrode called grid for controlling the flow of electrons in the beam. **91-** Define Cathode-Ray Oscilloscope (CRO). Ans: The Cathode-Ray Oscilloscope (CRO) is an instrument which is used to display the magnitudes of changing electric currents or potentials, graphically. **92-** Define Fluorescent screen. Ans: The screen of a cathode-ray tube consists of a thin layer of phosphor is known as fluorescent screen. **93-** Write uses of Cathode-Ray Oscilloscope (CRO). Ans: The CRO is used in many fields of science, such as displaying waveforms, measuring voltage, echo-sounding, to display heartbeats etc. **94-** Write two uses of digital electronics. Ans: Modern telephone system, radar system, industrial machines, medical equipments and many household appliances are using digital technology. **95-** Differentiate b/w ADC & DAC. Ans: ADC: A circuit that converts analogue signals to digital signals is called Analogue to Digital converter (ADC). DAC: A circuit which converts digital signals to analogue signals is called digital to analogue convertor (DAC). **96-** Define analogue quantities. Ans: The quantities whose values vary continuously are known as analogue quantities. For example: distance, temperature. **97-** Define digital quantities. Ans: The quantities whose values vary in discrete steps are called digital quantities. **98-** Write basic operations of digital electronics. Ans: Basic operations of digital electronics are AND, OR and NOT. **99-** Differentiate b/w analogue and digital electronics. Ans: Analogue electronics: The branch of electronics which processes the data being provided in the form of analogue quantities is called analogue electronics. Digital electronics: The branch of electronics which processes the data being provided in the form of digits is known as digital electronics.

Unit 17: 100- Define telecommunication. Ans: The methods and means that are used to communicate information to distant places instantly is called telecommunication. **101-** Define data managing power. Ans: To collect all information regarding a subject, for any purpose and to store it in the computer in more than one inter linked files which may help when needed, is called data managing. **102-** Define computer and write names its key parts. Ans: Computer is an electronic computing machine which is used for adding, subtracting, multiplying, to write text and to draw pictures. Kay parts of computer: i) Hardware ii) software. **103-** Define software. Ans: Software refers to the instructions or programs, that are installed in the hardware to perform different task. **104-** Define fax machine. Ans: Fax machine is the means to send the

copy of documents from one place to another through telephone lines. **105-** What do you mean by BSs and MSC? Ans: BSs means Base stations and MSC means Mobile Switching Centre. **106-** Define cell/mobile phone. Ans: Mobile phone is a sort of radio with two-way communication. It sends and receives the message in the form of radiowaves. **107-** What is photo phone or video phone? Ans: Photo Phone or video phone is a modern version of telephone. Contrary to a common telephone, users can see the pictures of each other. **108-** Write two uses of computer. Ans: i) In offices, computers are used for preparing letters, documents and reports. ii) Doctors used computers for diagnosing illness and treatment of diseases. **109-** What is hard disk? Ans: Hard disk is a storage device. It is a rigid, magnetically sensitive disk. All the data of user is saved in this disk. **110-** Write two advantages of Internet. OR What are main internet services? Ans: i) Web browsing: This function allows users to view web pages. ii) E-mail: It allows people to send and receive text messages. **111-** Write two advantages of E-mail. Ans: i) Faster communication ii) simple to use iii) cost free service. **112-** What is browser/search engine? OR What is the use of browser? Give two examples. Ans: A browser is an application which provides a window to the web. We can search anything through search engine like Google Chrome, Internet Explorer, Mozilla Firefox etc. **113-** Differentiate b/w software & hardware. Ans; Hardware: Hardware refers to the pars of a computer that we can see and touch. i.e. CPU, keyboard, monitor, printer mouse etc. Software: Software refers to the instructions or programs, that are installed in the hardware to perform different task. **114-** What is word processing? Ans: Through word processing we can write a letter, prepare reports and books, edit it and take its printouts. **115-** Differentiate b/w primary and secondary memory. Ans: Primary memory: It consists of two parts: Read only memeory (ROM), which starts the computer and Random access memory (RAM), which is used in computer as temporary memory. RAM vanishes when the computer is switched off. Secondary memory: It is used to store data permanently in the computer. When we open a program, data is moved from the secondary storage to primary storage. The secondary storage devices are audio-video cassettes and hard disk etc.

Unit 18: 116- Define atomic mass number and write its symbol. Ans: The sum of neutrons and protons present in a nucleus is called its atomic mass number. It is denoted by the letter A. **117-** Define isotopes. Ans: The atoms of same element with same atomic number but different atomic mass number are called isotopes. **118-** Define natural radioactivity. Ans: The spontaneous emission of radiation by unstable nuclei is called natural radioactivity. **119-** Define cosmic radiation. Ans: The Earth, and all living things on it also receive radiation from outer space. This radiation is called cosmic radiation. **120-** Define nuclear transmutation. Ans: The spontaneous process in which a parent unstable nuclide changes into a more stable daughter nuclide with the emission of radiation, is called nuclear transmutation. **121-** Write two characteristics of beta (β) particles. Ans: i) streams of high-energy electrons ii) ejected at various speeds as high as close to the speed of light. **122-** Write two characteristics of Gamma (ϒ) particles. Ans: i)Electromagnetic radiation of very short wavelength ii) Their wavelengths and energies can vary. **123-** Define ionization. Ans: The phenomenon by which radiations split matter into positive and negative ions is called ionization. **124-** Define half life. Ans; The time during which half of the unstable radioactive nuclei disintegrate is called the half-life of the sample of radioactive element. **125-** Write two uses of radio-isotopes. Ans: i) Iodine-131 is used for the monitoring of thyroid functioning. ii) For the diagnosis of brain tumor phosphorous-32 is used. **126-** Carbon dating: The age of a dead human, animal or tree can be estimated by comparing the activity of carbon-14 in the live and dead tree. This technique is called carbon dating. **127-** Define fission reaction OR nuclear fission. Ans: The process of splitting up a heavy nucleus into two smaller nuclei with release of large amount of energy, is called fission reaction. **128-** Define nuclear fusion OR fusion reaction. Ans: A process in which two light nuclei fuse to form a heavier nucleus with release of enormous amount of energy. **129-** Write harmful effects of radiations. Ans: i) Beta and Gamma radiation burns, which may cause redness, and sores on the skin. ii)Sterility i.e. inability to produce children. iii) Radiations may cause of cancer of the blood cells. **130-** Define background radiations. Ans: Radiations present in atmosphere due to different radioactive substances are called background radiations. **131-** Penetrating power: The strength of radiations to penetrate a certain material is called penetrating power.

132- Write two characteristics of alpha particles. Ans: i) Positively charges particles, ejected at high speed. ii) Their speed in the air is only a few centimeters. **133-** What are safety precautions for radiations. Ans: i) The sources should only be handled with tongs and forceps. ii) The users should use rubber gloves for experiment. iii) Never point a radioactive source towards a person. **134-** Define radioactive isotopes OR radio isotopes. Ans: The stable and non-radioactive elements can also be changed into radioactive elements by bombarding them with protons, neutrons or alpha particles. Such artificially produced radioactive elements are called radioactive isotopes or radioisotopes.

Important Long Questions:

Unit 10: 1- Define simple harmonic motion and prove that motion of simple pendulum is motion of simple harmonic motion (page 4,5). 2- Prove that the motion of mass attached to a spring is simple harmonic motion (page 2,3). 3- Define ripple tank, explain its structure, and how it works? (page 12). 4- Explain refraction of water waves with the help of ripple tank (page 13). 5- Derive a relationship between velocity, frequency and wavelength of a wave. Write its formula. (page 11). **Unit 12:** 6- State laws of reflection. Describe how they can be verified graphically (page 37). 7- What are optical fibres? Describe how total internal reflection is used in light propagating through optical fibres. (page 45). 8- Define refraction of light. Describe the passage of light through parallel-sided transparent material. (page 42,43). **Unit 13:** 9- Explain Coulomb's law of electrostatics and write its mathematical form (page 74). 10- Explain the parallel combination of capacitors (page 79). 11- What is gold leaf electroscope? Discuss its working principle with a labeled diagram (page 71). **Unit 14:** 12- What are features of parallel combination of resistors (page 103). 13- Determine the equivalent resistance of series combination of resistors (page 101). 14- Explain Ohm's law. What are its limitations? (page 97-98). 15- Explain energy dissipation in a resistance. What is Joule's law? (page 104-105). **Unit 15:** 16- What do you understand by the term mutual induction? (page 130) 17- What is transformer? Explain the working of transformer. (page 131-32) 18- Write a note on electric motor & DC motor. (page 123-24) **Unit 16:** 19- Explain the working of different parts of oscilloscope (page 142-43). 20- What are the three universal logic gates? Give their symbols and truth tables. (page 146-47-48) 21- Draw circuit diagram of OR and AND operations and make their truth tables (page 146-47). 22- What is electron gun? Describe the process of thermionic emission (page 142). **Unit 17:** 23- What do you understand by information and communication technology (ICT)? (Page 156) 24- What are the components of information technology? Indicate the function of each component. (page 156-57). 25- What is internet? Internet is a useful source of knowledge and information. Discuss. (page 168 to 70). 26- What is computer? What is the role of computer in everyday life? (page 162-63). **Unit 18:** 27- What are common radiation hazards? Briefly describe the precautions that are taken against them. (page 187-88). 28-Define nuclear fusion, and explain in detail (page 187).

Important Numericals:

Unit 10: Example 10.1, 10.2, Q# 10.1, 10.2, 10.4, 10.9 Unit 11: Example 11.2, Q# 11.2, 11.4, 11.9
Unit 12: Example 12.1, 12.2, 12.6, Q# 12.1, 12.2, 12.3, 12.4, 12.9, 12.10, 12.12
Unit 13: Example 13.2, 13.4 a,b, Q# 13.1, 13.2, 13.3, 13.6, 13.7, 13.9
Unit 14: Example 14.1, 14.3, 14.4a,b , 14.6, Q# 14.1, 14.3, 14.4, 14.10
Unit 18: Example 18.2, 18.3a,b , Q# 18.2, 18.3, 18.5, 18.9