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| Text  Description automatically generated  **PB2/PHEEEAK/1222/B 16-JAN-2023**  **EEE CONSORTIUM**  **PRE BOARD EXAMINATION(2022 -2023)**  **PHYSICS (MARKING SCHEME)** |

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| Q.No |  | Marks | Total |
|  | (i) | 1 | 1 |
|  | (i) 72 V | 1 | 1 |
|  | (i) 40 Ω | 1 | 1 |
|  | (i) A | 1 | 1 |
|  | (iii) 3.2 x 10-25s Am2 | 1 | 1 |
|  | (ii) 50 µV | 1 | 1 |
|  | (iv) D | 1 | 1 |
|  | (iii) become infinite | 1 | 1 |
|  | (ii) Diffraction fringes become narrower and crowded. | 1 | 1 |
|  | (iv) Linear Momentum | 1 | 1 |
|  | (i) Infrared region | 1 | 1 |
|  | (i) binding energy per nucleon increases | 1 | 1 |
|  | (i) there will not be a steady current in the circuit | 1 | 1 |
|  | (ii) 1.23 Å | 1 | 1 |
| 15. | (i) aluminium | 1 | 1 |
| 16. | d) A is false and R is also false. | 1 | 1 |
| 17. | a) Both A and R are true and R is the correct explanation of A. | 1 | 1 |
| 18. | c) A is true but R is false. | 1 | 1 |
| 19. | B==  = 1.9×10-4 T into the plane of paper.  OR   B= =  =2×10-5 T downward in the vertical plane | 1  1  OR  1  1 | 2 |
| 20. | solution | 1  1 | 2 |
| 21. | i) An oscillating charge produces an oscillating electric field in space, which produces an oscillating magnetic field. The oscillating electric and magnetic fields regenerate each other, and this results in the production of em waves in space.  (ii) Electric field is along x−axis and magnetic fie  In what way is the directions of the electric and magnetic field vectors  representing an electromagnetic wave related to each other | 1  1 | 2 |
| 22. | Here  Sin ic = 1 /  ic = 450  According to question, i = 300  hence TIR will not take place  solution  Light ray will emerge from face AC. | 1  1 | 2 |
| 2  23 | For metal B stopping potential will be more as photo electrons ejected from the surface of metal B will have more kinetic energy.  OR  According to Einstein’s photo electric equation  h  (i) The increase in frequency of incident radiation has no effect on photoelectric current. This is because of incident photon of increased energy cannot eject more than one electron from the metal surface.  (ii) With the increase in frequency, the K.E. of the photoelectron increases, so stopping potential also increases. | 1  1  OR  1  1 | 2 |
| 24 | The peaks of graph are possible only when we believe shells are present in  nucleus why fusion graph between mass no And binding energy per nucleon  vu20l477 -Nuclear Physics - TopperLearning.com  Deduct 1 mark for not marking the fusion and fission regions. | 2 | 2 |
| 2  25. | Material X is p-type and material Y is n-type.  (i) The junction is reverse biased.  (ii) For the V-l graph  Class 12 Physics Important Questions Chapter 14 Semiconductor Electronics 2 | 1  1 | 2 |
| 26 | (i) Dipole moment p = q x 2d = 0.64 x 10 – 6 Cm  (ii) E =  = 5 x 10 5 NC – 1  OR  E = kq/r2  Enet  = E1 – E2 = 7.2 x 10 15 NC – 1  Towards + 0.2 C charge. | 1  1  1  OR  1  1  1 | 3  OR  3 |
| 27 |  | ½  ½  1  1 | 3 |
| 28 | Given d = 1 mm = 10-3 m, λ = 600 nm = 6 × 10-7 m, For first order maxima d sin θ = n λ or sin θ = nλd = 6 × 10-4 Now for minima we have d sin θ = (2n+1 )λ/2  For third-order minima we have n = 3 Therefore we have  sin θ = (2 × 3 + 1)λ/2d = 7λ/2d = 21 × 10-4  Therefore, angular separation is θmin – θmax = 15 x 10 – 4 | 1  1  1 | 3 |
| 29 | (A) total number of spectral lines emitted = 3  graphics for cbse-q27 page 1  (B) Since n = 3 to n = 1 has highest energy emitted and we know that the one with higher energy emitted has shorter wavelength. Therefore, shortest wavelength will be emitted in n = 3 to n = 1 spectral line.  OR  (A) When an electron makes a transition from one of its non-radiating orbits to another of lower energy, a photon is emitted having energy equal to the energy difference between the two states. The frequency of the emitted photon is then  E2 – E1 = hf  (B) number of spectral lines =  n2 = 4 and n1 = 1 hence number of spectral lines = 6  These lines belong to Lyman, Balmer and Paschen series. | 1  1  1  u  OR  1  1  1 | 3 |
| 30 | (A)  Write the two processes that take place in the formation of a p-n junction.  Explain with the help of a diagram, the formation of the depletion region  and barrier potential in a  the formation of p - n junction, the holes from p-region diffuse into the n-region and electrons from n-region diffuse into p-region and electron hole pair combine and get annihilated. This in turn, produces potential barrier VB across the junction which opposes the further diffusion through the junction. Thus, small region forms in the vicinity of i the junction which is depleted of free charge carrier and has only immobile ions is called the depletion region.  (B) In forward bias width of depletion region decreases and in reverse bias width of depletion region increases. | 1  1  1 | 3 |
| 31 | i) The electric potential at a point is the amount of work done to move a unit positive charge from an infinitely long distance to that point. The SI unit of electric potential is **volt (V)**  ii) Consider a system of three point charges q1​, q2​ and q3​. Such that q2​ and q3​ are initially at infinite distance from the charge q1​, Work done to bringing the charge q2​ from infinity to point B    iii  **OR**   1. It is an [electrical insulator](https://en.wikipedia.org/wiki/Insulator_(electricity)) that can be [polarised](https://en.wikipedia.org/wiki/Polarisability" \o "Polarisability) by an applied [electric field](https://en.wikipedia.org/wiki/Electric_field). 2. The electric field between the plates of parallel plate capacitor is directly proportional to capacitance C of the capacitor. The strength of the electric field is reduced due to the presence of dielectric. If the total charge on the plates is kept constant, then the potential difference is reduced across the capacitor plates. In this way, dielectric increases the capacitance of the capacitor. | 1  1  1  1  1  OR  1  1  1  1  1 | 5 |
| 32 | (A)        (B) As power factor is unity  R = Z  capacitance C =  C = 50 µF  OR  solution  It works on the principle of Faraday’s law of electromagnetic induction. Whenever a coil is rotated in a uniform magnetic field about an axis perpendicular to the field, the magnetic flux linked with coil changes and an induced emf is set up across its ends.  (B)  Flux in coil =  induced emf = E =  E = | 1  1  1  1  1  OR  2  1  1  1 | 5 |
| 33 | (A)  Two thin convex lens L1 and L2 of focal lengths f1 and f2 respectively,are  placed coaxially in contact An - Physics - Ray Optics And Optical  Instruments - 10695119 | Meritnation.comTwo thin convex lens L1 and L2 of focal lengths f1 and f2 respectively,are  placed coaxially in contact An - Physics - Ray Optics And Optical  Instruments - 10695119 | Meritnation.com  (B) Power of the combination,  P = P1 + P2= 15 + (-5) = 10D  Therefore, focal length of the combination,  f = 10 cm  Now u = - 30 cm  v = = 15 cm  **OR**  (A)  a) Draw ray diagram of refraction of light through a prism and explain the  phenomenon of dispersion of light.(b) Write the formula for lens power and  define its unit.  (Deduct ½ mark for each angle missing in the diagram)  Relation,  (B)  =  v = 2.12 x 108 m/s | 1  1  1  1  1  OR  2  1  1  1 | 5 |
| 34 | i) The working of a Wheatstone bridge is based on the principle of null deflection, which means that the ratio of their resistances is equal, and no current flows through the circuit.ii) Relative magnitude of resistance in four arms, relative positions of battery and galvanometeriii) Reff ​= 40×120/​120+40=30Ω  I=7V/ (30+5)Ω =0.2A OR  P/Q=200/20 = 10  R/S= 400/40 = 10  Hence it satisfies the null condition that is, P/Q = R/S  ∴ Current in the resistance P = current in the resistance VAB/(P+Q)  That is, 1.5/ (200+20) = 0.0681A  Again, current in the resistance R = current in the resistance VAB/(R+S)  That is, 1.5/ (400+40) = 0.0340A | 1  1  1  1  OR  1  1 | 4 |
| 35 | (i) Wavelength reduces but frequency remains same.  (ii) phase difference = 0  (iii)  sin r =  OR  (iii) | 1  1  1  1  OR  1  1 | 4 |

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