Guess Paper – 2011
Class – XII
Subject –Physics

Sample paper 1

Question 1. What is the work done in moving a charge of 10 nC between two points on an equipotent surface? (1 mark)

Question 2. Name the device used for measuring the internal resistance of a secondary cell? (1 mark)

Question 3. What is the nature of magnetic field in a moving coil galvanometer? (1 mark) a

Question 4. If a rate of change of current of 2 A/s induces an e.m.f.of 10mV in a solenoid, what is the self -inductance of the solenoid? (1 mark)

Question 5. What type of magnetic material is used in making permanent magnets? (1 mark)

Question 6. Two metals A, B have work-functions 2eV, 4eV respectively. Which metal has lower threshold wavelength for photoelectric effect? (1 mark)

Question 7. Which part of the electromagnetic spectrum is used in operating RADAR? (1 mark)

Question 8. Which type of biasing gives a semiconductor diode very high resistance? (1 mark)

Question 9. An electric dipole, when held at 300 with respect to a uniform electric field of 104N/C, experiences a torque of 9 x 10-26Nm. Calculate the dipole moment of the dipole. (2 marks)

Question 10. A set of n identical resistors, each of resistance R ohm, when connected in series have an effective resistance X ohm and when the resistors are connected in parallel, their effective resistance is Y ohm. Find the relation between R, X and Y. (2 marks)

Question 11. State Kirchhoff's rules for electrical networks. (2 marks)

Question 12. Show that Lenz's law is in accordance with the law of conservation of energy. (2 marks)

Question 13. Draw a labeled diagram of Hertz's experiment for producing electromagnetic waves. (2 marks)

Question 14. Give two differences between fringes formed in single slit diffraction and Young's double slit experiment. (2 marks)

Question 15. Light of wavelength 600nm is incident on an aperture of size 2mm. Calculate the distance up to which the ray of light can travel such that its spread is less than the size of the aperture. (2 marks)

Question 16. Explain the principle used in Bunsen's grease photometer to compare the illuminating powers of two light sources. (2 marks)

Question 17. A ray of light while traveling from a denser to a rarer medium undergoes total internal reflection. Derive the expression for the critical angle in terms of the speed of light in the respective media. (2 marks)

Question 18. Draw a graph showing the variation of binding energy per nucleon with mass number of different nuclei. Mark the region where the nuclei are most stable. (2 marks)
Question 19. Name the logic gate shown in the diagram and give its truth table. (2 marks)

Question 20. State and explain Seebeck effect. (2 marks)

Question 21. Explain with the help of a circuit diagram how the value of an unknown resistance can be determined using a Wheatstone bridge. Give the formula used. (3 marks)

Question 22. Earth receives an amount of heat radiation 1.4 x 103 W/m2 from the sun. Assume that earth re-emits all the radiation received from the sun. Calculate the surface temperature of the earth. (3 marks)

Question 23. A straight wire carries a current of 3A.Calulate the magnitude of the magnetic field at a point 10cm away from the wire. Draw diagram to show the direction of the magnetic field. (3 marks)

Question 24. Explain how a vibration magnetometer can be used to determine the magnetic moment of a bar magnet. (3 marks)

Question 25. Deduce lens maker's formula for a thin biconvex lens. (3 marks)

Question 26. Explain the origin of spectral lines of hydrogen using Bohr's theory. (3 marks)

Question 27. A beam of electrons passes unelected through mutually perpendicular electric and magnetic fields E and B respectively. If the electric field is cut-off ,the electron beam moves in a circular path of radius 'r'.Derive the expression for e/m of electrons in terms of r,E and B. (3 marks)

Question 28. Draw a labeled diagram of Van de Graff generator. Give its principle and explain its working. (5 marks)

Question 29. Prove that the power dissipated in an ideal resistor connected to an a.c. source is V2eff/R.Acapacitor,a resistor and a 40 mH inductor are connected in series to an a.c. source of frequency 60 Hz. Calculate the capacitance of the capacitor, if the current is in phase with the voltage. (2+3 marks)

Question 30. Explain with the help of a circuit diagram the working principle of a transistor as an amplifier in the common emitter configuration .Derive the expression for the voltage gain of the amplifier.(5 marks)

Sample paper no 2

Question 1. Horizontal component of Earth's magnetic field at a place is 3 times the vertical component. What is the value of angle of dip at this place? (1 mark)

Question 2. Force between two point electric charges kept at a distance d apart in air is F. If these charges are kept at the same distance in water, how does the force between them change? (1 mark)

Question 3. Give any two factors on which thermo-electric emf produced in a thermo-couple depends. (1 mark)

Question 4. The electric current in a wire in the direction from B to A is decreasing. What is the direction of induced current in the metallic loop kept above the wire as shown in the figure? (1 mark)

Question 5. Name the electromagnetic radiations used for viewing objects through haze and fog. (1 mark)

Question 6. Give the ratio of the number of holes and the number of conduction electrons in an intrinsic semiconductor. (1 mark)

Question 7. In the given diagram, is the diode D forward or reversed biased? (1 mark)

Question 8. Name the planet which has maximum value of albedo. (1 mark)

Question 9. Two point electric charges of unknown magnitude and sign are placed a distance'd' apart. The electric field intensity is zero at a point, not between the charges but on the line joining them. Write two essential conditions for this to happen. (2 marks)

Question 10. The variation of potential difference V with length l in case of two potentiometers X and Y is as shown in the given diagram. Which one of these two will you prefer for comparing emf's to two cells and why? (2 marks)

Question 11. Name any one material having a small value of temperature coefficient of resistance. Write one use of this material. (2 marks)

Question 12. Write two advantages and two disadvantages of a secondary cell over a primary cell. (2 marks)

Question 13. In the figure, the straight wire AB is fixed while the loop is free to move under the influence of the electric currents flowing in them. In which direction does the loop begin to move? Give reason for your answer. (2 marks)

Question 14. A radio frequency choke is air-cored coil whereas in audio frequency choke is iron-cored. Give reasons for this difference. (2 marks)

Question 15. An astronomical telescope consists of two thin lenses set 36 cm apart and has a magnifying power 8. Calculate the focal lengths of the lenses. (2 marks)

Question 16. Use the mirror formula to show that for an object lying between the pole and focus of a concave mirror, the image formed is always virtual in nature. (2 marks)

Question 17. An £-particle and a proton are accelerated through the same potential difference. Calculate the ratio of velocities acquired by the two particles. (2 marks)

Question 18. Describe the method used for determination of distance of a planet by parallax method. (2 marks)

Question 19. Explain the principle of a tangent galvanometer. How does the reduction factor of the galvanometer change, when (i) number of turns of the coil is increased and (ii) radius of the coil is decreased? Give reason for your answer in each case. (3 marks)

Question 20. A wire of uniform cross-section and length l has a resistance of 16 ohm. It is cut into four equal parts. Each part is stretched uniformly to length l and all the four stretched parts are connected in parallel. Calculate the total resistance of the combination so formed. Assume that stretching of wire does not cause any change in the density of its material. (3 marks)

Question 21. An electric heater and an electric bulb are rated 500 W, 220 V and 100 W, 220 V respectively. Both are connected in series to a 220 V a.c. mains. Calculate the power consumed by (i) the heater and (ii) electric bulb. (3 marks)
Question 22. Why is diffraction of sound waves easier to observe than diffraction of light waves? What two main changes in diffraction pattern of a single slit will you observe when the monochromatic source of light is replaced by a source of white light? (3 marks)

Question 23. Explain surface wave and sky wave propagations of radio waves. Why is short wave communication over long distances not possible by surface wave propagation? (3 marks)

Question 24. Give reasons for following observations on the surface of moon: (3 marks)

(i) Sun-rise and sun-set are abrupt

(ii) Sky appears dark

(iii) A rainbow is never observed.

Question 25. The energy levels of an atom of element are shown in the following diagram. Which one of the level transitions will result in the emission of photons of wavelength 620 nm? Support your answer with mathematical calculations. (3 marks)

Question 26. Give the logic symbol and truth table for AND gate. Explain, with the help of a circuit diagram, how this gate is realized in practices. (3 marks)

Question 27. Drawing a labeled circuit diagram, explain how a NPN transistor can be used as an amplifier in common base configuration. (3 marks)

Question 28. Explain the effect of introducing a dielectric slab between the plates of a parallel plate capacitor on its capacitance. Derive an expression for its capacitance with dielectric as the medium between the plates.

Or

Give the principle and explain the working of a Van de Graaff generator with the help of a labeled diagram (Marks 5)

Question 29. Explain the process of release of energy in a nuclear reactor. Draw a labeled diagram of a nuclear reactor and write the function of each part. (5 marks)

Question 30. Draw a labeled diagram of Thomson's experimental set-up to determine e/m of electrons. Explain by deriving the necessary mathematical expression how of electron can be determined by this method. (5 marks)

Sample paper 3

Physics Class XII

Question 1. Draw an equipotent surface in a uniform electric field. (1 mark)

Question 2. If a wire is stretched to double its original length without less of mass, how will the resistivity of the wire be influenced? (1 mark)

Question 3. Why do magnetic lines of force prefer to pass through iron than through air? (1 mark)

Question 4. What is the power factor of an LCR series circuit at resonance? (1 mark)

Question 5. Why is the transmission of signals using ground waves restricted to frequencies upto 1500 kHz? (1 mark)

Question 6. The polarizing angle of a medium is 60o. What is the refractive index of the medium? (1 mark)

Question 7. How does the collector current change in a junction transistor, if the base region has larger width? (1 mark)

Question 8.Two stars A and B have magnitudes -2 and +4 respectively. Which star appears brighter? (1 mark)

Question 9. An electric flux of -6 x 103 Nm2/C passes normally through a spherical Gaussian surface of radius 10 cm, due to a point charge placed at the center.

(i) What is the charge enclosed by the Gaussian surface?

(ii) If the radius of the Gaussian surface is doubled, how much flux would pass through the surface? (2 marks)

Question 10. Three identical resistors, each of resistance R, when connected in series with a d.c. source, dissipate power X. If the resistors are connected in parallel to the same d.c. source, how much power will be dissipated? (2 marks)

Question 11. Define mutual inductance. State two factors on which the mutual inductance between a given pair of coils depends. (2 marks)

Question 12. Light from a galaxy, having wavelength of 6000 Ao, is found to be shifted towards red by 50 Ao. Calculate the velocity of recession of the galaxy. (2 marks)

Question 13. A converging lens has a focal length of 20 cm in air. It is made of a material of refractive index 1.6. If it is immersed in a liquid index 1.3, what will be its new focal length? (2 marks)

Question 14. Draw a labeled ray diagram to show the image formation in astronomical telescope for normal adjustment position. Write down the equation for its magnifying power. (2 marks)

Question 15. The half-life of a radioactive sample is 30 seconds. Calculates (i) the decay constant, and (ii) time taken for the sample to decay to 3/4th of its initial value. (2 marks)

Question 16. Draw a logic circuit diagram showing how a NAND gate can be converted into a NOT gate. (2 marks)

Question 17. What is an ideal diode? Draw the output waveform across R, for the input waveform given below : (2 marks)

Question 18. Write, in brief, the method to determine the distance of an inferior planet from the sun. (2 marks)

Question 19. Explain, with the help of a circuit diagram, the use of potentiometer for determination of internal resistance of a primary cell. Derive the necessary mathematical expression. (3 marks)

Question 20. Calculate the resistance between A and B of the given network. (3 marks)

Question 21. State Faraday's laws of electrolysis. Write down the relation connecting chemical equivalent and electro-chemical equivalent. (3 marks)

Question 22. An electron is moving at 106m/s in a direction parallel to a current of 5 A, flowing through an infinitely long straight wire, separated by a perpendicular distance of 10 cm in air. Calculate the magnitude of the force experienced by the electrons. (3 marks)
Question 23. A bar magnet, held horizontally, is set into angular oscillations in Earth's magnetic field. It has time periods T1 and T2 at two places, where the angles of dip are $\alpha 1$ and $\alpha 2$ respectively. Deduce an expression for the ratio of the resulting magnetic field at the two places. (3 marks)
Question 24. Verify Snell's law of refraction using Huygens' wave theory. (3 marks)
Question 25. Find the position of an object which when placed in front of a concave mirror or focal length 20 cm, produces a virtual image, which is twice the size of the object. (3 marks)
Question 26. If the frequency of the incident radiation on the cathode of a photo cell is doubled, how will the following change:
(i) Kinetic energy of the electrons,
(ii) Photoelectric current,
(iii) Stopping potential.
Justify you answer. (3 marks)
Question 27. Explain, with the help of a circuit diagram, why the output voltage is out of phase with the input voltage in a common emitter transistor amplifier. (3 marks)
Question 28. With the help of a labeled diagram, describe Milliken’s oil-drop experiment for determining the charge of an electron. (5 marks)
Question 29. Draw the curves showing the variation of inductive reactance and capacitive reactance with applied frequency of an a.c source. A capacitor, a resistor of 5 ohm, and an inductor of 50 mH are in series with an a.c. source marked 100 V, 50 Hz. It is found that voltage is in phase

with the current. Calculate the capacitance of the capacitor and the impedance of the circuit. (2+3 marks)
Question 30. Define capacitance of a capacitor. Give its unit. Derive an expression for the capacitance of a parallel plate capacitor in which a dielectric medium of dielectric constant K fills the space between the plates.

Or
Explain the principle, construction and working of a Van de Graff generator. (5 marks)

Sample paper 4
XII PHYSICS

Q. 1. In a hydrogen atom, an electron revolves around a proton. Which of these two exerts a greater electrostatic force on the other?

Q. 2. What is the force experienced by a positively charges particle Q moving at right angles to a uniform electric field E.

Q. 3. What is the order of voltages that can be built up using a Van De Graff generator?

Q. 4. What is the angle b/w Electric field and Dipole moment at an axial point?

Q. 5 Define geomagnetic ratio. What is its value?

Q. 6 State the condition in which terminal voltage across a secondary cell is equal to its emf.

Q. 7. The dielectric strength of air is 3 x 10^6 V/m. What is the maximum charge that can be safely stored on a sphere of radius 10m?

Q. 8. Name two types of commercially available resistors.

Q. 9. On the same graph plot the variation of E versus R and V versus R for a point charge.

Q. 10. Define mobility and mention its SI unit

Q. 11. Two resistors are connected in parallel b/w A and B to give a net resistance of 2 ohms. When one of these resistors is broken, the net resistance becomes a 3 ohms. What is the resistance of the resistor that was broken?

Q. 12. Using a suitable graph, explain why nichrome is used in standard resistance coils.

Q. 13. A velocity selector is to be designed for particles of velocity 10m/s. What magnetic field should be employed if the electric field in it is 100 N/C

Q. 14. Explain why a potentiometer is preferred over a voltmeter for measuring potential differences.

Q. 15. An alpha particle and a proton accelerated by the same potential difference enter into a magnetic field. Find the ratio of their radius and the ratio of their frequency.

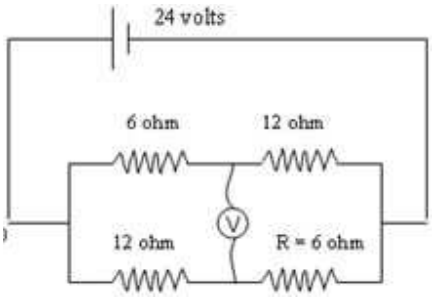
Q. 16. In a meter bridge experiment with a fixed resistor of 10 ohm, the balance length is found to be 75cm. What resistance should be added in series with this fixed resistor so as to bring the null point in the center of the wire?

Q. 17. The resistively of a metal X is 3.2×10^{-8} while the free electron density is 5×10^{28} m^{-3}. Find the drift velocity of electrons if a potential gradient of 1 Vm^{-1} is applied across X.

Q. 18. What type of materials are used for making

a. Permanent magnets
b. Transformer cores. Give two line reasons for each

Q. 19. In the circuit, what is the reading of the voltmeter?
What resistance should be connected in series with the R = 6 ohm resistor so the voltmeter reading become zero



Q. 20. Show that the far field of a solenoid resembles that of a bar magnet. Hence define the magnetic moment of a solenoid.

Q. 21. A long cylinder of radius R_o is carrying a current I_o, which is uniformly distributed over its cross section. Derive an expression for the magnitude of magnetic field inside as well as outside the wire. Plot a curve to show the variation of magnetic field with radial distance.

Q. 22. A and B are two concentric hollow metallic shells of radius R_A and R_B. A is given a charge QA while B is given a charge QB. Find the electric potential at a distance R from the center such that

a. $R < R_A$
b. $R_A < R < R_B$
c. $R > R_B$

Q. 23. Derive an expression for the torque acting on a current carrying loop placed in a uniform magnetic field. Hence define the magnetic moment of a current carrying loop.

Q. 24. Use kirchoff's laws to deduce the condition of a balanced Wheatstone bridge.

Q. 25. Explain mathematically, why the resistance of metals increases while that of semiconductor decreases with the rise in temperature. Plot Resistance versus Temperature for Cu and for Silicon.

Q. 26. Three charges Q , Q and – Q are placed on the vertices of an equilateral triangle of side L. Find the net force experienced by the charge Q and the net force experienced by the charge – Q.

Q. 27. Cell A has an emf E_A and internal resistance r_A while cell B has emf E_B and internal resistance rB. Derive an expression for the equivalent emf and internal resistance

Q. 28. Using a labeled diagram explain the construction and working of a moving coil galvanometer. Define its current and voltage sensitivity and explain how they can be increased.
(b) A galvanometer with a coil resistance of 5 ohm can tolerate a maximum current of 10mA. Explain how this can be converted into an ammeter of range 1A.

Q. 29. There are a total of N cells each of emf E and internal resistance r. They are connected in the form of a 2 dimensional array of "n" rows each having equal number of cells. What is the maximum current that can be obtained from this combination?
(b) This array is connected to an external resistor R. Derive an expression for the current flowing through R. For what value of R is this current maximum.

Q. 30. Derive the value of potential due to an electric dipole at a point r distance away at an angle θ. On same graph show the variation of potential with distance for a point charge and for a dipole

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