



19-02-2024

Time: 3.00 Hours

Standard 12
PHYSICS
Part - A

Marks: 70

Answer all the questions.**15x1=15**

- 1) The blueprint for making ultra durable synthetic material is mimicked from
a) Lotus leaf b) Peacock feather c) Morpho butterfly d) parrot fish
- 2) The frequency range of 3 MHz to 30 MHz is used for
a) Ground wave propagation b) skywave propagation
c) space wave propagation d) satellite communication
- 3) Atomic number of H-like atom with ionization potential 122.4V for $n=1$ is
a) 2 b) 1 c) 4 d) 3
- 4) In an electron microscope, the electrons are accelerated by a voltage of 14kV. If the voltage is changed to 224 kV, then the de-Broglie wavelength associated with the electrons would
a) decrease by 4 times b) increase by 2 times
c) increase by 4 times d) decrease by 2 times
- 5) Light transmitted by Nicol Prism is
a) partially polarised b) Unpolarised
c) plane polarised d) elliptically polarised
- 6) The speed of light in an isotropic medium depends on
a) its intensity b) its wavelength
c) the nature of propagation d) the motion of the source w.r.t medium
- 7) The direction of viscous force in Millikan's oil drop experiment is
a) always upwards
b) always downwards
c) opposite to the direction or motion of the oil drop
d) either upwards or downwards
- 8) If the input to the Not gate is $A=1011$ its output is
a) 1000 b) 0100 c) 1100 d) 0011
- 9) 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 remains same
- 10) What is the current -drawn out from the battery?
a) 1 A b) 2 A
c) 3 A d) 4 A



- 11) 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) 45° b) 30° c) 90° d) 60°
- 12) Which of the following electromagnetic radiation's is used for viewing objects through fog?
a) Microwave b) x-rays c) infrared d) gamma rays
- 13) In a step-up transformer the input voltage is 220 V and the output voltage is 11kV. The ratio of number of turns of primary to secondary is
a) 50 : 1 b) 1 : 50 c) 5 : 1 d) 1 : 5
- 14) When the current changes from +2A to - 2A in 0.05s, and emf of 8V is induced in the coil. The co-efficient of self induction of the coil is
a) 0.2H b) 0.4H c) 0.8H d) 0.1H
- 15) The workdone in moving $4\mu\text{C}$ charge from one point to another in an electric field is 0.012J. The potential difference between them is
a) 300 V b) 0.03V c) 30V d) 3000 V

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Part - B

Answer any six questions. Q.No. 24 is compulsory.

6x2=12

- 16) The electric field lines never intersect. Justify
- 17) Define Threshold frequency?
- 18) What do you mean by skip distance?
- 19) Give any two example for "Nano in nature"
- 20) Mention the difference between interference and diffraction.
- 21) If an electric field of magnitude 570NC^{-1} is applied in the copper wire. Find the acceleration experienced by the electron.
- 22) Give the properties of paramagnetic materials
- 23) State Len's law
- 24) Calculate the number of nuclei of carbon. 14 undecayed after 22,930 years. If the initial number of carbon 14 atoms is 10,000. The half life of carbon-14 is 5730 years.

Part - C

Answer any six questions. Q.No. 33 is compulsory.

6x3=18

- 25) Derive the relation between f and R for a spherical mirror.
- 26) Write down the properties of electro magnetic waves.
- 27) Obtain the expression for energy stored in a parallel plate capacitor.
- 28) A monochromatic light of wavelength of 500nm strikes a grating and produces fourth order maximum at an angle of 30° . Find the number of slits per centimeter.
- 29) Important inferences from the average binding energy curve.
- 30) List the applications of LED(Light emitting diode)
- 31) Define seebeck's effect. Explain the applications of seebeck's effect.
- 32) Find the magnetic field due to a long straight conductor using Ampere's circuital law.
- 33) The equation for an alternating current is given by $i = 77 \sin 314t$. Find the peak current, frequency, time period

Part - D

Answer all the questions.

5x5=25

- 34) Define Gauss's law. Obtain the expression for electric field due to an infinitely long charged wire

(OR)

Obtain a relation for the magnetic field at a point along the axis of the circular coil carrying current.

- 35) Explain the working of a single-phase AC generator with necessary diagram

(OR)

Derive the mirror equation and the equation for Lateral magnifications.

- 36) Explain about compound microscope and obtain the equation for magnifications.

(OR)

How the emf of two cells are compound using potentiometer?

- 37) What is meant by absorptions pectrum? Explain the tupe's of absorption spectrum.

(OR)

Explain the basic elements of communication system with the necessary block diagram.

- 38) Explain the J.J.Thomson experiments the specific charge of electron.

(OR)

Obtain Einstein's photoelectric equation with necessary explanation.

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