**INDIAN SCHOOL AL WADI AL KABIR**

**FIRST PRELIMINARY EXAM 2020- ‘21**

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| Sr.No. | **MARKING SCHEME** | Marks |
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| **Section – A****All questions are compulsory. In case of internal choices, attempt any one of them.**  |

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| [1] | [magnetic flux] | 1 |
| [2] | [microwave]**OR** C = 1 √ µoεo | 1 |
| [3] |  qE = qVB or V = $\frac{E}{B}$ | 1 |
| [4] | Vd1 = 4Vd **OR**Manganin  | 1 |
| [5] | The ground state energy of hydrogen atom is – 13.6 eV. What are the kinetic and potential energies of the electron in this state?   K.E = 13.6 eV and P.E =-27.2Ev | ½ + 1/2 |
| [6] |  α  | 1 |
| [7] |  1.227Ao | 1 |
| [8] | brightness decreases **OR**Zero  | 1 |
| [9] | [Violet] | 1 |
| [10] |  L1- objective , L3- eye piece **OR**[ii] I = a2  | ½ + 1/2 |
| [11] | [A] | 1 |
| [12] |  [C] | 1 |
| [13] | [A] | 1 |
| [14] | [C] | 1 |
| [15] | [1] b angle of incidence is greater than critical angle[2]b more than the refractive index of cladding[3]a There is no loss of intensity of light in reflecting prism[4]a 1.05[5]a 280 | 4 |
| [16] | [1] [c] A hollow metal box[2] [b] electrostatic shielding[3] [d] electric field, E = 0, Potential V = constant[4] [b]$ \frac{-q}{4πr\_{1}^{2}}$[5] [c]$ \frac{Q+q}{4πr\_{2}^{2}}$ | 4 |
| [17] | A charged particle having a charge of 2nC moving in a magnetic field B with a velocity $\vec{v}$ = $10^{5}\hat{i}$ m/s experiences a magnetic force $\vec{F}$ = $2 x 10^{5} [-\hat{j]}$ N . Find the direction and magnitude of the magnetic field. ---- [1/2]2 x 10-5 –j = q[105 I x B] ------[1/2]B is acting along the + z axis ----[1/2]F = qVB sinθ [½] Or B = 0.1T ---[1/2] | 2 |
| [18] | [a] no change [1]For writing the formula alone and final answer is wrong θ = $\frac{β}{d}$ or $\frac{λ}{d}$ [1/2][b] no change [1]**OR**[a] definition of wave front [1][b][1/2 + ½] | 2 |
| [19] |  Derivation capacitorFigure [1/2] steps [1/2 + ½]final expression [1/2] any one expression**OR**[a] Definition equipotential surface [1][b] Potential is inversely proportional to the distance[1] | 2 |
| [20] |  | 2 |
| [21] |  Total path difference = $\frac{xd}{D}+ \frac{λ}{4}$ [1/2]For constructive interference $\frac{xd}{D}+ \frac{λ}{4}$ = n λ ---[1/2]or x = [ n -$ \frac{1}{4}$ ]$ \frac{Dλ}{d}$ [1/2]X1 = [1 -$ \frac{1}{ 4}$ ]$ \frac{Dλ}{d}$ = $ \frac{3Dλ}{4d}$X2 = [2 -$ \frac{1}{4}$ ]$ \frac{Dλ}{d}$ = $\frac{7Dλ}{4d}$X2 – X1 = $\frac{Dλ}{d}$ = $β$ [1/2] | 2 |
| [22] | BH = BE cosI [1/2]0.4 x 10-4 = BE cos60or BE = 0.8 x 10-4T[ ½ + ½ + 1/2]**OR**[a] Definition angle of dip [1/2][b]Figure [1/2]Step [1/2]Tan I = $\frac{BV}{BH}$ [1/2]  | 2 |
| [23] | [1]As reflecting telescope has mirror objective, the image formed is free from chromaticaberration. [1] | 2 |
| [24] | [a] labelled diagram of moving coil galvanometer[ ½ + ½ + ½][b] significance of radial magnetic field - linear scale [1/2] | 2 |
| [25] |  [i] principle [1/2][ii] [½ + ½ + ½] | 2 |
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| [26] | E1 = $-\frac{d∅}{dt}$ or $-\frac{dBA}{dt}$ or $-A[\frac{1-0}{2-0}$] –[1/2] E1 = - [2.25 x 10-2  ]volt [1/2]E2 = $-\frac{d∅}{dt}$ or $-\frac{dBA}{dt}$ or $-A[\frac{1-1}{4-2}$] [1/2] = 0 volt [1/2]E3 = $-\frac{d∅}{dt}$ or $-\frac{dBA}{dt}$ or $-A[\frac{0-1}{6-4}$] [1/2]E3 = 2.25 x 10-2  v [1/2] | 3 |
| [27] | [a] E = $\{\frac{E1}{r1}+\frac{E2}{r2}$} x$ \frac{r1r2}{r1+r2}$ [1/2+ ½} = 1.7V [1/2] r = $\frac{r1r2}{r1+r2}$ [ ½ + ½] = 0.12 ohm [1/2]**OR**[i] diagram [1/2]Steps [1/2 + ½ + ½]]Final result [1/2][ii] zero temp. coefficient of resistance [1/2] | 3 |
| [28] | [1][1/2 + ½]][1/2 + ½]**OR**[a] Definition ‘threshold frequency’ [1] | 3 |
| [29] | Diagram [1/2]Steps [1/2 + ½ + ½ + ½]final answer [1/2] | 3 |
| [30] | [a]Labelled diagram [1/2]Electromagnetic induction / mutual induction [1/2]Working[1/2][b]steps [1/2+ 1/2]Final result [1/2]  | 3 |
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| [31] | Diagram [1/2 + ½]Steps [1/2 + ½ + ½ + ½ +1/2 +1/2 + ½]final answer [1/2] **OR**[a] Diagram [1/2 + ½]Steps [1/2 + ½ + ½ + ½] final answer [1/2 + ½]] [b] Graph [1/2]These become weaker with increasing n, since only one- fifth, one-seventh, etc. of the slit contributes the intensity[1/2] | 5 |
| [32] | basic principle [1/2]derivation steps = ½ + ½ + ½]labelled diagram – [1/2 + ½]working – [½ + ½ + ½ + 1/2]]OR[a] impedance [1/2]Circuit diagram [1/2]phasor diagram [1/2]derivation steps [ ½ + 12 + ½ + 1/2]final result [1/2][c] expression for phase angle ‘Ф’Step [1/2]Final result [1/2] | 5 |
| [33] | Diagram [1/2 + ½]Steps [1/2 + ½ + ½ ] final answer [1/2 + ½]]F1= 2 x 10-8 x 3.6 x 108  = 7.2N [1/2]F2 = 2 x 10-8 x 3.27 x 108  = 6.54 N [1/2]Net force = 7.2 – 6.54 = 0.66N [1/2] **OR**[a] Diagram [1/2 + ½]Steps [1/2 + ½ + ½ ] final answer [1/2 + ½]]U = $\frac{Kq1 q2}{r12}$ + $\frac{K q2 q3}{r23}$ + $\frac{Kq3 q1 }{r31}$ = 0 [1/2]U = $\frac{-Kq x+Q}{r}$ + $\frac{K Q x-q}{r}$ + $\frac{K-q x-q }{2r}$ = 0 [1/2]Q/q = ¼ [1/2] | 5 |