INDIAN SCHOOL MUSCAT

SECOND PRE-BOARD EXAMINATION

APRIL 2021

SET A

CLASS XII

Marking Scheme – PHYSICS [THEORY]

Q.NO.	Answers	Marks
		(with
		split
		up)
1.	Pole strength	1
2.	Microwave OR Equal to one	1
3.	Remains same	1
4.	(i)Decreases (ii) increases OR E ₀ =300 V	1/2 + 1/2
5.	1:1	1
6.	Metal B	1
7.	Boron /Cadmium OR 1:2	1
8.	n type OR p type	1
9.	(i)Decreases (ii) increases	1/2 + 1/2
10.	1:1	1
11.	a	
12.	d	
13.	d	
14.	a	
15.	(1) a (2) d (3) c (4) c (5) a	
16.	(1) a (2) b (3) b (4) a (5)d	
17.	(i)Galvanometer is a highly current sensitive device which would shows large deflections even with the passage of small amount of currents through it. (ii)it has a very high resistance value which can alter the magnitude of current flowing through it.	1
		1
18.	Figure Derivation- (Snell's law on the basis of Huygen's wave theory when light is travelling from a denser to a rarer medium.)	1 1
	OR	
		1
	Plane wavefront	1

1		1/2
1 9	(a) Since the capacitors are connected in parallel we have,	72
	$C = C_1 + C_2 + C_3$	
	$= (2+3+4) \times 10^{-12}$	
	$= 9 \times 10^{-12} = 9 \mathrm{pF}$	
	(b)	
	$q_1 = C_1 V$	
	$= 2 \times 10^{-12} \times 100$	
	$= 2 \times 10^{-10} \text{ C}$	
	$q_2 = C_2V$	
	$= 3 \times 10^{-12} \times 100$	1.1/
	$= 3 \times 10^{-10} C$	1 ½
	$q_3 = C_3V$	
	$= 4 \times 10^{-12} \times 100$	
	$= 4 \times 10^{-10} \text{C}$	
	OR	
	(a)	
	(b)Yes. Electric potential is zero at all points on equatorial line of electric dipole ,while electric field is	1
	non zero. (or any correct example)	1
		1
20.	 (a) The fractional change due to incident light on minority charge carriers in reverse bias is much more than that over the majority charge carriers in forward bias. So, photodiodes are used to measure the intensity in reverse bias condition. (b)distinguish between n type and p type semi conductor (any two points) 	1
21.	(a) due to eddy current	$\frac{1/_2 + 1/_2}{1}$
<i>2</i> 1.	(b) way to minimize eddy current	$\begin{vmatrix} 1 \\ 1 \end{vmatrix}$
22.	(a) When screen is moved away, D increases. As $\beta = \lambda D/d$	1
	therefore width of the fringes increases.	
	(b) If s is size of the source and S is distant of source from the plane of the two slits, then for	
	interference fringes to seen, the condition is	
	s/S<\lambda/D	
	As source slit is brought closer to double slit plane, S decreases, the interference pattern gets	
22	less and less sharp. When the source is too close, the fringe separation remains fixed.	1
23.	Diagram of half wave rectifier i/p and o/p wave forms	$\frac{1}{\frac{1}{2} + \frac{1}{2}}$
	1 p and orp wave forms	72 T 72

24.	Three elements of earth's magnetic field	1 1/2
	At the poles OR	1/2
	(a) definition – angle of dip	1
	(b) poles	1/2
	equator	1/2
25.	Fringe width $\beta = \lambda D/d$	1
	$= 5 \times 10^{-4} \text{ m}$ SECTION D	1
	SECTIOND	
26.	Definition – self inductance	1
	Derivation – energy stored in an inductor	2
27.	(a) drift velocity is halved (with reason)	1
	(b) drift velocity is halved (with reason)	1
	(c) remains unchanged (with reason)	1
	OR	
	relation between electric current and drift velocity-fig and derivation	1/2 + 2
	relation between electric current and drift velocity rig and derivation	1/2
28.	(i) metal Q	1
	(ii)	
	$E = h\theta_0 = 6.63 \times 10^{-34} \times 6 \times 10^{14} = 3.97 \times 10^{-19} J$	1
	(iii)no change	1
20	At the distance of nearest approach	
29	PE = KE	1/2
		, -
	$rac{ m k(ze)(2e)}{ m r_0} = 4.5~ m MeV = 4.5 imes 10^6 imes 1.6 imes 10^{-19} m J$	1/
		1/2
	${ m r}_0 = rac{{ m k(ze)(2e)}}{4.5 imes 1.6 imes 10^{-13}}$	
	$4.5 imes1.6 imes10^{-13}$	
	$9 imes 10^9 imes (80) imes 2 imes (1.6 imes 10^{-19})^2$	2
	$=\frac{9\times10^{9}\times(80)\times2\times\left(1.6\times10^{-19}\right)^{2}}{4.5\times1.6\times10^{-13}}=51.2\times10^{-15}\mathrm{m}.$	

30.	Attractive To the state of the	2
	Marking regions	1
31.	(a) Gauss's law statement	1
	(b) the expression for electric field due to an infinitely long straight thin charged wire with diagram	2+1
	Graph showing the variation of E with r	
	OR	1
	 (a) Definition electric dipole moment . SI unit. (b) Diagrammatic representation of the position of dipole in stable and unstable equilibrium (c) writing the expression for the torque acting on the dipole and potential energy of dipole in both the cases 	2
32.	coherent sources of light -definition	1
	two conditions for sustained interference pattern. expression for the width of interference fringes(YDS) with diagram OR	3
	Lens maker formula derivation	
	Fig – Derivation	1 ½ 3 ½

33.	a) Faraday's law of electromagnetic induction- statement and mathematical expression	2
	(b)Deducing an expression for the emf induced in the rod with figure	
	(c) expression for current induced in it.	2
	Or	1
	working of a step up transformer, with diagram.	
	expression for the secondary to primary voltage in terms of the number of turns in the two coil.	1 ½ 2 ½ 1
	any two sources of energy loss in a transformer	