QB365 Student Learing Managemnet System
Exam Name: Pre Quarterly - Practice
Std: 12th Standard - Physics
Chapter: Current Electricity, Electrostatics, Electromagnetic Waves, Electromagnetic Induction and Alternating Current, Magnetism and Magnetic Effects of Electric Current, Ray Optics, Wave Optics, Dual Nature of Radiation and Matter, Atomic and Nuclear physics, Electronics and Communication , Recent Developments in Physics

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Questions:

IV.ANSWER THE FOLLOWING

1. Explain the determination of the internal resistance of a cell using voltmeter.
2. Obtain the expression for electric field due to an infinitely long charged wire.
3. Write down the properties of electromagnetic waves.
4. Show mathematically that the rotation of a coil in a magnetic field over one rotation induces an alternating emf of one cycle. (or) Emf induced by changing relative orientation of the coil with the magnetic field.
5. Discuss the working of cyclotron in detail.
6. Obtain the law of radioactivity.
7. Obtain lens maker's formula and mention its significance.
8. Explain the construction and working of a full wave rectifier
9. Obtain the equation for bandwidth in Young's double slit experiment.
10. Describe briefly Davisson – Germer experiment which demonstrated the wave nature of electrons.

III.ANSWER THE Q.NO: 33 COMPULSORILY OF THE REMAINING ANSWER ANY 5

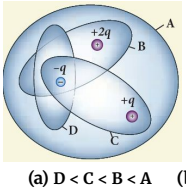
11. State and explain Kirchhoff 's rules
12. A parallel plate capacitor has square plates of side 5 cm and separated by a distance of 1 mm.
    (a) Calculate the capacitance of this capacitor.
    (b) If a 10 V battery is connected to the capacitor, what is the charge stored in any one of the plates? (The value of ε_0 = 8.85 x 10^{-12} Nm^2 C^{-2})
13. How will you induce an emf by changing the area enclosed by the coil?
14. Derive the relation between f and R for a spherical mirror.
15. Write the properties of cathode rays.
16. Calculate the mass defect and the binding energy per nucleon of the $^{108}_{47}Ag$ nucleus. [atomic mass of Ag = 107.905949]
17. Derive an expression for de Broglie wavelength of electrons.
18. List out the advantages and limitations of frequency modulation.
19. What are Fraunhofer lines? How are they useful in the identification of elements present in the Sun?

II.ANSWER THE Q.NO: 24 COMPULSORILY OF THE REMAINING ANSWER ANY 5

20. If the resistance of coil is 3 Ω at 20°C and α = 0.004/°C then determine its resistance at 100°C.
21. Define 'electric field'
22. What is displacement current?
23. What is magnetic susceptibility?
24. How does an endoscope work?
25. What is dispersion?
26. What is double refraction?
27. Mention any two advantages and disadvantages of Robotics.
28. How many photons per second emanate from a 50 mW laser of 640 nm?

I.CHOOSE THE BEST ANSWER

29. A wire connected to a power supply of 230 V has power dissipation P_1. Suppose the wire is cut into two equal pieces and connected parallel to the same power supply. In this case power dissipation is P_2. The ratio $\frac{P_2}{P_1}$ is _____.
    (a) 1 (b) 2 (c) 3 (d) 4
30. Four Gaussian surfaces are given below with charges inside each Gaussian surface. Rank the electric flux through each Gaussian surface in increasing order.



    (a) D < C < B < A (b) A < B = C < D (c) C < A = B < D (d) D > C > B > A
31. In an electromagnetic wave traveling in free space the rms value of the electric field is 3 V m^{-1}. The peak value of the magnetic field is _____.
    (a) 1.414 x 10^{-8} T (b) 1.0 x 10^{-8} T (c) 2.828 x 10^{-8} T (d) 2.0 x 10^{-8} T
32. A circular coil with a cross-sectional area of 4 cm^2 has 10 turns. It is placed at the centre of a long solenoid that has 15 turns/cm and a cross-sectional area of 10 cm^2. The axis of the coil coincides with the axis of the solenoid. What is their mutual inductance?

(a) 7.54 μH (b) 8.54 μH (c) 9.54 μH (d) 10.54 μH

33. The vertical component of Earth's magnetic field at a place is equal to the horizontal component. What is the value of angle of dip at this place?
(a) 30° (b) 45° (c) 60° (d) 90°

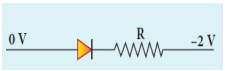
34. Temperature co-effieient of resistance for metals is _____.
(a) constant (b) positive (c) zero (d) negative

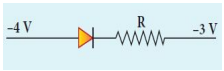
35. For light incident from air on a slab of refractive index 2, the maximum possible angle of refraction is, _____.
(a) 30° (b) 45° (c) 60° (d) 90°

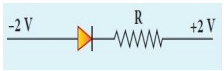
36. A ray of light strikes a glass plate at an angle 60°. If the reflected and refracted rays are perpendicular to each other, the refractive index of the glass is, _____.
(a) $\sqrt{3}$ (b) $\frac{3}{2}$ (c) $\sqrt{\frac{3}{2}}$ (d) 2

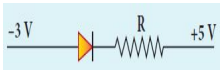
37. A photoelectric surface is illuminated successively by monochromatic light of wavelength λ and λ /2. If the maximum kinetic energy of the emitted photoelectrons in the second case is 3 times that in the first case, the work function of the material is _____.
(a) $\frac{hc}{\lambda}$ (b) $\frac{2hc}{\lambda}$ (c) $\frac{hc}{3\lambda}$ (d) $\frac{hc}{2\lambda}$

38. The charge of cathode rays particle is _____.
(a) Positive (b) negative (c) neutral (d) not defined

39. Which one of the following represents forward bias diode?
(a) 

(b) 

(c) 

(d) 

40. The alloys used for muscle wires in Robots are _____.
(a) Shape memory alloys (b) Gold copper alloys (c) Gold silver alloys (d) Two dimensional alloys

41. A current gain for, a transistor working as CB amplifier is 0.90. If emitter current is 10 mA, then base current is _____.
(a) 1mA (b) 2 mA (c) 0.1 mA (d) 0.2 mA

42. A charged oil drop is suspended in a uniform field of 3×10^4 Vm^{-1} so that it neither falls nor rises. The charge on the drop will be _____.
(a) 3.3×10^{-18}C (b) 3.2×10^{-18}C (c) 1.6×10^{-18}C (d) 4.8×10^{-18}C

43. A plane mirror produces a magnification of _____.
(a) -1 (b) + 1 (c) Zero (d) Between 0 and + ∞

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