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12

Reg No

Time : 3.00 hrs

First Revision Examination - 2024

PHYSICS

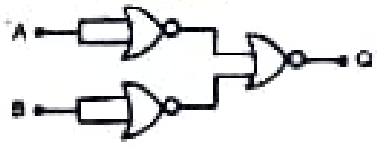
Max. Marks : 70

PART - I

Note: 1. Answer all the questions. **(15x1=15)**

2. Choose the most suitable answer and write the code with the corresponding answer.

1. Two metallic spheres of radii 1cm and 3cm are given charges of -1×10^{-2}C and 5×10^{-2}C respectively. If these are connected by a conducting wire, the final charge on the bigger sphere is
   a) 3×10^{-2}C b) 4×10^{-2}C c) 1×10^{-2}C d) 2×10^{-2}C
2. The internal resistance of a 2.1V cell which gives a current of 0.2A through a resistance of 10Ω is
   a) 0.2 Ω b) 0.5 Ω c) 0.8 Ω d) 1.0 Ω
3. 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° c) 90°
4. The potential energy of magnetic dipole whose dipole moment is $\vec{P}_m = (-0.5\hat{i} + 0.4\hat{j})$ Am^2 kept in uniform magnetic field $\vec{B} = 0.2\hat{i}$ T
   a) -0.1J b) -0.8J c) 0.1J d) 0.8J
5. The flux linked with a coil at any instant t is given by $\varnothing_B = 10t^2 - 50t + 250$. The induced emf at t = 3s is
   a) -190V b) -10V c) 10V d) 190V
6. $\frac{20}{\pi^2}$ H inductor is connected to a capacitor of capacitance C. The value of C in order to impart maximum power at 50 Hz is a) 50 μF b) 0.5 μF c) 500 μF d) 5 μF
7. The dimension of $\frac{1}{\mu_0 \varepsilon_0}$ is
   a) LT^{-1} b) L^2T^{-2} c) $L^{-1}T$ d) $L^{-2}T^2$
8. Inverse rule n_{21} =
   a) $n_{21} = \frac{n_2}{n_1}$ b) $n_{21} = \frac{1}{n_{21}}$ c) $n_{21} = \frac{1}{n_{12}}$ c) $n_{21} = \frac{n_1}{n_2}$
9. Which colour of light has the highest speed?
   a) Violet b) Red c) Green d) All have same speed
10. Duane-Hunt law is
    a) $\lambda = \frac{12,400}{V}$ m b) $\lambda = \frac{hc}{V}$ m c) $\lambda = \frac{hc}{\sqrt{E_k}}$ m d) None of the above
11. Emission of electrons by the absorption of heat energy is called _____ emission.
    a) Photo electric b) Field c) Thermionic d) Secondary
12. The threshold wave length for a metal surface whose photo electric work function is 3.313eV is
    a) 2062.6A° b) 4125 A° c) 6000A° d) 3750A°
13. Atomic number of H-like atom with ionization potential 122.4V for n = 1 is
    a) 1 b) 2 c) 3 d) 4
14. Which logic operation does the output Q of the above gate combination produce?



a) NOT b) OR c) AND d) EX-OR

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15. The strongest source of gravitational waves is

a) black holes b) accelerated mass c) god particles d) all the above

PART - II

Answer any six questions. Question no. 24 is compulsory. **(6x2=12)**

16. Define electric potential. Give a relation between electric field and electric potential.
17. The resistance of a nichrome wire at 0°C is 10Ω. If its temperature coefficient of resistance is 0.004/°C. Find the resistance at boiling point of water.
18. What is magnetic permeability?
19. State Lenz's law.
20. Why are electromagnetic waves non-mechanical?
21. Why do clouds appear white?
22. What is Bremsstrahlung?
23. What do you mean by skip distance?
24. Calculate the power of the lens of the spectacles needed to rectify the defect of nearsightedness for a person who could see clearly upto a distance of 1.8m.

PART - III

Answer any six questions. Question no.33 is compulsory. **(6x3=18)**

25. Discuss the functions of key components in Robots?
26. Distinguish between avalanche breakdown and zener breakdown.
27. Write the properties of Cathode rays.
28. How do we obtain characteristic x-ray spectra?
29. Discuss about Nicol prism.
30. Find the ratio of intensities of lights with wavelengths 500nm and 300nm which undergo Rayleigh Scattering.
31. Prove that the total energy is conserved during L-C Oscillations.
32. How the emf of two cells are compared using potentiometer?
33. Dielectric strength of air is 3×10^6 Vm^{-1}. Suppose the radius of a hollow sphere in the Van de Graff generator is R=0.5m. Calculate the maximum potential difference created by this Van de Graff generator.

PART - IV

Answer all the questions. Draw diagrams wherever necessary. **(5x5=25)**

34. a) Draw the circuit diagram of a half wave rectifier and explain its working.

(OR)

b) State Gauss law in electrostatics. Obtain an expression for electric field due to an infinitely long charged wire.

35. a) Obtain the law of radio activity.

(OR)

b) Obtain the condition for bridge balance in Wheatstone's bridge.

36. a) Obtain Einstein's photoelectric equation with necessary explanation.

(OR)

b) Derive the expression for the force between two parallel, current-carrying conductors.

37. a) Discuss the diffraction at a grating and obtain the condition for the mth maximum.

(OR)

b) Explain the construction and working of transformer.

38. a) Write down the properties of electromagnetic waves.

(OR)

b) Obtain lens maker's formula.

Kindly send me your answer keys to us - padasalai.net@gmail.com