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| **HY/PHAK/1220A 04/11/2020** | | | |
| **HALF YEARLY PAPER EXAMINATION (2020-21)** | | | |
| **Subject: PHYSICS**  **Grade: XII** | | Max. Marks:70Time:3 Hours | |
|  | SECTION A | |  |
|  | 1. DE 2. AB | |  |
|  | P | |  |
|  | Formula ------------------------------------- ½  1:1--------------------------------------------------- ½ | |  |
|  | Vector form expression | |  |
|  | µ0nI ---------------------------------1/2  zero ------------------------------1/2  OR  STATEMENT ----------------------1 | |  |
|  | Magnetic lines of force form continuous closed loops because a magnet is always a dipole and as a result, the net magnetic flux of a magnet is always zero. | |  |
|  | Minus x axis | |  |
|  | UV rays  X rays | |  |
|  | Zero --------------------------------------------1/2  Any suitable answer --------------------------1/2  OR  FORMULA ------------------1/2   0.0414 nm----------------1/2 | |  |
|  | 45 degree | |  |
|  | b | |  |
|  | a | |  |
|  | d | |  |
|  | a | |  |
|  | 1. Light cannot easily escape from fibre without multiple internal reflections. This is because:  a) Its critical angle with reference to outer covering is too large  b) Its critical angle with reference to outer covering is too small  c) The fibre is transparent  d) Rays always enter at angle greater than critical angle  2. The ratio of refractive indices of core and cladding must be  a) greater than one  b) less than one  c) equal to one  d) doesn’t make any difference  3. The basic reason for preferring optical fibres over copper cable  a) optical fibres are cheaper  b) optical fibres can easily bend  c) loss of intensity of the signal is almost negligible  d) electricity is not used at all  4. The index of refraction of transparent material is 1.4. The critical angle for total internal reflection, at a b-air interface, is nearly equal to:  A) 30°  B) 45°  C) 60°  D) 22°  5. Select another natural phenomenon which works on the same principle  a) swimming pool appears less deep  b) dispersion of light  c) mirage  d) brightness of full moon | |  |
|  | 1. Diffraction effects show that light does not travel straight lines. Under what condition the concepts of ray optics are valid. ( D = distance of screen from the slit) 2. D < Z f 3. D = Z f 4. D > Z f ( 5. D <<Z f 6. In the phenomena of Diffraction of light when the violet light is used in the experiment is used instead of red light then 7. Fringe width increases 8. No change in fridge width 9. Fringe width decreases 10. Colour pattern is formed 11. The wave-front due to source situated at the infinity is 12. Spherical 13. Plane 14. Cylindrical 15. Rectangular 16. A slit of width a is illuminated by white light. For red light (λ = 6500 Å) . The first minima is obtained at o θ = 30 degree . Then the value of a will be 17. 3250 Å 18. 4 6.5 x 10-4 mm 19. 1.3 micrometer 20. 2.5x10-4 cm 21. Diffraction aspect is easier to notice in case of the sound waves then in case of the light waves because sound waves 22. Have longer wavelength 23. Shorter wavelength 24. Longitudinal wave 25. Transverse waves | |  |
|  | Each Graph ----------------------------------1MARK  2 GRAPHS ----------------------------2 MARKS | |  |
|  | 1. λ= h/p   electron energy = h2/2mλ2  photon energy = hc/λ  electron energy / photon energy = 2mcλ/h  OR | |  |
|  | OR    DIRECTION 45 DEGREE | |  |
|  | Correct direction of E and B ---------------------------1  FIG ----------------------------------------------------1 | |  |
|  | Focal length of the convex lens, *f* = 20 cm  Image distance = *v*  According to the lens formula, we have the relation:  http://img1.mnimgs.com/img/curr/1/12/16/253/7319/NS_3-11-08_Sravana_12_Physics_9_38_NRJ_LVN_html_5a5195e7.gif  Hence, the image is formed 7.5 cm away from the lens, toward its right. | |  |
|  | **refractive index of prism =**μg **= 1.5** **as you can see that, light rays graze along face BC ,when the angle of incident is i is equal to the critical angle for the glass and liquid interface,** **now,**μl × sin90° = μg × sini μl = 1.5 × sin60° = 1.5 ×√3/2 = 1.2975   hence, refractive index of liquid is 1.2975 ≈ 1.3 | |  |
|  |  | |  |
|  | **--------------------------------------------------------------------1/2+1/2+1/2**  **fig -------------------------------------1/2**  **OR** | |  |
|  | Curves 1 and 2 correspond to similar materials while curves 3 and 4 represent different materials, since the value of stopping potential for the pair of curves (1 and 2) and (3 and 4) are the same. For given frequency of the incident radiation, the stopping potential is independent of its intensity.  So, the pairs of curves (1 and 3) and (2 and 4) correspond to different materials but same intensity of incident radiation. | |  |
|  | Section -D  All questions are compulsory. In case of internal choices, attempt any one. | |  |
|  | * 4i1+3i2=12 * 2i3-3i2=-8 * I1=i2+i3 * I2=28/13A * I1=18/13A * I3=-10/13A | |  |
|  | 1. i) behaves as a concave lens   ii) behaves as convex lens            OR  Fig --------------------1/2  Introduction --------1/2 | |  |
|  | The three characteristic features which can't be explained by wave theory are :   1. Kinetic energy of emitted electrons are found to be independent of intensity of incident light. 2. Below a certain frequency (threshold) there is no photoemission. 3. Spontaneous emission of photoelectrons.   OR  Einstein’s photoelectric equation -----------------------------1/2  Slope---------------------------------------------------------------1/2  ----------------------2 | |  |
|  | G= 12Ω, Ig = 2.5 mA, I =7.5 A-------------------------------------------------------1/2  S=IGG/(I-IG)-----------------------------------------------------------------------------1/2  0.004ohms ------------------------------------------------------------------------------1/2  Circuit diagram with S in parallel to G---------------------------------------------------1 | |  |
|  |  | | 1  1  1 |
|  | **Section – E**  **All questions are compulsory. In case of internal choices, attempt any one.** | |  |
|  | **STATEMENT AND PROOF ---------------------------------------3**The purpose of using the high resistance of 600 kΩ is to reduce the current through the galvanometer when the movable contact is far from the balance point. the balance point is not affected by the presence of high resistance.The method would not work , This is because if the emf of the driver cell of the potentiometer is less than the emf of the other cell, then there would be no balance point on the wire. OR  WHEATSTONE BRIDGE statement and proof ---------------------------3  ---------------------2 | |  |
|  | --------------------2  -----------------3 | |  |
|  | OR  FRINGE WIDTH DERIVATION  LABELLED FIG ------------------------------1  PROOF ------------------------------------------1.5  FINAL EXPRESSION -----------------------0.5    -----------------------------------------2 | |  |

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