INDIAN SCHOOL MUSCAT

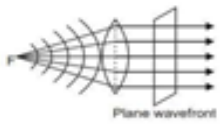
SECOND PRE-BOARD EXAMINATION

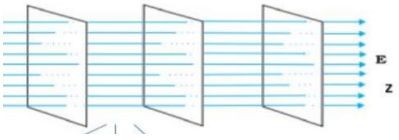
SET B

APRIL 2021

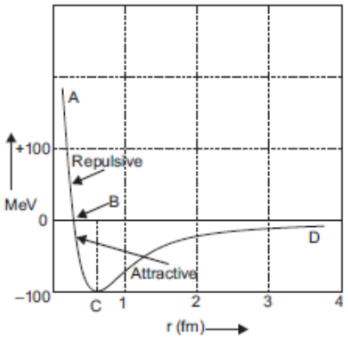
CLASS XII

Marking Scheme – SUBJECT [THEORY]

Q.NO.	Answers	Marks (with split up)
1.	1:1	1
2.	Pole strength	1
3.	(i)Decreases (ii) increases	1
4.	n type OR p type	½ + ½
5.	Velocity OR UV light	1
6.	1:1	1
7.	Boron /Cadmium OR 1:2	1
8.	(i)Decreases (ii) increases OR 300 V	1
9.	Remains same	½ + ½
10.	Metal B. Explanation	½ + ½
11.	a	
12.	d	
13.	d	
14.	a	
15.	(1) c (2) d (3) c (4) a (5) a	
16.	(1) b (2) a (3) b (4) a (5) d	
17.	(a) Photodiode used in reverse bias – reason (b) Distinguish between n type and p type – two points	1 ½ + ½
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.) OR (i)  (ii)  	1 1 1 1

19	(a) When screen is moved away, D increases. As $\beta=\lambda D/d$ 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 less and less sharp. When the source is too close, the fringe separation remains fixed.	1 1
20.	b) i) The soft iron coil in a galvanometer will make the field radial. Also, it increases the strength of the magnetic field. ii) Current sensitivity in the galvanometer is given by, $\frac{\theta}{I} = \frac{NBA}{k}$ Voltage sensitivity in the galvanometer is given by, $\frac{\theta}{V} = \frac{\theta}{IR} = \left(\frac{nBA}{k}\right).\frac{1}{R}$ The above two equations imply that increasing the current sensitivity may not necessarily increase the voltage sensitivity.	1 1
21.	(a) due to eddy current (b) way to minimize eddy current	1 1
22.	(a) Since the capacitors are connected in parallel we have, $C = C_1 + C_2 + C_3$ $= (2+3+4) \times 10^{-12}$ $= 9 \times 10^{-12} = 9\ pF$ $q_1 = C_1V$ $= 2 \times 10^{-12} \times 100$ $= 2 \times 10^{-10}\ C$ $q_2 = C_2V$ $= 3 \times 10^{-12} \times 100$ $= 3 \times 10^{-10} C$ $q_3 = C_3V$ $= 4 \times 10^{-12} \times 100$ $= 4 \times 10^{-10} C$ (b) OR (a)  (b) Yes. Electric potential is zero at all points on equatorial line of electric dipole ,while electric field is non zero. (or any correct example)	½ 1 ½

23.	Diagram of full wave rectifier i/p and o/p wave forms	1 ½ + ½
24.	Three elements of earth's magnetic field At the poles OR (a) definition – angle of dip (b) poles equator	1 ½ ½ 1 ½ ½
25.	Fringe width $\beta=\lambda D/d$ $= 5 \times 10^{-4}$ m	1 1
	SECTION C	
26.	At the distance of nearest approach PE = KE $\frac{k(ze)(2e)}{r_0} = 4.5\ \text{MeV} = 4.5 \times 10^6 \times 1.6 \times 10^{-19}\text{J}$ $r_0 = \frac{k(ze)(2e)}{4.5 \times 1.6 \times 10^{-13}}$ $= \frac{9 \times 10^9 \times (80) \times 2 \times (1.6 \times 10^{-19})^2}{4.5 \times 1.6 \times 10^{-13}} = 51.2 \times 10^{-15}\text{m}.$	1 2
27.	Cells in parallel – expression for emf and resistance OR (a) constantan and manganin are used for making standard resistors (b) connections between resistors in a meter bridge made of thick copper strips (c) the balance point is obtained near the middle of the bridge wire in meter bridge experiments	3 1 1 1
28.	(i) metal Q (ii) $E = h\vartheta_0 = 6.63\ x10^{-34} x\ 6x10^{14} = 3.97x\ 10^{-19} J$ (iii)no change	1 1 1

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

	equilibrium writing the expression for the torque acting on the dipole and potential energy of dipole in both the cases	
33.	a) Faraday's law of electromagnetic induction- statement and mathematical expression (b)Deducing an expression for the emf induced in the rod with figure (c) expression for current induced in it. Or 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. any two sources of energy loss in a transformer	2 2 1 1 ½ 2 ½ 1