

- 12) If the wavelength of the light is reduced to one fourth, then the amount of scattering is
 a) increased by 16 times b) decreased by 16 times
 c) increased by 256 times d) decreased by 256 times
- 13) Phase between the electric field and the magnetic field of an electromagnetic wave is
 a) 0 b) $\pi/4$ c) $\pi/2$ d) π
- 14) Strength of scattering depends on
 a) Wavelength of light b) size of the particle
 c) both (a) and (b) d) velocity of light
- 15) The speed of light in glass is
 a) same as in air b) greater than the speed in air
 c) less than the speed in air d) less than the speed of sound in air
- 16) A Coolidge tube operates at 24800V. The maximum frequency of X radiation emitted from Coolidge tube is
 a) 6×10^{18} Hz b) 3×10^{18} Hz c) 6×10^8 Hz d) 3×10^8 Hz
- 17) The chromium ions doped in the ruby rod
 a) Absorbs red light b) absorbs green light
 c) absorbs blue light d) emits green light
- 18) The size of an atom from Rutherford experiment is
 a) 10^{-10} m b) 10^{-16} m c) 10^{-14} m d) 10^{-12} m
- 19) For the first order X-ray diffraction, the wavelength of the X-ray is equal to the lattice spacing at a glancing angle of
 a) 15° b) 60° c) 45° d) 30°
- 20) At the threshold frequency, the velocity of the electrons is
 a) zero b) maximum c) minimum d) infinite
- 21) The rest mass of photon is
 a) $h\nu$ b) $h\nu/C$ c) $C/h\nu$ d) zero
- 22) Isotopes have
 a) Same mass number but different atomic number
 b) Same proton number and neutron number
 c) Same proton number but different neutron number
 d) Same neutron number but different proton number
- 23) The time taken by the radioactive element to reduce to $1/e$ times is
 a) half life b) mean life c) half life/2 d) twice the mean life
- 24) Anemia can be diagnosed by
 a) $_{15}P^{31}$ b) $_{15}P^{32}$ c) $_{26}Fe^{59}$ d) $_{11}Na^{24}$
- 25) An atom has 108 protons and 108 neutrons. The diameter of the nucleus is
 a) 12.4 F b) 15.6 F c) 3.9 F d) 7.8 F
- 26) The colour of light emitted by a LED depends on
 a) its reverse bias b) the amount of forward current
 c) its forward bias d) type of semiconductor material
- 27) Forbidden energy gap for semiconductors like Ge and Si are respectively
 a) 1.1 eV and 0.7 eV b) 0.7 eV and 1.1 eV
 c) 11 eV and 0.7 eV d) 1.1 eV and 7 eV

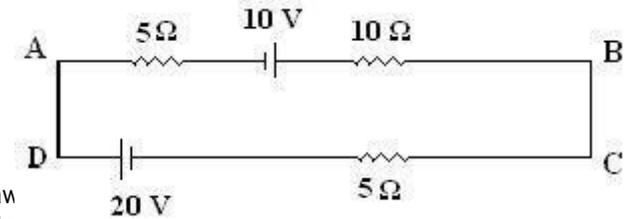
- 28) In the forward bias characteristic curve, a diode appears as
 a) a high resistance b) a capacitor c) an OFF switch d) an ON switch
- 29) High frequency waves follow
 a) The ground wave propagation b) the line of sight direction
 c) ionospheric propagation d) the curvature of the earth
- 30) The first man made satellite is
 a) Aryabhata b) Sputnik c) Vennila d) Rohini

Part – II

Note : Answer any fifteen questions.

(15 X 03 = 45)

- 31) Define one coulomb
 32) Define electric field intensity. Give its unit
 33) Name three changes observed in transition temperature
 34) Find the magnitude and direction of the current in the following circuit



- 35) State Ohm's law
 36) State tangent law
 37) What is inductive reactance? Give its unit.
 38) An aircraft having a wing span of 20.48 m flies due north at a speed of 40 ms^{-1} . If the vertical component of earth's magnetic field at the place is $2 \times 10^{-5} \text{ T}$, calculate the e.m.f. induced between the ends of the wings.
 39) On what factors the amounts of optical rotation depend on?
 40) Give the conditions for sustained interference.
 41) The minimum wavelength of X-rays produced from a Coolidge tube is 0.05 nm. Find the operating voltage of the Coolidge tube.
 42) State Moseley's law
 43) Define threshold frequency.
 44) What are isotones? Give examples
 45) The radioactive isotope $_{84}\text{Po}^{214}$ undergoes a successive disintegration of two α -decays and two β -decays. Find the atomic number and mass number of the resulting isotope.
 46) Why CE configuration is preferred over CB configuration for operating transistor as an amplifier?
 47) State De Morgan's theorems.
 48) Draw the circuit for NOT gate using transistor.
 49) When there is no feedback the gain of the amplifier is 100. If 5% of the output voltage is feedback into the input through a negative feedback network, find out the voltage gain after feedback.
 50) What are the advantages of frequency modulation?