Tsi12P

08-01-25

TENKASI DISTRICT
FIRST PREPARTORY EXAM 2024-2025
12th Standard

Time Allowed 3 hours   **PHYSICS**   maximum Marks :70
PART I   15x1=15

Note: Answer all the questions:

1) If voltage applied on a capacitor is increased from V to 2V, choose the correct confusion
   - 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

2) A toaster operating at 240 V has a resistance of 120Ω. Its power is
   - a) 400 W
   - b) 2 W
   - c) 480W
   - d) 240 W

3) A coil of area of cross section $0.5m^2$ with 10 turns is in a plane which is parallel to an uniform magnetic field of $0.2 Wb/m^2$. The flux through the coil is
   - a) 100wb
   - b) 10wb
   - c) 1wb
   - d) Zero

4) The transverse nature of light is shown in,
   - a) Interference
   - b) Diffraction
   - c) Scattering
   - d) Polarisation

5) The work function of a metal is 6.626×10^{-19} J. The threshold frequency is
   - a) 1×10^{15} Hz
   - b) 10×10^{-19} Hz
   - c) 1×10^{-15} Hz
   - d) 10×10^{19} Hz

6) A non-conducting charged ring carrying a charge of q, mass m and radius r is rotated about its axis with constant angular speed w Find the ratio of its magnetic moment with angular momentum is
   - a) q/m
   - b) 2q/m
   - c) q/2m
   - d) q/4m

7) Stars twinkle due to,
   - a) Reflection
   - b) Total internal reflection
   - c) Refraction
   - d) Polarisation

8) A conductor of length 50cm carrying a current of 5A, is placed preperdicular to a magnetic field of induction 2×10^{-3} T. Find the force of the conductor
   - a) 5×10^{-3} N
   - b) 500 N
   - c) 50 N
   - d) 50×10^{-3} N

9) Emission of electrons by the absorption of heat energy is called_____ Emission.
   - a) Photoelectric
   - b) Field
   - c) Thermionic
   - d) Secondary

10) Which of the following electromagnetic radiations is used for viewing objects through fog
   - a) microwave
   - b) Gamma rays
   - c) X – rays
   - d) Infrared

11) If the value of $\alpha = 0.9$ then $\beta = ?$
   - a) 9
   - b) 90
   - c) 1
   - d) 0.9

12) The ration between the first three orbits of hydrogen atom is
   - a) 1:2:3
   - b) 2:4:6
   - c) 1:4:9
   - d) 1:3:5

13) If the input to the NOT gate is A=1011, its output is?
   - a) 0100
   - b) 1000
   - c) 1100
   - d) 0011

14) Decay constant of radioactive element is 0.0693/day, the Half life period =?
   - a) 10 days
   - b) 14 days
   - c) 140 days
   - d) 1.4 days

15) ' Ski Wax' is an application of nano product in the field of
   - a) Medicine
   - b) Textile
   - c) Sports
   - d) Automotive industry

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PART II

Note: Answer any 6 Questions: (Q.No.24 is compulsory)   6x2=12

16) Define Electric dipole moment . write its unit
17) What is peltier effect?
18) State Biot – Savart's law
19) A 400 mH coil of negligible resistance is connected to an AC circuit in which an effective current of 6 mA is flowing. Find out the inductive reactance of the coil if the frequency is 1000 Hz
20) Give the uses of X – rays
21) What is Snell's window?
22) Mention the difference between interference and diffraction
23) Define work function of a metal. Give its unit
24) The radius of the 5th orbit of hydrogen atom is 13.25 Å calculate the de broglie wavelength of the electron orbiting in the 5th orbit.

PART III

Note: Answer any 6 Questions: (Q.No. 33 is compulsory)   6x3=18

25) Derive an expression for electrostatic potential energy of the diplole in a uniform electric field
26) Mention the applications of solar cell
27) What are the special features of magnetic lorentz force?
28) Derive the expression for self inductance of a long solenoid?
29) Derive the relation between f and R for a spherical mirror?
30) Explain the Hertz experiment?
31) Mention the uses of polaroids
32) Derive the expression for energy of electron using Bohr atom model
33) A battery has an emf of 12V and connected to a resistor of 3Ω. The current in the circuit is 3.93 A. Calculate the terminal voltage and internal resistance of battery.

PART IV

Note: Answer all questions: 5x5=25

34) a) Explain in details the construction and working of a vandegraff generator.
(OR)
b) Discuss the diffraction at Single slit and obtain the condition for nth minimum
35) a) Obtain the condition for bridge balance in wheatstone's bridge?
(OR)
b) Describe the function of transistor as an amplifier with neat circuit diagram
36) a) Derive the expression for the force between two parallel current carrying conductors
(OR)
b) Discuss the spectral series of hydrogen atom

37) a) Describe the Fizeau's method to determine the speed of light
(OR)
b) Explain the construction and working of transformer
38) a) Write down maxwell equations in integral form
(OR)
b) Discuss the characteristic X-ray spectra

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