COMMON SECOND REVISION TEST - 2025

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Standard XII   Reg.No.: ☐ ☐ 2 4 1 9

PHYSICS

Time: 3.00 hrs.   **Part - I**   Marks: 70

I. **Choose the correct answer:**   15 x 1 = 15
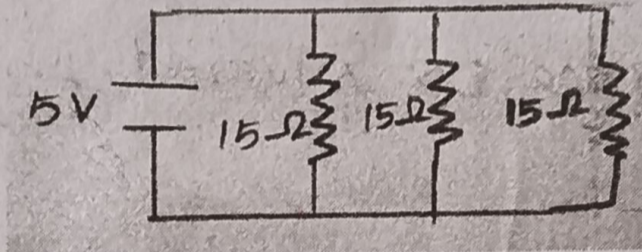
1. Type of material which emits green light in LED

   a) Ga In N   b) Si C   c) Al Ga P   d) Ga As P

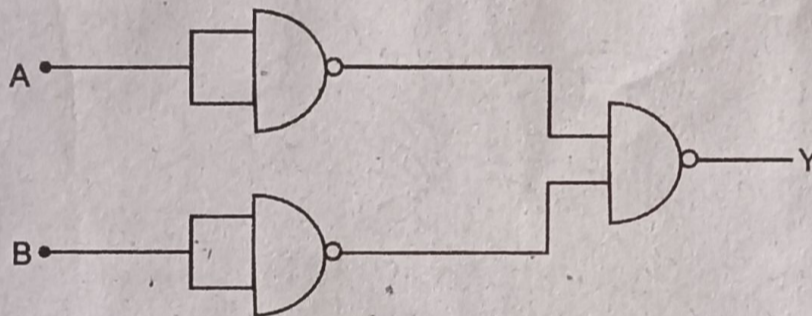2. Ultraviolet radiation frequency range is from

   a) 10^{11} Hz to 4×10^{14} Hz   b) 4×10^{14} Hz to 8×10^{14} Hz

   b) 8×10^{14} Hz to 10^{17} Hz   d) 10^{17} Hz to 10^{19} Hz

3. The current in the circuit o is

   a) 4 A   b) 1 A   c) 2 A   d) 3 A

4. The given electrical network is equivalent to

   a) NAND gate   b) OR gate   c) NOT gate   d) EX-OR gate

5. The transverse nature of light is shown in

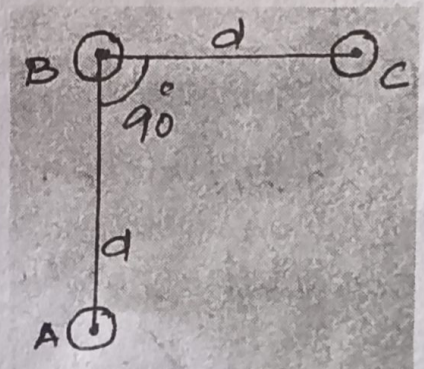   a) Interference   b) Diffraction   c) Scattering   d) Polarisation

6. Q factor is equal to

   a) $\dfrac{WrL}{R}$ b) $\dfrac{1}{R}\sqrt{\dfrac{L}{C}}$ c) $\dfrac{X_L}{R}$ d) All the above

7. An arrangement of three parallel straight wires placed perpendicular to plane of paper carrying same current I along the same direction is shown in fig. Magnitude of force per unit length on the middle wire B is given by :

   a) $\dfrac{2I^2\mu_o}{\pi d}$ b) $\dfrac{I^2\mu_o}{\sqrt{2}\,\pi d}$

   c) $\dfrac{\sqrt{2}\,I^2\mu_o}{\pi d}$ d) $\dfrac{I^2\mu_o}{2\pi d}$

8. The radius of curvature of curved surface at a thin plano convex lens is 10 cm and the refractive index is 1.5. If the plane surface is silvered, then the focal length will be

    a) 5 cm   b) 10 cm   c) 15 cm   d) 20 cm

9. In a series RL circuit, the resistance and inductive reactance are the same. Then the phase difference between the voltage and current in the circuit is

    a) $\pi/4$ b) $\pi/2$ c) $\pi/6$ d) zero

10. A parallel plate capacitor stores at charge Q at a voltage V. Suppose the area of the parallel plate capacitor and the distance between the plates are each doubled then which is the quantity that will change?

    a) Capacitance   b) Charge   c) Voltage   d) Energy density

11. The threshold wavelength for a metal surface whose photoelectric work function is 3.313 eV is

    a) 4125 A°   b) 3750 A°   c) 6000 A°   d) 2062.5 A°

12. In this figure, identify the signs of two changes and find the ratio $\left|\dfrac{q_1}{q_2}\right|$
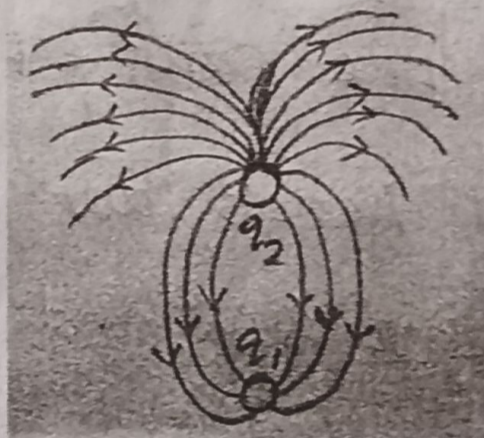
    a) $1/3$ b) $2/3$ c) $4/7$ d) $1/5$

13. The refractive index of canada balsam is

    a) 1.658   b) 1.486   c) 1.523   d) 1.684

14. Which one of the following is the natural nanomaterial?

    a) Peacock feather   b) Peacock beak

    c) Grain of sand   d) Skin of the whale

15. A radioactive nucleus (initial mass number A and atomic number Z) emits two α-particles and 2 positrons. The ratio of number of neutrons to that of proton in the final nucleus will be

    a) $\dfrac{A-Z-4}{Z-2}$ b) $\dfrac{A-Z-2}{Z-6}$ c) $\dfrac{A-Z-4}{Z-6}$ d) $\dfrac{A-Z-12}{Z-4}$

Part - II

II. Answer any 6 questions. (Q.No.24 is compulsory)   6 x 2 = 12

16. Define Gauss law.

17. Resistance of a material at 20°C and 40°C are 45 Ω and 85 Ω respectively. Find its temperature coefficient of resistivity.

18. Define Stopping potential.

19. Using the relation $\vec{B} = \mu_0(\vec{H} + \vec{M})$, show that $\chi_m = \mu_r - 1$

20. Give the properties of neutrino.

21. State Lenz's law.

22. Why are NOR and NAND gates called universal gates?

23. What are Fraunhofer lines? How are they useful in the identification of elements present in the sun?

24. The angle of minimum deviation for an equilateral prism is 37°. Find the refractive index of the material of the prism.

Part - III

III. Answer any 6 questions. (Q.No.33 is compulsory)   6 x 3 = 18

25. What is total internal reflection? Give the conditions for total internal reflection.

26. What is Seebeck effect? Give the applications of Seebeck effect.

27. Calculate the cut off wavelength and cut off frequency of X rays from an X ray tube of accelerating potential 20,000 V.

28. Mention the differences between interference and diffraction.

29. Prove the Boolean identity AC + ABC = AC and give its circuit description.

30. Obtain the expression for energy stored in the parallel plate capacitor.

31. In alpha decay why the unstable nucleus emits $_2He^4$ nucleus? Why it does not emit four separate nucleons?

32. Give the properties of dia / para / ferro magnetic materials.

33. An ideal transformer has 460 and 40,000 turns in the primary and secondary coils respectively. Find the voltage developed per turn of the secondary if the transformer is connected to a 230 V AC mains. The secondary is given to a load of resistance $10^4 \Omega$. Calculate to the power delivered to the load.

Part - IV

IV. Answer all the questions.   5 x 5 = 25

34. a) Calculate the electric field due to a dipole on its equatorial plane.

(OR)

   b) Describe the Fizeau's method to determine the speed of light.

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

(OR)

b) Explain the Young's double slit experimental setup an obtain the equation for path difference.

36. a) Derive the expression for force on a current carrying conductor placed in a magnetic field.

(OR)

b) Explain the construction and working of a full wave rectifier.

37. a) Explain the working of a single-phase AC generator with Necessary diagram.

(OR)

b) Briefly explain the principle and working of electron microscope.

38. a) What is spectrum? Explain the types of emission spectrum.

(OR)

b) Write down the postulates of Bohr atom model and calculate the radius of the orbit of the electron using Bohr hypothesis.

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