## PARAMVEER HI-TECH MATRIC HR.SEC.SCHOOL, PAUPARAPATTI II-50 \%

MARK: 70
SUBJECT: PHYSICS

## I. Choose the most suitable answer from the given four alternatives 15X1=15

1. The light emitted in an LED is due to
a) Recombination of charge carriers
b) Reflection of light due to lens action
c) Amplification of light falling at the junction
d) Large current capacity
2. The frequency range of 3 MHz to 30 MHz is used for
(a) Ground wave propagation
(b) Space wave propagation
(c) Sky wave propagation
(d) Satellite communication
3. The charge of cathode rays is
(a) Positive
(b) negative
(c) neutral
(d) not defined
4. If the nuclear radius of $\mathrm{Al}^{27}$ is 3.6 Fermi, the approximate nuclear radius of $\mathrm{Cu}^{64}$ is
(a) 2.4
(b) 1.2
(c) 4.8
(d) 3.6
5. The threshold wavelength for a metal surface whose photoelectric work function is 3.313 eV is
a) $4125 \AA$
b) $3750 \AA$
c) $6000 \AA$
d) $2062.5 \AA$
6. In an electron microscope, the electrons are accelerated by a voltage of 14 kV . If the voltage is changed to 224 kV , then the de Broglie wavelength associated with the electrons would
a) increase by 2 times
b) decrease by 2 times
c) decrease by 4 times
d) increase by 4 times
7. The radius of curvature of curved surface at a thin planoconvex 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. Stars twinkle due to,
(a) reflection
(b) total internal reflection
(c) refraction
(d) polarisation
9. In an oscillating LC circuit, the maximum charge on the capacitor is Q . The charge on the capacitor when the energy is stored equally between the electric and magnetic fields
(a) $\mathrm{Q} / 2$
(b) $Q \sqrt{ } 3$
(c) $Q \sqrt{2}$
(d) $Q$
10. In a series $R C$ circuit, the resistance and capacitive 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
11. 1 Rydberg $=$ $\qquad$
a) -13.6 eV
b) -3.4 eV
c) -1.51 eV
d) -0.27 eV
12. In LCR circuit when $X_{L}=X_{C}$ the current
a) is zero
b) in phase with the voltage
c) leads the voltage
d) lags behind the voltage
13. Barkhausen conditions for sustained oscillation is $\qquad$
a) $|A \beta|=1$
b) $|A \beta|=0$
c) $|A \beta|=2 \pi$
d) $|A \beta|=\pi$
14. $1 \mathrm{eV}=$ $\qquad$ J
(a) $1.602 \times 10^{-19}$
(b) $1.626 \times 10^{-27}$
(c) $6.626 \times 10^{-31}$
(d) 2.5
15. If the focal length is 25 cm for a lens, what is the power of the lens?
(a) 4 D
(b) 2 D
(c) 0.04 D
(d) 40 D

## II. Answer any six of the following questions (Q.NO 21 is compulsory)

16. How will you define Q-factor?
17. What is dispersion?
18. State Lenz's law.
19. Define work function of a metal. Give its unit.
20. What is meant by radioactivity?
21. Calculate the cut-off wavelength and cut-off frequency of $x$-rays from an $x$-ray tube of accelerating Potential 20,000 V.
22. What is distance of closest approach?
23. Draw the input and output waveforms of a full wave rectifier
24. What is modulation?
III.Answer any six of the following questions (Q.NO - 32 is compulsory) $6 \times 3=18$
25. Arrive at lens equation from lens maker's formula.
26. Derive the relation between $f$ and $R$ for a spherical mirror.
27. Mention the ways of producing induced emf.
28. List out the advantages and limitations of frequency modulation.
29. List out the advantages of stationary armature-rotating field system of AC generator.
30. Derive an expression for de Broglie wavelength of electrons.
31. Write down the postulates of Bohr atom model.
32. Find the (i) angular momentum (ii) velocity of the electron revolving in the 5 th orbit of hydrogen atom.
$\left(\mathrm{h}=6.6 \times 10^{-34} \mathrm{Js}, \mathrm{m}=9.1 \times 10^{-31} \mathrm{~kg}\right)$
33. Give the applications photocell.
IV.Answer the following questions

5X5=25
34. a) List out the laws of photoelectric effect.
(OR)
b) Give circuit symbol, logical operation, truth table, and Boolean expression of
i) AND gate ii) OR gate iii) NOT gate iv) NAND gate v) NOR gate and vi) EX-OR gate
35. a) Prove that the total energy is conserved during LC oscillations.
(OR)
b) Describe the working of nuclear reactor with a block diagram.
36. a) Derive the equation for refraction at single spherical surface.
(OR)
b) Briefly explain the principle and working of electron microscope.
37. a) Explain the construction and working of a full wave rectifier
(OR)
b) Explain the construction and working of transformer.
38. a) Describe the Fizeau's method to determine the speed of light.
(OR)
b) Explain the J.J. Thomson experiment to determine the specific charge of electron.

