

Tsi12P

Tenkasi District Common Examinations
Common First Revision Examination - January 2023



10-D1-2022

Standard 12

Time: 3.00 hrs

PHYSICS

Marks: 70

Part - I**Answer all the questions.****15×1=15**

- 1) Two coherent monochromatic light beams of intensities I and $4I$ are superposed. The maximum and minisible intensities in the resulting beam are
 a) $5I$ and I b) $5I$ and $3I$ c) $9I$ and I d) $9I$ and $3I$
- 2) What is the angular momentum of an electron in Bohr's hydrogen atom whose energy is -0.544 eV.
 a) $\frac{h}{\pi}$ b) $\frac{2h}{\pi}$ c) $\frac{5h}{2\pi}$ d) $\frac{7h}{2\pi}$
- 3) Three particles having their charges in the ratio of 1:3:5 produce the same spot on the screen in Thomson's experiment. Their masses are in the ratio of
 a) 5:3:1 b) 3:1:5 c) 1:3:5 d) 5:1:3
- 4) An e.m. wave is propagating in a medium with velocity $v = v \hat{i}$. The instantaneous oscillating electric field of this e.m. wave is along $+y$ axis, then the direction of oscillating magnetic field of the e.m. wave will be along
 a) $-y$ direction b) $-x$ direction c) $+z$ direction d) $-z$ direction
- 5) When the current changes from $+2A$ to $-2A$ in 0.05 s, an emf of 8 V is induced in a coil. The coefficient of self-induction of the coil is
 a) 0.2 H b) 0.8 H c) 0.4 H d) 0.1 H
- 6) Three wires of equal lengths are bent in the form of loops. One of the loops is circle, another is a semi-circle and the third one is a square. They are placed in a uniform magnetic field and same electric current is passed through them. Which of the following loop configuration will experience greater torque?
 a) circle b) semi-circle c) square d) all of them
- 7) Two wires of A and B with circular cross section are made up of the same material with equal lengths. suppose $R_A = 3R_B$, then what is the ratio of radius of wire A to that of B?
 a) $\sqrt{3}$ b) 3 c) $1/\sqrt{3}$ d) $1/3$
- 8) If voltage applied on a capacitor is increased from V to $2V$, 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
- 9) The barrier potential of a p-n junction depends on
 i) type of semi conductor material ii) amount of doping iii) temperature
 which one of the following is correct
 a) (i) and (ii) only b) (ii) only c) (ii) and (iii) only d) (i) (ii) and (iii)
- 10) A thin convex lens is placed on a plane mirror. When the object is kept at a distance a from the lens mirror combination its images is formed at a distance $a/3$ in front of the combination. The value of a is
 a) $3f$ b) f c) $2f$ d) $3/2f$
- 11) A Young's double slit experiment uses a monochromatic source. The shape of interference fringes formed on the screen is
 a) hyperbola b) circle c) straight lined d) parabola
- 12) The de Broglie wavelength associated with electron in the $n = 4$ level is
 a) $1/4$ th of the De Broglie wavelength of electron in the ground state
 b) 4 time the De Broglie wavelength of electron in the ground state
 c) 2 time the De Broglie wavelength of electron in the ground state
 d) $1/2$ time the De Broglie wavelength of electron in the ground state
- 13) Kinetic energy vs frequency graph in photo electric emission slope, y intercept respectively
 a) h, ϕ_0 b) $-h, \phi_0$ c) $-h, -\phi_0$ d) $h, -\phi_0$
- 14) What is ratio of circumference of the first 3 Bohr orbit is
 a) 1:2:3 b) 1:4:9 c) 1:9:81 d) 1:1:1

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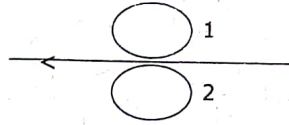
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- 15) A uniform metallic wire has a resistance of 18 ohm and bend into an equilateral triangle then the resistance between any vertices of the triangle is
 a) 4 ohm b) 12 ohm c) 8 ohm d) 2 ohm

Part - II**Answer any 6 questions. (Question No. 24 is compulsory)**

6×2=12

- 16) What are the differences between Coulomb force and gravitational force?
 17) State Fleming's left hand rule.
 18) Using Lenz's law, predict the direction of induced current in conducting rings 1 and 2 when current in the wire is steadily decreasing.



- 19) What are Fraunhofer lines? How are they useful in the identification of elements present in the Sun?
 20) What is the reason for reddish appearance of sky during sunset and sunrise?
 21) State Brewster's law.
 22) Define Curie.
 23) Why were NOR and NAND gates called universal gates?
 24) Calculate the cut-off wavelength and cutoff frequency of x-rays from an x-ray tube of accelerating potential 20,000 V.

Part - III**Answer any 6 questions. (Question No. 33 is compulsory)**

6×3=18

- 25) State and prove De Morgan's first and second theorem.
 26) Discuss the beta decay process with examples.
 27) Derive an expression for de Broglie wavelength of electrons.
 28) An unpolarised light of intensity 32 Wm^{-2} passes through Polaroids such that the axes of the first and the last Polaroids are at 90° . What is the angle between the axes of the first and middle Polaroids so that the emerging light has an intensity of only 3 Wm^{-2} ?
 29) Obtain the equation of lateral displacement of light passing through a glass slab.
 30) Mention the various energy losses in a transformer.
 31) Obtain the expression for energy stored in the parallel plate capacitor.
 32) Obtain the relation between current and drift velocity.
 33) The resistance of a moving coil galvanometer is made twice its original value in order to increase current sensitivity by 50%. Find the percentage change in voltage sensitivity for a parallel plate capacitor.

Part - IV**Answer all the questions.**

5×5=25

- 34) a] Explain in detail the construction and working of a Van de Graaff generator. (OR)
 b] Discuss about the simple microscope and obtain the equations for magnification for near point focusing and normal focusing.
 35) a] Obtain the balancing condition of Wheatstone network. (OR)
 b] Describe briefly Davission - Germer experiment which demonstrated the wave nature of electrons.
 36) a] i) Derive the expression for the force on a current-carrying conductor in a magnetic field.
 ii) A wire of length L carrying a current I along the Y direction is kept in a

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 magnetic field given by $B = \left(\frac{C/\sqrt{3}}{i+j+k} \right) T$. Find the magnitude of Lorentz force acting on the wire. (OR)

- b] Show mathematically that the rotation of a coil in a magnetic field over one rotation induces an alternating emf of one cycle.
 37) a] Write down Maxwell equations in integral form. (OR)
 b] Obtain lens maker's formula.
 38) a] Discuss the spectral series of hydrogen atom. (OR)
 b] Explain the construction and working of a full wave rectifier.