



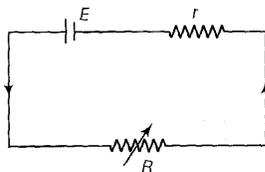
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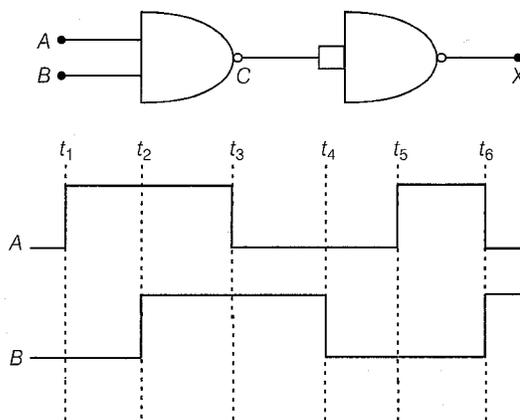
Very Very Important Questions for XII Board Exam [Physics]

1. What is the range of frequencies of television signals? 1 mark
2. Why can't we prepare permanent magnets from paramagnetic materials? 1 mark
3. What is Fresnel distance? 1 mark
4. Can an inverted telescope work as a microscope? 1 mark
5. Define impact parameter. 1 mark
6. What is Bohr magneton? 1 mark
7. What is the relationship between amplitude of electric and magnetic field in free space? 1 mark
8. How does the collector current change in a junction transistor, if the base region has large width? 1 mark
9. How does the energy gap in an intrinsic semiconductor vary, when doped with a pentavalent impurity? 1 mark
10. Which device is used for transmitting TV signals over long distances? 1 mark
11. What should be the length of the dipole antenna for a carrier wave of frequency 3×10^8 Hz? 1 mark
12. Draw the graph showing the variation of resistivity with temperature for silicon. 1 mark
13. A photon and an electron have the same de-Broglie wavelength, which one has higher total energy? 1 mark
14. Why is heavy water used as a moderator in a nuclear reactor? 1 mark
15. Which has larger susceptibility; iron or copper? 1 mark
16. How does electron mobility change for a good conductor when the temperature of the conductor is decreased at constant potential difference? 1 mark
17. In an experiment on a meter bridge, if the balancing length AC is x , what would be its value, when the radius of the meter bridge wire AB is doubled? 1 mark
18. Current is allowed to flow in a metallic wire at a constant potential difference. When the wire becomes hot or cold, water is poured on half of its portion. By doing so, its other half portion becomes cold or more hot. Explain its reason. 2 marks
19. A jet plane is travelling towards West at a speed of 1800 km/h. What is the voltage difference developed between the ends of the wing having a span of 25 m, if the earth's magnetic field at the location has a magnitude of 5×10^{-4} T and the dip angle is 30° . 2 marks
20. State four properties of nuclear forces. 2 marks
21. A ground receiver is receiving a signal at
 - (i) 5 MHz and
 - (ii) 100 MHz transmitted from a ground transmitter at a height of 300 m located at a distance 100 km. Identify whether it is coming via space wave or sky wave propagation or satellite transponder. Radius of earth $\approx 6.4 \times 10^6$ m; N_{\max} of ionosphere $= 10^{12} \text{ m}^{-3}$. 2 marks

22. On a particular day, the maximum frequency reflected from the ionosphere is 10 MHz. On another day, it was found to be increase to 11 MHz. Calculate the ratio of maximum electron densities of the ionosphere on the two days. 2 marks
23. A closely wound solenoid of 200 turns and area of cross-section $1.6 \times 10^{-4} \text{ m}^2$. Carrying a current of 4.0 A, is suspended through its centre allowing it to turn in a horizontal plane.
 (i) What is the magnetic moment associated with the solenoid?
 (ii) What are the force and torque on the solenoid, if a uniform horizontal magnetic field of $7.5 \times 10^{-2} \text{ T}$ is set up at an angle of 30° with the axis of the solenoid? 2 marks
24. A cell of emf E and internal resistance r is connected across a variable external resistance R . Plot graphs to show variation of 2 marks



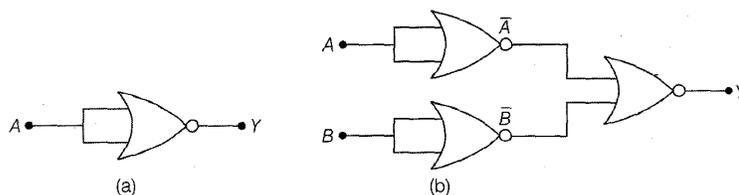
- (i) E with R
 (ii) terminal potential difference of the cell V with R .
25. Can the potential barrier across a p-n junction be measured by simple connecting a voltmeter across the junction. 2 marks
26. Derive an expression for self inductance of a long air-cored solenoid of length l , cross-sectional area A and having number of turns N . 2 marks
27. Draw the output waveform at X , using the given inputs A , B for the logic circuit show below. Also identify the gate. 2 marks



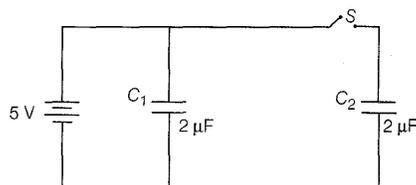
28. When a galvanometer having 30 division scale and 100Ω resistance is connected in series to the battery of emf 3V through a resistance of 200Ω , show full scale deflection. Find the figure of merit of the galvanometer in microampere. 2 marks
29. What is the focal length of combination of a convex lens of focal length 30 cm and a concave lens of focal length 20 cm? Is the system a converging or a diverging lens? 2 marks
30. A student connects a long air core coil of manganin wire to a 100 V DC source and records current of 1.5 A. When the same coil is connected across a 100 V, 50 Hz AC source, the current reduces to 1.0 A. 2 marks
 (i) Give reasons for this observation
 (ii) Calculate the value of reactance of the coil.

31. Give reason for 2 marks
- (i) Lighter elements are better moderators for a nuclear reactor than heavier elements.
 - (ii) in a natural uranium reactor, heavy water is preferred moderator to ordinary water.

32. Write the truth table for the circuit given in Fig. (a) and (b) consisting of NOR gate only. Identify the logic operation (OR, AND, NOT) performed by the two circuits. 2 marks

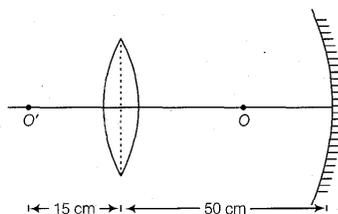


33. Figure show two identical capacitors C_1 and C_2 , each of $2\mu\text{F}$ capacitance, connected to a battery of 5 V . Initially switch S is closed. After sometime S is left open and dielectric slabs of dielectric constant $K = 5$ are used inserted to fill completely the space between the plates of the two capacitors. How will the (i) charge and (ii) potential difference between the plates of the capacitors be affected after the slabs are inserted? 2 marks

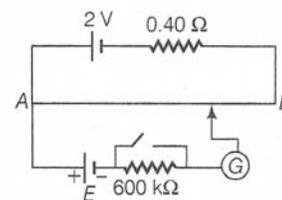


34. A cell of emf E and internal resistance r is connected across a variable resistor R . How the terminal potential V vary with resistance R . 2 marks
35. A source of emf is used to establish a current I , though a coil of self-inductance L . Show that the work done by the source to build up the current I is $\frac{1}{2}LI^2$. 2 marks.
36. A galvanometer coil has resistance of $115\ \Omega$ and the meter shows full scale deflection for current of 4 mA . How will you convert the mater into a ammeter of range 0 to 6 A ? 3 marks
37. Show that the shortest wavelength lines in Lyman, Balmer and Paschen Series have their wavelengths in the ratio $1 : 4 : 9$. 3 marks
38. Two charged conducting sphere of radii a and b are connected to each other by a connecting wire. What is the ratio of (i) charges on the spheres and (ii) electric fields at the surface of two spheres. 3 marks
39. With the help of a diagram show the biasing of a photodiode. Give its one use and draw its characteristic curves. State with reason why a photodiode is usually operated at a reverse bias. 3 marks
40. A slit of width a is illuminated by light of wavelength 700 nm . What will be the value of slit with a , when 3 marks
- (i) first minimum falls at an angle of diffraction 30° ?
 - (ii) first maximum falls at an angle of diffraction 30° ?

41. The ground state energy of hydrogen atom is -13.6 eV. If an electron makes a transition from an energy level -0.85 eV to -3.4 eV, calculate the wavelength of the spectral line emitted. To which series of hydrogen spectrum, does this wavelength belong sketch the energy level diagram to show the transition. 3 marks
42. What is sky wave propagation? What do you mean by critical frequency, skip distance and fading? 3 marks
43. State the law of radioactive decay. If N_0 is the number of radioactive nuclei at some initial time t_0 , find out the relation to determine the number N present at a subsequent time. Draw a plot of N as a function of time. 3 marks
44. A 100 mH inductor, a 20 μ F capacitor and a 10 Ω resistor are connected in series to a 100 V, 50 Hz AC source. Calculate 3 marks
- (a) Impedance of the circuit at resonance.
 (b) Current at resonance.
 (c) Resonant frequency
45. In the accompanying diagram, the direct image is formed by the lens ($f = 10$ cm) of an object placed at O and that formed after reflection from the spherical mirror is formed at the same point O' . What is the radius of curvature of the mirror? 3 marks



46. Draw a labeled ray diagram of an astronomical telescope, forming the image at infinity. An astronomical telescope uses two lenses of powers 10 D and 1 D. 3 marks
- (i) State with reason, which lens is preferred of objective and eye-piece.
 (ii) Calculate the magnifying power of the telescope, if the final image is formed at the near point.
47. Give reason for the following. 3 marks
- (i) Why is ground wave transmission of signals restricted to a frequency of 1500 kHz?
 (ii) How does the length of a dipole antenna vary with increase of the frequency of the carrier wave?
 (iii) How does the effective power radiated by an antenna vary with wavelength?
48. Figure show a potentiometer with a cell of 2.0 V and internal resistance of 0.40 Ω maintain a potential drop across the resistor wire AB. A standard cell which maintains a constant emf of 1.02 V gives a balance point at 67.3 cm length of the wire. To ensure very low current is drawn from the standard cell, a very high resistance of 600 k Ω is put in series with it, which is shorted close to the balance point. The standard cell is then replaced by a cell of unknown emf E and the balance point found similarly, turns out to be at 82.3 cm length of the wire. 5 marks
- (i) What is the value of E ?
 (ii) What purpose does the high resistance of 600 k Ω have?
 (iii) Is the balance point affected by this high resistance?

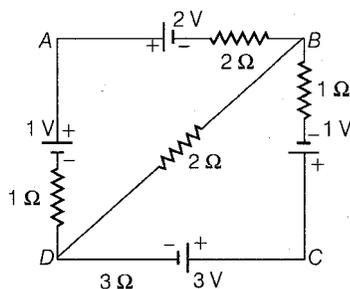


49. An AC source of voltage $V = V_m \sin \omega t$ is connected, one by one, to three circuit elements, X, Y and Z. It is observed that the current flowing in them
- (i) is in phase with applied voltage for element X. 5 marks
- (ii) lags the applied voltage, in phase, by angle $\frac{\pi}{2}$ for element Y.
- (iii) leads the applied voltage, in phase, by angle $\frac{\pi}{2}$

Identify the three circuit elements.

Find an expression for the current flowing in the circuit, when the same AC source is connected across a series combination of the elements X, Y and Z. If the frequency of the applied voltage is varied, set up the condition of the frequency when the current amplitude in the circuit is maximum. Write expression for this current amplitude?

50. Define resistivity of a conductor. How does the resistivity of a metallic conductor changes with temperature? Draw approximate graph of resistivity plotted against temperature for
- (i) metal (ii) an alloy and (iii) a semiconductor 5 marks
51. A ray of light goes from medium 1 to medium 2 velocity of light in the two media are c_1 and c_2 respectively. For an angle of incidence θ in medium 1. The corresponding angle of refraction in medium 2 is $\theta/2$. 5 marks
- (i) Which of the two media is optically denser and why?
- (ii) Establish the relationship between θ , c_1 and c_2 .
- (iii) Find relation between critical angle and polarizing angle.
52. (i) the following graph shows the variation of terminal potential difference V , across a combination of three cells in series to a resistor versus current I .
- (a) calculate the emf of each cell. 1 mark
- (b) for what current I , will the power dissipation of the circuit be maximum? 1 mark
- (ii) For the circuit show here, calculate the potential difference between point B and D 3 marks



53. (i) What do you mean by current sensitivity of a moving coil galvanometer. On what factor does it depend? 2 marks
- (ii) State two reasons why a galvanometer cannot be used as such to measure current in a given circuit? 2 marks
- (iii) The current sensitivity of a moving coil galvanometer is 5 division/mA and voltage sensitivity is 20 division/volt. Find the resistance of the galvanometer. 1 mark