NEW TRUST SCIENCE ACADEMY

GUESS PAPER 2025

PHYSICS – 12th

سیکنڈ ایئر فزکس

- FSC
- Ics

2nd year Physics guess paper

FOR ALL PUNJAB BOARD

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NEW TRUST SCIENCE ACADEMY

2nd year Physics

GUESS PAPER 2025

Unit # 12

Important Short Questions

1. Do electrons tend to go to a region of high potential or low potential?
2. Electric lines of force never cross. Why?
3. Suppose that you follow an electric field line due to positive point charge. Do electric field and the potential increases or decreases?
4. Describe a force or forces on a positive point charge when placed between parallel plates?
5. Give similarities and differences b/w coulomb and gravitational force?
6. Is E necessarily zero inside a charged rubber balloon if balloon is spherical? Assume that charge is distributed uniformly over the surface?
7. The potential is constant over a given region of space. Is the electrical field zero or non zero in this region. Explain?
8. If a point charge q of mass m is released in a non- uniform electric field with field lines in the same direction pointing, will it make a rectilinear motion?
9. Prove that the unit of series RC circuit is second?
10. Verify that an ohm times farad is equivalent to second?
11. How can you identify that which plate of a capacitor is positively charged?
12. Show that newton / coulomb = volt / meter?
13. What is electron volt? Show that 1 eV = 1.6×10^{-19} J?
14. Write down properties of electric field lines?
15. Define electron volt. Give its mathematical form?
16. Difference b/w electric field and field intensity?
17. What is polarization how dipole is formed?

IMPORTANT LONG QUESTIONS

1. What is electrical potential? Find electric potential at point due to point charge?
2. What is gauss's law? Derive the relation for electric intensity due to infinite sheet of charge?
3. Define electrical potential? How can you find the electric potential at a point due to point charge "q"?
4. Define capacitance? And derive the expression for capacitance of parallel plate capacitor without dielectric and dielectric between plates?
5. Derive the formula for energy stored in a capacitor?

Unit # 13

Important Short Questions

1. Describe a circuit which will give a continuously varying potential?
2. Is the filament resistance, lower or higher in a 500W, 220V light bulb in a 100W, 220V bulb?

3. Do bends in wire affect its electrical resistance? Explain?
4. What is wheat stone bridge? How can it be used to determine the unknown resister? Sketch its diagram?
5. Define Kirchhoff's rules of circuit analysis?
6. What are the difficulties in testing whether the filament of a lighted bulb obeys ohm's law?

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7. Define temperature coefficient of resistance. Give its resistance?
8. Define ohm's law. Also define ohmic and non ohmic?
9. Explain why the terminal potential difference of battery decreases when the current drawn from it is increased?
10. why does the resistance of a conductor rise with temperature?
11. What is the difference between conventional current and electronic current?
12. A potential difference is applied across the ends of a copper wire. What is the effect on the drift velocity of free electron?

13. What is thermistor?
14. Why the terminal potential difference of battery decreases when the current drawn from it increases?
15. Name any four sources of current?

IMPORTANT LONG QUESTIONS

1. What is wheat stone bridge. Describe its construction and working. How it is used to determine unknown resistance?
2. State and explain ohm's law?
3. What is potentiometer? Explain its principle and working?

Unit # 14

Important Short Questions

1. Why the resistance of an ammeter should be very low?
2. If a charged particle move in a straight line through some region of space can you say that magnetic field in the region is zero?
3. Define current sensitivity of galvanometer?
4. Why the voltmeter should have a very high resistance?
5. How can you use magnetic field to separate isotopes of chemical element?
6. What is meant by Lorentz force?
7. Why does the picture of T.V screen distort when a magnet is brought near the screen?
8. Is it possible to orient a current loop in a uniform magnetic field such that the loop will not tend to rotate. Explain?
9. How can a current loop be used to determine the presence of a magnetic field in a given region of space?
10. What is CRO? How can you explain the waveform of various voltages formed in the CRO? Write its two uses?
11. Describe the change in the magnetic field inside a solenoid carrying a steady current I if (a)the length of the solenoid is doubled but the number of turns remains the same, and (b) the number of turn is doubled but the length remains the same?
12. suppose the charge "q" is moving in a uniform magnetic field with a velocity v. Why is there no work done by the magnetic force that acts on a charge "q"?
13. discuss briefly, digital multimeter (DMM)?
14. Two charged particles are projected into a region where there is a magnetic field perpendicular to their velocities. If the charges are deflected in the opposite direction, what can you say about them?
15. Difference between flux density and flux. How are they related?
16. Explain what is meant by the sensitivity of a galvanometer. How can a galvanometer be made more sensitive?

IMPORTANT LONG QUESTIONS

1. State Ampere's law and also apply it to find the magnetic field due to a current-carrying solenoid.
2. Derive an expression for the force on a charged particle moving in a magnetic field.

3. What is galvanometer? Define its principle, construction, and how it can be converted into (a) an Ammeter (b) a Voltmeter?
4. How can you find an e/m value of an electron. Explain?

Unit # 15

Important Short Questions

1. In certain region the earth's magnetic field point vertically downward when a plane flies due north, which wing tip is positively charged?
2. Does the induced emf always act to decrease the magnetic flux in the circuit?
3. When an electric motor such as an electric drill is being used. Does it act as a generator? If so, what is the consequence of this?
4. Show that ε and $\frac{\Delta \emptyset}{\Delta t}$ have same units?
5. Can a step- up transformer increase the power level?
6. What do you mean by back emf effect in a motor?
7. What is motional emf? Give its formula?
8. Does the induced emf in a circuit depend on the resistance of the circuit?
9. How would you position flat loop of wire in changing magnetic field so that there is no emf induced in a loop?
10. Can an electric motor be used to derive an electric generator with the input from generator being used to operate the motor?
11. What is the difference between motor and generator? Also explain back motor effect in generators?
12. Four unmarked wires emerge from a transformer. What steps would you take to determine the turn ratio?
13. Is it possible to change both area of the loop and the magnetic field passing through the loop and still not have an induced emf in the loop?
14. How efficiency of transformer can be improved?
15. A suspended magnet is oscillating freely in a horizontal plane. The oscillations are strongly damped when a metal plate is placed under the magnet, explain why it occurs.
16. Define self-inductance and mutual inductance with their equation and mathematical formula unit?
17. Can a D.C motor is converted into a D.C generator? What changes are required to be done?
18. When the primary of a transformer is connected to A.C. mains, the current in it (a) is very low if the secondary circuit is opened but (b) increases when the secondary circuit is closed. Explain these facts?

IMPORTANT LONG QUESTIONS

1. State and derive Faraday's law of electromagnetic induction.
2. State and explain mutual induction, derive its relation, also define Henry.
3. Why is energy stored in an inductor when current flows through it? Derive a relation for the energy density of the magnetic field? / derive an expression for the energy stored in an inductor. Define energy density?
4. Define transformer. Give its principle, construction and working?

Unit # 16

Important Short Questions

1. What is choke coil. Where is it used?
2. How does doubling the frequency affect the reactance or (a) an inductance (b) a capacitor?
3. How the reception of particular radio station is selected on your radio set?
4. How many times per second will an incandescent lamp reach maximum brilliance

when connected to a 50Hz source?

5. Name the device that will (a) permit flow of direct current but oppose the flow of alternating current (b) permit flow of alternating current but oppose the flow of direct current?
6. Define impedance write its unit and symbol?
7. A sinusoidal current has rms value of 10 A. what is the maximum or peak value?

8. What is meant by A.M and F.M.?
9. In R- L circuit will the current lag or lead the voltage? Explain your answer with vector diagram?
10. Define peak value and peak-to-peak value of A. C voltage?
11. Explain the conditions under which electromagnetic waves are produced by source?
12. What is meant by inductive reactive and capacitive reactance?
13. Write down the advantages of 3 phase AC supply?
14. At what frequency will an inductor of 1 H have reactance of 500Ω?

IMPORTANT LONG QUESTIONS

1. Explain the series RLC circuit connected to an A.C input and determine its resonance frequency? What other features does this circuit show at resonance?
2. What is RC series circuit? Calculate the impedance and phase angle of R-C series circuit?
3. Define impedance and derive a relation for impedance and phase angle for RL and RC series circuit?
4. What are electromagnetic waves? Discuss principle of generation, transmission and reception of electromagnetic waves?

Unit # 17

Important Short Questions

1. Differ between crystalline and amorphous solids?
2. How will you obtain n-type and p-type material from pure silicon?
3. Define curie's temperature. What is its value for iron?
4. Define elasticity and plasticity.
5. Distinguish between intrinsic and extrinsic semiconductors. How would you obtain n-type and p-type from pure silicon? Illustrate it by a schematic diagram?
6. Define modulus of elasticity. Show that the units of modulus of elasticity and stress are the same. Also, discuss its three kinds.
7. What is meant by strain energy? How can it be determined from the force-extension graph?
8. What is meant by para, dia, and ferromagnetic substances? give an example for each?
9. Define stress and strain. What is their SI units?
10. Difference b/w brittle and ductile substance. Give an example for each?
11. Define unit cell and crystal lattice?
12. Define superconductors. Give its two uses?

13. What is meant by hysteresis loop. How it is used in the construction of transformer?
14. How does the motion of electrons in n- type differ from motion of holes in p- type substances?
15. What is meant by coercivity of magnetic material?

IMPORTANT LONG QUESTIONS

1. Define strain. Find out strain energy in deformed materials. How can it be determined from the force extension graph?
2. Explain energy band theory on the basis of this categorize the kinds of solids?

3. What is doping? Describe the formation of n- type and p- type semi conductors?

Unit # 18

Important Short Questions

1. What is the effect of forward and reverse biasing of a diode on the width of depletion region?
2. write four uses of photodiode?
3. What is the net charge on n- type or a p- type substance?
4. Why charge carries are not present in the depletion region?
5. Why ordinary silicon diodes do not emit light?
6. Define rectification. Draw a circuit diagram of half wave rectification?
7. The base current in the transistor is very small. Why?
8. The anode of a diode is 0.2V positive with respect to its cathode. Is it forward biased?
9. Write down the logic expression and table for exclusive XNOR and NOR gate?
10. Why a photodiode is operated in reverse biased state?
11. Write down the two characteristics of OP – amplifier?
12. What is the principle of virtual of ground? Apply it to find the gain of an inverting amplifier?
13. Draw the diagram of XOR and NAND gate. Write its formula?

IMORTANT LONG QUESTIONS

1. What is rectification. Explain full wave rectification by bridge rectifier?
2. What is transistor? How transistor is used as an amplifier? how in detail with circuit diagram and calculate its gain?
3. What is operational amplifier? Find the gain op- amplifier as non – inverting amplifier?

Unit # 19

Important Short Questions

1. If the speed of light were infinite, what would the equations of special theory of relativity reduced to?
2. Photon “A” has a twice energy of photon “B” what is the ratio of momentum of “A” to that of “B”?
3. Is it possible to create a single electron from energy? Explain?
4. Which photon red, blue or green carries the most (a) energy (b) momentum?
5. Differentiate b/w photoelectric effect and Compton effect?
6. Will higher frequency light eject greater number of electrons than low frequency light?
7. What are the measurements on which two observers in relative motion will always agree upon?
8. Can pair production takes place in vacuum? explain?
9. Which has the lower energy quanta? Radio waves or X- rays?
10. As a solid is heated and begin to glow, why does it appear red?
11. What advantages an electron microscope has over an optical microscope?
12. Will bright light emits more electrons from the metal surface than the dimmer light of the same colour?
13. Why do we don’t observe Compton effect with visible light?
14. What happens to total radiation of black body if its absolute temperature is doubled?
15. If an electron and a proton have same dee Broglie wavelength. Which particle have greater speed?
16. We do not notice the de Broglie wavelength for a pitched cricket ball. Explain why?
17. When does light behave as a wave. When it behave as a particle?
18. Define special theory of relativity and write its postulates?
19. Is energy conserved when an atom emits a photon of light? Explain?

20. Does the brightness of a beam of light primarily depends on the frequency of photon or on the number of photon?

IMPORTANT LONG QUESTIONS

1. Explain special theory of relativity with postulates and explain the results?
2. Write a note on Compton's effect. Also derive Einstein's equation?
3. State and explain Heisenberg's Uncertainty principle?
4. What is photoelectric effect? How its different results were successfully explained by Einstien?
5. Explain de Broglie hypothesis. How davison and german experimentally proved the de Broglie hypothesis?

Unit # 20

Important Short Questions

1. Explain why laser action could not occur without population inversion between atomic levels?
2. How can the spectrum of hydrogen contain so many lines, when hydrogen contain one electron?
3. Give two postulates of Bohr's model of hydrogen atom?
4. What is meant by line spectrum? Explain how line spectrum can be used for identification of elements?
5. Can the electron in the ground state of hydrogen atom absorb energy of 13.6eV and greater than 13.6 eV?
6. In energy conserved when an atom emits a photon of light?
7. What do you mean when we say that the atom is excited?
8. Can X- ray be refracted, reflected, diffracted and polarized like other waves?
9. What are the advantages of laser over ordinary light?
10. Give two uses of laser in medicine and industry?
11. Define ionization and excitation potential.
12. Define population inversion and metastable state.
13. What is a CAT scanner?
14. Define characteristics of X-rays and continuous X-rays?
15. What is spectroscopy and spectra?

IMPORTANT LONG QUESTIONS

1. Compute the shortest wavelength radiation in Balmer series. What value of "n" be used?
2. Calculate the longest wavelength radiation for paschen series?
3. State postulates of Bohr's model of the hydrogen atom and show that hydrogen atom has quantized radii. Also calculate the radius of first orbit of hydrogen atom?
4. Explain inner shell transition and X- rays production?

Unit # 21

Important Short Questions

1. A particle which produces more ionization is less penetrating? Why?
2. If somebody accidentally swallows an α- source and a β- source, which would be the more dangerous to him. Why?
3. If a nucleus has half life of one year does this mean that it will completely decay after two years?
4. Which radiation would deposit more energy to your body (a)10mGy to your hand or (b) 1mGy to entire body?
5. Why are heavy nuclei unstable?
6. What is meant by critical mass?
7. What make fusion reaction difficult to achieve?

8. How can radioactivity help in treatment of cancer?
9. Define half-life of radioactive element. How we find it?
10. What do you mean by Quark?
11. what do you understand by background radiation? State two sources of radiations?
12. what fractions of radioactive sample decays after two half-life elapsed?
13. What is radioactivity?
14. What is radioactive tracer?
15. Describe one application each in medicine, agriculture and industry?
16. What is difference between mass defect and binding energy?
17. Differentiate b/w hydrons and laptons?
18. Discuss the advantages and disadvantages of nuclear power compared to the use of fossil fuel generated power?
19. What happens to charge or mass of radioactive element when an α-particle is emitted by it?
20. What are isotopes. What do have in common and what are their differences?
21. What information is revealed by length and shape of the track of incident particle by Wilson cloud chamber?
22. What are the uses of nuclear reactor?

IMPORTANT LONG QUESTIONS

1. Explain the principle, construction and working of Geiger muller counter?
2. What is mass spectrograph how is it used to find the mass of isotopes?
3. What is nuclear fission? Explain fission chain reaction in a reactor?
4. Define Aston's mass spectrograph and how it can be used for the detection of isotopes?
5. Explain fission reaction in detail?

IMPORTANT NUMERICAL QUESTIONS

1. Example # 12.4
2. Numerical # 12.4, 12.7, 12.9, 12.10, 12.12
3. Example # 13.1,13.2, 13.3, 13.4
4. Numerical # 13.1, 13.4, 13.5
5. Example # 14.1, 14.4, 14.5, 14.6
6. Numerical # 14.2, 14.5, 14.7
7. Numerical # 15.3, 15.6, 15.7, 15.11, 15.14, 15.15, 15.17, 15.18
8. Example # 16.1, 16.2
9. Numerical # 16.3, 16.4, 16.6, 16.9
10. Example # 17.1
11. Numerical # 17.1, 17.2, 17.3, 17.4, 17.5
12. Example # 18.1
13. Numerical # 18.1, 18.2, 18.3
14. Example # 19.2, 19.8, 19.9, 19.11
15. Numerical # 19.2, 19.5, 19.9, 19.10
16. Numerical # 20.5, 20.7
17. Example # 21.1, 21.3
18. Numerical # 21.1, 21.2, 21.6, 21.6, 21.10

Note: For the best preparation, prepare all the exercise numerical.