V12P

Virudhunagar District
Common First Revision Test - January 2024

Standard 12

PHYSICS

Time: 3.00 Hrs. Marks: 70

Part - A

Choose the correct answer: **15×1=15**

1) When an ordinary light passes through Nicol prism, the refractive index of canada balsam layer is equal to
a) 1.658 b) 1.523 c) 1.486 d) 1

2) A photo electric surface is incident with light of frequency 4 times the threshold frequency of the surface, then the maximum velocity of the emitted photoelectrons is
a) $\sqrt{\frac{h\gamma_0}{m}}$ b) $2\sqrt{\frac{h\gamma_0}{m}}$ c) $\sqrt{\frac{h\gamma_0}{2m}}$ d) $\sqrt{\frac{6h\gamma_0}{m}}$

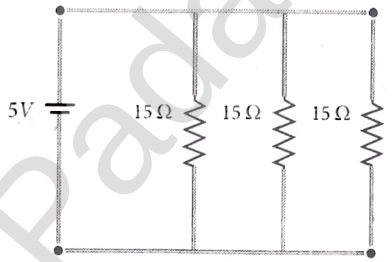
3) Colour of the sky seen by an astranout in space is
a) violet b) white c) black d) blue

4) If the nuclear radius of ^{27}Al is 3.6 fermi, the approximate nuclear radius of ^{64}Cu in fermi is
a) 2.4 fermi b) 1.2 fermi c) 4.8 fermi d) 3.6 fermi

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

6) An electric dipole is placed at an alignment angle of 30° with the electric field of 2×10^5 NC^{-1}. It experiences a torque equal to 8 Nm. The charge on the dipole if the dipole length is 1 cm is
a) 4 mC b) 8 mC c) 5 mC d) 7 mC

7) What is the current drawn out from the battery?



a) 1A b) 2A c) 3A d) 4A

8) A particle having mass m and charge q is accelerated through a potential difference V. Find the force experienced when it is kept under perpendicular magnetic field B.
a) $\sqrt{\frac{2q^3BV}{m}}$ b) $\sqrt{\frac{q^3B^2V}{m}}$ c) $\sqrt{\frac{2q^3B^2V}{m}}$ d) $\sqrt{\frac{2q^3BV}{m^3}}$

9) The ratio of power factor of an A.C. circuit with 'R' and RLC series circuit under resonance is
a) zero b) +1 c) −1 d) infinity

10) If the amplitude of electric field is 900 Vm^{-1}, then the amplitude of manetic field for a electromagnetic wave is
a) 100T b) 300T c) 3×10^{-6} T d) 6×10^{-6} T

11) The materials used in Robotics are
a) Silver and Gold b) Copper and Gold
c) Steel and Aluminium d) Aluminium and Steel

12) In photo electric effect, the kinetic energy of emitted photo electron depends on
a) intensity of radiation
b) frequency of radiation
c) nature of metal surface
d) both frequency of radiation and nature of metal surface

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13) Two plates of parallel plate capacitor of side 2 cm is separated by 1mm. The capacitance of the capacitor is
a) 3.54 pF b) 8.85 pF c) 1 μF d) 3.54 μF

14) An aeroplane moves along the runway and takes off at 45° with horizontal where the magnetic field is 4×10^{-5} T. If the velocity is 20 m/s and the distance between the wings is 20m, the induced emf is
a) 16v b) 16 mv c) zero d) 16 μv

15) The half life of a free neutron is
a) 13 seconds b) 10^{-14} seconds c) 10.1 minutes d) 13 minutes

Part - B

Answer any six questions. Question No. 24 is compulsory: **6×2=12**

16) State Malus law in polarisation.
17) Define cutoff potential.
18) Write any two drawbacks of Bohr atom model.
19) Current gain of a transistor in common base mode is $\alpha = 0.95$, $I_E = 1mA$, find the value of I_C and I_B.
20) State Gauss law in electrostatics.
21) A bar magnet aligned at 30° with a uniform magnetic field 0.8T experiences torque of 0.2Nm. Calculate the magnetic moment of the bar magnet.
22) What is A.C generator? Mention its principle.
23) Write any two properties of electromagnetic waves.
24) Resistance of Nichrome wire at 20°C is 10Ω. The temperature coefficient of resistance is 0.004/c°, calculate the resistance of wire at the boiling point of water.

Part - C

Answer any six questions. Question No. 33 is compulsory: **6×3=18**

25) Obtain an expression for electric potential at a point due to a point charge.
26) State and explain Kirchoff's voltage law.
27) Derive the equation for emf induced due to change in area enclosed by a coil in uniform magnetic field.
28) What is absorption spectrum? Describe the line absorption spectrum.
29) A car of mass 4000 kg moves with a velocity of 50 m/s on road. Calculate the momentum and Debroglie wavelength.
30) Derive the relation between f and R of a spherical mirror.
31) Write the differences between Fresnel and Frawnhofer diffraction of light.
32) List out the advantages and limitations of Amplitude modulation.
33) Calculate the value of angular momentum and velocity of an electron revolving in the 5th orbit of Hydrogen atom.

Part - D

Answer all the questions in detail: **5×5=25**

34) a) Derive an expression for electric potential at any point due to an electric dipole.
(OR)
b) Explain the phenomenon of reflection of light using Huygen's principle.

35) a) Derive an equation for dispersive power of material of prism.
(OR)
b) Obtain the expression for balancing condition in Wheatstone's bridge.

36) a) Derive an expression for force between two parallel conductors carrying current.
(OR)
b) Explain β^- and β^+ decay in Radio activity.

37) a) Describe the construction and working of a fullwave rectifier.
(OR)
b) Describe the principle, construction and working of a transformer.

38) a) Explain the modification in Ampere's circuital law by Maxwell - obtain the equation also.
(OR)
b) What is photoelectric effect? State the laws of photoelectric effect.
