



Standard - 12

PHYSICS

Maximum Marks: 70

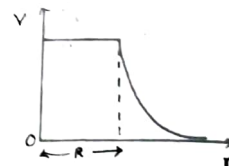
Time: 3.00 Hours

Part - A

Choose the correct answer:

15 × 1 = 15

- In an oscillator a charged particle is accelerated so that it oscillates with a frequency of 30 MHz, then the wavelength of electromagnetic wave produced is
a) 1 m b) 10 m c) 100 m d) 1000 m
- In any transistor the collector region is
a) smaller than base and emitter region b) highly doped than emitter region
c) larger than emitter region and doped moderately
d) none of the above
- In an A.C. circuit the current and voltage are given as $i = \frac{1}{\sqrt{2}} \sin(100\pi t)A$ and $v = \frac{1}{\sqrt{2}} \sin(100\pi t + \frac{\pi}{3})V$, then the power dissipated in the circuit is
a) $\frac{1}{4}$ b) $\frac{\sqrt{3}}{4}$ c) $\frac{1}{2}$ d) $\frac{1}{8}$
- The ionisation potential of an atom corresponds to $n = 1$ orbit is 122.4 v, then the atomic number is
a) 1 b) 2 c) 3 d) 4
- A magnet of dipole moment $\vec{P}_m = (-0.5\vec{i} + 0.4\vec{j})Am^2$ is placed in uniform magnetic field $\vec{B} = 0.2\vec{i}T$, the potential energy is
a) -0.1 J b) -0.8 J c) 0.1 J d) 0.8 J
- Electrons are emitted in X-ray tube by the method of
a) photoelectric emission b) field emission
c) thermionic emission d) secondary emission
- Light when passed through a Nicol prism, will be
a) partially polarised b) unpolarised
c) elliptically polarised d) completely polarised
- A carbon resistor is marked with coloured rings as brown-black-yellow. The value of resistance is
a) 100 K Ω b) 10 K Ω c) 1 K Ω d) 1000 K Ω
- The twinkling of stars is due to
a) reflection of light b) total internal reflection of light
c) refraction of light d) polarisation of light
- The graph V-r shows the variation of
a) electrostatic potential due to a spherical shell with charge Q and Radius R.
b) electrostatic potential due to straight conductor carrying charge
c) electric field due to infinite plane sheet of charge
d) electric field due to a point charge
- An example for non-polar molecule is
a) N₂O b) H₂O c) CO₂ d) NH₃
- An electric filament bulb is marked with rating as 220 V, 100 w. If the bulb is connected to 110 v supply, the power is
a) 50 w b) 25 w c) 200 w d) 173.2 w
- Which one of the following is the natural nanomaterial?
a) Peacock feather b) Peacock beak
c) grain of sand d) skin of the whale
- Current passing through a coil varies from +2A to -2A in 0.05 second induces an emf of 8V. The self inductance of the coil is
a) 0.2 H b) 0.4 H c) 0.8 H d) 0.1 H
- The radius of ⁶⁴Cu nucleus is
a) 2.4 Fermi b) 1.2 Fermi c) 4.8 Fermi d) 3.6 Fermi



V12P

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Part - B

Answer any six questions. Question no 24 is compulsory:

6×2=12

- 16) What is total internal reflection of light?
- 17) Define threshold frequency.
- 18) State De Morgan's First and Second Theorem.
- 19) Write the uses of Infra red radiation.
- 20) A stepdown transformer decreases the alternating voltage from 220V to 11 V and current increases from 6A to 100 A. Calculate the efficiency.
- 21) Define electric flux.
- 22) Calculate the magnetic field produced at a point 1 m from a straight conductor carrying 1 A current.
- 23) State Brewster's law in polarisation.
- 24) The mass of ${}^7_3\text{Li}$ nucleus is found to be less than the total mass of constituent nucleons by 0.042u. Calculate the $\frac{BE}{A}$ of ${}^7_3\text{Li}$ nucleus.

Part - C

Answer any six question. Question no 33 is compulsory:

6×3=18

- 25) Derive an expression for effective capacitance when capacitors are connected in series.
- 26) Explain how will you convert the galvanometer into an ammeter.
- 27) What is displacement current? Obtain an expression for it.
- 28) A biconvex lens is made of a material of refractive index 1.5. The radii of curvature of the surfaces of the lens are 20 cm and 15 cm, calculate the focal length of the lens.
- 29) Write the uses of polaroids.
- 30) Derive an equation for DeBroglie's wave length.
- 31) A silicon diode is connected with 1 KΩ resistance as shown in the circuit. Calculate the current between A and B.



- 32) Describe the method of inducing emf by changing the area enclosed by a coil. Obtain the equation for it.
- 33) A cell supplies a current of 0.9 A when connected to 2Ω resistance and supplies a current of 0.3 A when connected to resistance of 7Ω, calculate the internal resistance of the cell.

Part - D

Answer the following questions in detail:

5×5=25

- 34) a] Derive an expression for electric field at a point along the equatorial position of an electric dipole. (OR)
- b] Obtain the equation for fringe width in Young's double experiment on interference of light.
- 35) a] Derive an equation for law of radioactive disintegration. (OR)
- b] Describe the construction and working of Cyclotron.
- 36) a] Apply Kirchoff's laws to obtain the balancing condition of Wheatstone's bridge. (OR)
- b] Explain how a transistor act as an amplifier with a circuit diagram.
- 37) a] Obtain the equation for phase angle between current and voltage in RLC series circuit. (OR)
- b] Explain the photoelectric effect by Einstein's theory. Obtain Einstein's photo electric equation.
- 38) a] Derive the mirror equation. Hence calculate the magnification also. (OR)
- b] Describe the types of an emission spectrum.

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