

Tsi12P

Tenkasi District  
Common Half Yearly Examination - 2023



04-01-2024

Standard 12

PHYSICS

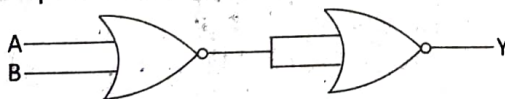
Part - I

Time: 3.00 Hours

Marks: 70  
15x1=15

**Note:** Answer all the questions.  
Choose the best answer.

- 1) Which charge configuration produces a uniform electric field?
  - a) Point charge
  - b) infinite uniform line charge
  - c) uniformly charged infinite plane
  - d) uniformly charged spherical shell
- 2) A dipole of dipole moment  $\vec{p}$  placed in an uniform electric field  $\vec{E}$  with angle  $\theta$ . Then the torque acting on the dipole is
  - a) along  $\vec{p}$
  - b) Opposite  $\vec{p}$
  - c) along  $\vec{E}$
  - d) perpendicular to plane containing  $\vec{p}$  and  $\vec{E}$
- 3) The temperature coefficient of resistance of a wire is  $0.00125 \text{ per}^\circ\text{C}$ . At  $20^\circ\text{C}$ , its resistance is  $1\Omega$ . The resistance of the wire will be  $2\Omega$  at
  - a)  $800^\circ\text{C}$
  - b)  $700^\circ\text{C}$
  - c)  $850^\circ\text{C}$
  - d)  $820^\circ\text{C}$
- 4) A Circular coil of radius  $5 \times 10^{-2} \text{ m}$  and 50 turns carries a current of 3 ampere. The magnetic dipole moment of the coil is
  - a)  $1.0 \text{ Am}^2$
  - b)  $1.2 \text{ Am}^2$
  - c)  $0.5 \text{ Am}^2$
  - d)  $0.8 \text{ Am}^2$
- 5) 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)  $30^\circ$
  - b)  $45^\circ$
  - c)  $60^\circ$
  - d)  $90^\circ$
- 6) At resonance of LCR circuit
  - a) Impedance (Z) maximum
  - b) current minimum
  - c) Impedance (Z) is equal to R
  - d)  $\gamma_0 = \frac{1}{\sqrt{LC}}$
- 7) Which of the electromagnetic wave used to view the objects through thick fog?
  - a) Microwave
  - b)  $\gamma$ -ray
  - c) X-ray
  - d) IR waves
- 8) "Sky Wax" is an application of nano product in the field of
  - a) Medicine
  - b) Textile
  - c) sports
  - d) Automotive industry
- 9) The materials used in Robotics are
  - a) Aluminium and silver
  - b) Silver and gold
  - c) Copper and gold
  - d) steel and aluminium
- 10) What is the Logic operation of given circuit



- a) AND
  - b) OR
  - c) NAND
  - d) Ex-OR
- 11) If the nuclear radius of  $^{27}\text{Al}$  is 3.6 fermi, the approximate nuclear radius of  $^{64}\text{Cu}$  is
    - a) 2.4
    - b) 1.2
    - c) 4.8
    - d) 3.6
  - 12) Emission of electrons by the absorption of heat energy is called ..... emission
    - a) photoelectric
    - b) field
    - c) thermionic
    - d) secondary
  - 13) Light travels 50cm through the medium of refractive index 1.5 from the medium of refractive index 1. Then the optical path of the medium is
    - a) 50 cm
    - b) 25 cm
    - c) 75 cm
    - d) None of the above

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- 14) The transverse nature of light is shown in  
 a) interference      b) diffraction      c) scattering      d) polarisation
- 15) Order the emitted particles in the given reaction  
 ${}_Z A^A \rightarrow {}_{Z+1} Y^A \rightarrow {}_{Z-1} K^{A-4} \rightarrow {}_{Z-1} K^{A-4}$   
 a)  $\alpha, \beta, \gamma$       b)  $\beta, \alpha, \gamma$       c)  $\gamma, \alpha, \beta$       d)  $\gamma, \beta, \alpha$

## Part - II

6x2=12

**Note:** Answer any 6 questions. Q.No. 19 is compulsory.

- 16) What are the differences between Coulomb force and gravitational force?  
 17) State Kirchoff's voltage rule?  
 18) What are the limitations of cyclotron?  
 19) The equation for an alternating current is given by  $i = 77 \sin 314t$ . Find the peak value, frequency, time period and instantaneous value at  $t = 2\text{ms}$ .  
 20) What is meant by Fraunhofer lines?  
 21) An object is placed at a certain distance from a convex lens of focal length 20cm. Find the distance of the object if the image obtained is magnified 4 times.  
 22) What is a photo cell? Mention the different types of photo cells?  
 23) Define curie.  
 24) Write the D-Morgan's theorem.

## Part - III

6x3=18

**Note:** Answer any 6 questions. Q.No. 26 is compulsory.

- 25) Obtain Gauss Law from Coulomb's law  
 26) When two resistances connected in series and Parallel their equivalent resistances are  $15\Omega$  and  $56/15\Omega$  respectively. Find the individual resistances.  
 27) Write the special features of Lawrance Force.  
 28) How can the Induced emf produced by changing the area of the coil?  
 29) Write and six properties of electromagnetic waves.  
 30) Write note on: i) Mirrage ii) Total internal reflection  
 31) State and prove Brewster's Law  
 32) Note on characterstic X-ray spectrum  
 33) Calculate the time required for 60% of a sample of radon undergo decay.  
 (Given  $T_{1/2}$  of radon = 3.8 days)

## Part - IV

5x5=25

**Note:** Answer all the questions.

- 34) a) Explain in detail the construction and working of a Van De Graff generator.  
 (OR) Tenkasi Dist
- b) Write the Integral form of Maxwell's Equations.
- 35) a) Compare the emf of two cells using potential meter.  
 (OR)
- b) State De-Broglie hypothesis and Derive an expression for De - Broglie Wave length of electrons.
- 36) a) Explain the construction and working of transformer.  
 (OR)
- b) What is dispersion? Obtain the equation for dispersive power of a prism
- 37) a) Explain the simple Microscope and Derive the expression for magnification in near point focussing.  
 (OR)
- b) Find the Radius and the Velocity of orbiting electron in the  $n^{\text{th}}$  orbit using Bohr hypothesis.
- 38) a) What is half - Wave rectfier and explain its function.  
 (OR)
- b) Deduce the relation for the magnetic induction at a point due to an infinetely long straight conductor carrying current.