HALF YEARLY EXAM

QUESTION PAPER

ORIGINAL EXAM PAPERS



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V12P

Virudhunagar District
Common Half Yearly Examination - 2023

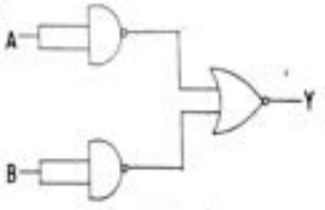
Standard 12
PHYSICS
PART - I

Time: 3.00 Hours | Marks: 70

i) Answer all the questions: **15x1=15**

ii) Choose the most appropriate answer from the given four alternatives and write the option code and the corresponding answer

1) The temperature coefficient of resistance of a wire is 0.00125/°C. At 300k, its resistance is 1Ω. the resistance of the wire will 2Ω at
   a) 1154 k b) 1100k c) 1400 k d) 1127 k
2) Fraunhofer lines are an example of ..... spectrum
   a) line emission b) line absorption
   c) band emission d) band absorption
3) If voltage applied on a capacitor is increased from V to 2 V, choose the correct conclusion
   a) Q remains the same, C is doubled b) Q is doubled, C doubled
   c) C remains same, Q doubled d) Both Q and C remain same
4) The internal resistance of a 2.1 V 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
5) A circular coil of radius 5 cm and 50 turns carries a current of 3 ampere. The magnetic dipole moment of the coil is nearly
   a) 1.0 Am^2 b) 1.2Am^2 c) 0.5Am^2 d) 0.8Am^2
6) In a transformer, the number of turns in the primary and the secondary are 410 and 1230 respectively. If the current in primary is 6 A, then that in the secondary coil is
   a) 2 A b) 18 A c) 12 A d) 1 A
7) 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
8) The transverse nature of light is shown in
   a) Interference b) diffraction c) Scattering d) Polarisation
9) 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°
10) If the input to the Not gate is A = 1011, its output is
   a) 0100 b) 1000 c) 1100 d) 0011
11) A current carrying wire produces in the neighbourhood
   a) Electric and magnetic fields b) Electric field only
   c) magnetic field only d) no field
12) If the net reactance of the LCR series ac circuit is zero, the phase difference between the resultant voltage and current in the circuit is
   a) 30° b) 45° c) 60° d) 0°
13) What is the ratio of the energies of the hydrogen atom in its first to a second excited state?
   a) 9 : 4 b) 3 : 3 c) 4 : 1 d) 1 : 2
14) The following logical electric circuit is equivalent to
   a) AND gate b) OR gate
   c) NOR gate d) NOT gate



15) The electric field at the equator of a dipole is E : If the strength of the dipole and distance are now doubled, then the electric field will be
   a) E/2 b) E/8 c) E/4 d) E

PART - II

Answer any six questions: Q.No.24 is compusolry. **6x2=12**

16) Distinguish between avalanche breakdown and Zener breakdown. (Give two points)
17) What is meant by radioactivity?
18) What is photo electric effect?
19) A monochromatic light of wavelength of 500 nm strikes a grating and produces fourth order maximum at an angle of 30°. Find the number of slits per centimeter.
20) Why does sky appear blue?
21) What is displacement current?
22) State Lenz's law
23) Calculate the electrostatic force between the proton and the electron in a hydrogen atom. They are separated by a distance of 5.3×10^{-11} m. The Magnitude of charges on the electron and proton are 1.6×10^{-19}C.
24) An electronics hobbyist is building a raido which requires 150Ω in her circuit. But she has only 220Ω, 79Ω and 92Ω resistors available. How can she connect the available resistors to get the desired value of resistance?

PART - III

Answer any six questions: Q.No.33 is compusolry. **6x3=18**

25) What are the properties of an equipotential surface?
26) Explain cells are connected in parallel
27) Discuss the conversion of galvanometer into a voltmeter.
28) The current flowing in the first coil changes from 2A to 10A in 0.4 second. Find the mutual inductance between two coils if an emf of 60mv is induced in the second coil. Also determine the magnitude of induced emf in the second coil if the current in the first coil is changed from 4A to 16A in 0.03 second. Consider only the magnitude of induced emf.
29) Write short notes on infrared rays
30) A point object is placed at 20cm. From a thin plano-convex lens of focal length 15cm whose plane surface is silvered. Locate the position and nature of the final image.
31) Differentiate between Fresnel and Fraunhofer diffraction.
32) State De Morgan's first and second theorem.
33) A proton and an electron have same de Broglie wavelength. Which of them moves faster and which possesses more Kinetic energy?

PART - IV

Answer all the questions: **5x5=25**

34) Calculate the electric field due to a dipole on its axial line.

(OR)

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

35) Explain the determination of the internal resistance of a cell using potentiometer.

(OR)

Discuss the spectral series of Hydrogen atom.

36) Deduce the relation for the magnetic field at a point due to an infinitely long straight conductor carrying current.

(OR)

Prove law of reflection using Huygens' principle.

37) Obtain lens Malcer's formula

(OR)

Find out the phase relationship between voltage and current in a pure inductive circuit

38) Write down Maxwell equations in integral form.

(OR)

Obtain Einstein's Photoelectric equation with necessary explanation.

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