Sample Paper – 2011
Class – XII
Subject – Physics

COMMON MISTAKES COMMITTED BY THE STUDENTS IN JNVs IN PHYSICS OF CLASS XII

The following area / contents are being given below which are generally some confusable / mistakable for the students in Physics Subject for XII Class syllabus.

UNIT No. 1: **ELECTROSTATICS**:-

i) Electric field intensity & Electric Potential due to electric dipole.
ii) Way for finding the directions of Electric field.
iii) Effect of dielectric in capacitors.
iv) Numeric Problems based on counter nation of capacitors.
v) Area Vector concept in Gauss Theorem.

UNIT 2: **CURRENT ELECTRICITY**

i) Factors affecting the resistance of a register (conductor) i.e. Relaxation time Temp. etc.
ii) Circuit diagram (Wheatstone Bridge , Meter Bridge , Potentiometer)
iii) Numerical on Wheatstone Bridge , Meter Bridge , Potentiometer
iv) Combination of resistances

UNIT 3: **MAGNETIC EFFECT OF CURRENT**

i) Direction of magnetic field in different situation
ii) Biota Savant Law (Formula in vector form)
iii) Sensitivity of Galvanometer.
iv) Magnetic dipole moment & Electric dipole moment.
v) Die & Para magnetic substances.

UNIT 4: **E.M.I. & A.C.**

i) Applications of Lentz Law
ii) Instantaneous, Peak & r m s. value of AC current / voltage.
iii) AC through pure inductor & capacitor phase difference between voltage & current
iv) Numerical Problems based on LCR series circuit (condition of resonance)
v) Power factor.

UNIT 5: **E.M.WAVES**

i) Conditions of propagation of E.M. Waves

UNIT 6: **OPTICS**

i) Numerical Problem based on lens formula.
ii) Resolving power; magnifying power of optical instruments.
iii) Conditions of Interference & Diffraction
iv) Single slit diffraction pattern.
v) Huygens's wave theory explanation for Reflection & Refraction Laws.

UNIT 7: **DUAL NATURE OF MATTER & RADIATION**

i) Explanation of laws of Photo Electric Effect using Einstein equation
ii) Derision & Germen Experiment (Polar Graphs)

UNIT 8: **ATOMIC NUCLEUS**

i) Decay law
ii) Explanation of Binding Energy curve & numerical problems based on B.E. per nucleus

UNIT 9: **SOLID & SEMI CONDUCTOR DEVICES**

i) Energy level diagram for Extrinsic & intrinsic semiconductors

ii) Biasing of P-N Junction diode

iii) Transistors PNP & NPN Biasing

iv) Applications of Logic gates.

UNIT 10: **PRINCIPLES OF COMMUNICATION**

i) Block diagram of transmission and reception system

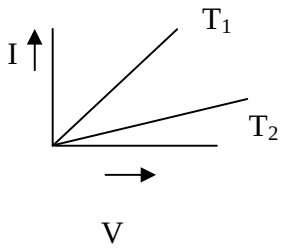
ii) Wave shape of analog and digital signals

iii) Wave shape of frequency & amplitude modulated wave for sine and square wave

Electrostatics

S. No.	CONTENT AREA	QUESTIONS
1	Electrostatics Charges	1. A glass rod rubbed with silk acquired a charge + $1.6x10^{-14}$c. What is the charge on the silk? 2. What is quantization of charge? 3. State Coulombs Law. Write its Victoria form. 4. Define dielectric constant of a medium. Dielectric constant of a medium is unity, What will be its permittivity? 5. Force between two point charges Kept at a distance γ apart in air is F. If these charges are kept in the water at the same distance how does the force between them
2	Electrostatic Field	1. Draw electric lines of force due to i) an isolated positive point charge (q>o) ii) an isolated negative point charge (q>o) 2. Two electric lines of force do not interact. Explain why? 3. Define the term electric dipole moment. 4. Give two properties of electric lines of force. Sketch them for a positively charged metallic sphere. 5. Desire an expression for electric field intensity at a distance 'r' from a point charge "q". 6. State Gauss Theorem in electrostatics. Give its mathematical form. 7. Two point charges +e and +VE coulomb are separated by a distance of 6r. Find the point on the line joining the two charges where the electric field is zero. 8. State Gauss theorem in electrostatics. Apply this theorem to calculate the electric field due to an infinite plane sheet of charge. 9. An electric dipole is held in a uniform electric field i) Show that no translator force acts on it ii) Derive an expression or the torque acting on it . 10. Define the term Electric flux. What is its S.I. Unit? An electric flux of $-6x10^3$ Nm^2/c passes normally through a spherical Gaussian surface of radius 10 cm, due to point charge placed at the centre. a) What is the charge enclosed bye the Gaussian surface? b) If the radius of the Gaussian surface is doubled, how much flux would pass through the surface. 11. Derive an expression for the total work done in rotating an electric dipole through an angle O is a uniform electric field E.

		12. Derive an expression for the electric field intensity at any point along the axial line of an electric dipole.
3.	Electric Potential Electric Potential Energy	1. Calculate the work done in moving a charge of 10^{-6} coulomb, 5cm on an equipotent surface. 2. Show that E = -dv / dr 3. (i) Calculate the electric potential at a point P due to charge of 0.5 μ c located at 10 cm from it . (ii) Also calculate the work done in bringing a charge of $3x10^{-9}$ c from infinity to point p. 4. Derive an expression for the potential at a point along the axial line of a short electric dipole. 5. Define "electric potential". Deduce an expression for the electric potential at a point distance 'r' form a point charge (7°) 6. Explain the concept of Electric potential energy. Derive an expression for the potential energy of a sys teem of two point charges 7. A proton is moved in a uniform electric field of 1.7×10^{-4} N/c between two point A and B separated by a distance of 0.1m. (i) What is the potential difference between the oats? (ii) How much work is done in above process?
4.	Capacitance Capacitors Grouping of Capacitors	1. Define capacitance of a capacitor? 2. How id dielectric constant expressed in terms of capacitance of a capacitor? 3. Two protons p_1 and p_2 are place between two parallel plates having a potential difference V as shown in the figure. Will these protons experience equal or unequal force? + | - + p_1 - + - + - + p_2 - 4. Name the physical quantity whose S.I. unit is (i) coulomb/volt (ii) Joule /coulomb. 5. Derive an expression for the energy stored in a capacitor. 6. How much energy will be stored in a capacitor of 100 μF capacity, when charged by a battery of 20v? 7. Three capacitors of equal capacitance, when connected in series, have a net capacitance of C_1 and when connected in parallel have a capacitance of c_2. What will be the value of C_1/C_2. 8. Explain the principal of a Capacitor. 9. Obtain equivalence capacitance of the following network given $C_1 = C_4 = 100pF$ $C_2 = C_3 = 200pF$ 10. Dielectric slab of thickness t is introduced between the plates of a parallel plate capacitor, separated by a distance (t<d). Derive an

	Van – de – Graft Generator	expression for the capacitance of the capacitor? A capacitor of 20μFand charged to 500v is connected in parallel with another capacitor of 10μF charged to 200v. Find the common potential 12. Define capacitance of a capacitor. Give it S.I. Unit. Prove that the total electrostatic energy stored in a parallel plate capacitor is 1-2 CV^2. Hence derive the expression for energy density of a capacitor.
6	Electric current Resistance & E.M.F.	1. What is the S.I. Unit of electric current? 2Are the direction of conventional and electric current same? 3. What is the cause of resistance of a conductor? 4. Define resistivety. Give its S.I. Unit 5. Define potential gradient of a wire. Give its S.I. Unit. 6. What is the effect of temperature on the conductivity of electrolyte? 7. A carbon resistor is marked in colored bands of red, black, orange, and silver, what is its resistance with tolerance? 8 What are the factors on which the resistance oaf material depends? Give the corresponding relation. 9. What is the thermostat? Give its two applications 10. State Kickoffs laws for an electrical network? 11. What is super conductivity? Write its two applications. 12. Define resistively of a conductor and state its S.I. Unit. State and explain how the resistively of a conductor varies with temperature. 13. Derive an expression for the drift speed of electrons in a good conductor in terms of relaxation time of electrons. 14. Define the terms resistively of a conductor. Give its S.I. Unit. Show the resistance R of a conductor is given by ml/ ne^2T. Where symbols have their usual meaning. 15. V – I graph for a metallic wire at two different temperatures T_1 and T_2 is as shown in the following figure. which of the two temperatures is higher and why 
7.	Electrical Measurement	1. Why potentiometer is preferred over volt meter for measuring potential d

ACTION PLAN FOR XII (PHYSICS)

HOW TO IMPROVE PERFORMANCE OF BRIGHT CHILDREN

1. Identification of Bright students.

2. Study Material prepared by the teachers, some special reference book and advanced study material should be provided to them.

3. Extra Assignment and High Standard question on CBSE pattern should be given to the students.

4. Bright children must be motivated to go through each and every line of the NCERT Text book. They should be motivated to solve the exercises of NCERT Book.
5. More and more stress on solving Numerical Problems.

6. Application and Understanding based questions related to different theorem and fundamental principles should be given. Different questions from previous 5 years (at least) CBSE papers and from different sample papers should also be described.

7. Students should be made aware about the word limit for answering the questions.

8. Students should concentrate only on CBSE Exams avoiding preparation for other competitive exams.

9. Time Management is also compulsory.

10. All the topics of the CBSE Curriculum must be thoroughly studied.

11. To make aware the students about the marking scheme of Board Exams, they can understand the tricks for scoring good marks.

12. Some special practice set prepared by the teachers should be provided to bright students continuously. After evaluation students should make aware about the mistakes made by them.

13. At least continuous motivation and encouragement and continuous guidance of subject expert to the students.

COMMON ERRORS COMMITTED BY THE STUDENTS (CLASS- XII)

1. After solving the numerical problems don't write SI-Units of the Physical Quantities.
2. Before attempting the Numerical convert all the given Physical Quantities in SI-Units.
3. The answer should be the point.
4. Show ray direction in ray-diagrams & current direction in circuit diagrams.
5. Clearly not show the Polarized & unpolarized Light.
6. Not aware while drawing a resistance & capacitor in circuit diagrams.
7. Not aware while drawing a resistance & inductor in circuit diagrams.
8. Generally don't write the name of Physical Quantities used in the formula.
9. Not differentiate between Faraday's Law of EM-Induction & Faraday's Laws of Electronics.

DIFFICULT AREAS AND QUESTION BASED ON THE TOPICS CLASS XII

UNITS	TOPIC	QUESTION
1. **Electro Statics**	(a) Gauss Theorem (b) Electric Dipole (c) Capacitor	(1) Explanation of Gauss Theorem & Its applications for plane Conducting sheets. (2) Electric field intensity due to a short dipole at its equation point Axial points.

2. **Current Electricity**	(a) Kirchhoff' s Law (b) Dependence of Resistively	(3) Effect of conducting & Dielectric slab between plates of a parallel plate capacitor. (1)Numerical based on Law. (2)Calculation of current & charge stored in a capacitor & resistance mixed circuit. (1) Dependence of Resistively on temperature & Relaxation time and its explanation.
3.Magnetic Effect of current & Magnetism	a) Magnetic field b) Galvanometer c) Magnet	1) Magnetic field at the axis of current carrying circular coil 1) Conversion of Galvanometer into ammeter & voltmeter of desire range. 1) Explanation of mega meridian & Geographic meridian , angle or dip
4. E.M.I. & A.C.	a) Pharos diagrams b) Power factor c) Resonance	1) Expression for LCR – Circuit by pharos diagrams & numerical based on resonant condition 1) Derivation of power factor for LCR – Circuit. 1) Numerical based on ע – 1/(2Π√LC) resonance condition
5. E.M. Waves	a) Transverse Nature	1) Expression & Explanation of Transverse Nature of EM – Waves

6. Optics	a) Wave front b) Refraction c) Lens makers formula d) Diffraction e) Resolving power	1) Concept of wave front & its classification & Explanation. 1) Explanation of Refraction on the basis of wave theory. 1) Derivation of Lens makers Formula with labeled diagram. 1) Diffraction due to a single slit & explanation for central maxima & minima 1) Resolving power of microscope & Telescope	2 3 5 3 2
7. Dual Nature of Matter & Radiation	a) Davison German Experiment	1) Explanation of D. & G. Experiment.	3 3

	b) Photo – Electric effect	1) Explanation of Einstein's Photo electric equation	
8. Atomic Nucleus	a) Half life b) Binding energy (c) α -Scattering Experiment	1) Calculation of Binding Energy per nuclei for given nuclear Reaction. ($\Delta E = \Delta mc^2$) (1) Explanation of α -Particles scattering.	3 3
9. Solid & Semiconductor Devices	(a) PN-Junction Diode (b) Transistor	(1) Formation of Depletion Layer in forward & reverse biasing of a PN-Junction diode. (1) Zever Diode as a voltage regulator & its curve. (1)Input & Output characteristics curve of NPN & PNP- Transistor. (2) Transistor as oscillator.	3 3 3 3
10. Principles of Communication	(a) Demodulation (b) Block Diagrams	(1) Concept of Demodulation. (1) Explanation of Receiver & Transmitter on the basis of Block Diagrams. .	2 3

Unit –8 (Atomic Nucleus)

Questions for slow learners students.

1. Give Bohr Model of atom & it 's Hypothesis?
2. Determine value of velocity, radius, time period, Energy of a atom with the help of Bohr Model?
3. Why cadmium Rod is used in Nuclear reactors?
4. Why is Heavy water used in Nuclear Reactors?
5. Define fission reaction & Fusion reaction?
6. Give an example of Fission reaction & Fusion reaction?
7. Give relation between mass in amu with kg
8. Give the relation b/w Joule & eV energy.
9. Define half life of Radio active decay.
10. Define Radio activity?

11. Explain α decay with an example & what effect on parent nuclei when α particle decay?
12. Explain β -, β +, β0 decay with an example of each? What effect on parent nuclei when β -, β +, β 0 particles decays from Nucleus?
13. Identify D2

$$D \xrightarrow{235,\ \beta} D_1 \xrightarrow{\alpha} D_2 \quad (92)$$

18. Identify D4

$$D \xrightarrow{235,\ \alpha} D_1 \xrightarrow{\beta} D_2 \xrightarrow{\alpha} D_3 \xrightarrow{\beta} D_4 \quad (92)$$

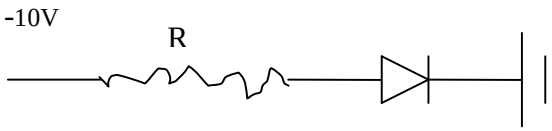
19. Write the S1 unit for the activity of a Radioactive decay?

20. Write β decay in the Nuclear decay process .

21. Unit –9 (Solid and Semi conductor devices)

Questions for slow learners students.

1. What type of charge carriers are there in an n type semiconductor and p type semiconductor.
2. Which type of biasing results in very high resistance of a P n Junction?
3. Write down the truth table of AND, OR, NOT, NAND and NOR gate.
4. Why a common emitter is generally preferred over a common base amplifier.
5. Is the Diode D forward or reverse biased in the given diagram?



6. Draw energy band diagram of n type and p type semiconductor.
7. With the help of circuit diagram explain the working principle of a full wave Testifier.
8. Draw energy band diagram of metal, Insulator and Semiconductor.
9. For a transistor connected in common emitter mode, the voltage drop across the collector is 1.5 v and base is 50. Find the base current if Rc is 1.5 k.\
10. What is the magnitude of potential barrier for (a) Ge Junction (b) Si Junction
11. Explain zener diode.
12. What is an intrinsic semi conductor? Why does its conductivity increase with rise of Temperature?
13. What is an N-P-N transistor? How does it differ from P-N-P transistor? Give their symbols. Explain it action.
14. Explain through a labeled circuit diagram the working of a transistor as amplifier (common emitter configuration)
15. Explain through a labeled circuit diagram, the working of a transistor as an oscillator.
16. Explain transistor as a switch with circuit diagram.
17. The input resistance of a common emitter amplifier is 2k and a c. current gain is 20. If the load resister used is 5k , calculate (i) the voltage gain of the amplifier. (ii) The Trans conductance of the transistor used.
18. Draw a circuit diagram for a two input or and AND gate and explain its working with the help of Input and output wave form.

Unit –10 (Principle of communication)

Questions for slow learners students.

1. Distinguish between analog signal and digital signal.
2. What is modulation?
3. What is the various method of modulation?
4. Define modulation factor.
5. What is amplitude modulation?
6. Show graphically amplitude modulation.
7. What are the limitations of amplitude modulation?
8. What is the importance of modulation index?
9. Draw a sketch to illustrate the basic elements required to transmit and receive an audio signal.
10. Why do we need modulation?
11. It is necessary to use satellites for long distance T.V. Transmission. Give one reason.
12. Derive the height of antenna h up to which the T.V. signal can be directly received from a T.V.
13. Explain amplitude modulation. How is it modulated & detected.

Unit – 7 (Dual Nature of Matter & Radiations)

1. Define Threshold frequency.

2. Define work function of a metal.

3. Draw the graph showing the variation of stopping potential & frequency.

4. Derive the relation for the De-Brule's wave-length for the matter particles.

5. An electron & a proton are possessing same K.E. which of the two has greater De-broglie wavelength.
6. The freq. of light incident on the surface of a metal in doubled keeping the intensity same. What is the effect on – (i) K.E. of photo electrons. (ii) Photo electric potential. (iii) Stopping potential. Justify the answer in each case.
7. Derive the wavelength for an electron.
8. What is Einstein's photo electric equation? With the help of this equation. Explain the photo electric effect laws?
9. What are photo electric effect laws?
10. Explain the wave nature of electron with the help of Deviation & Garner experiment.

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