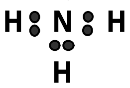
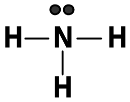
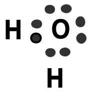
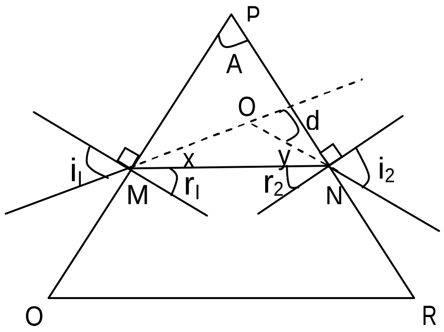
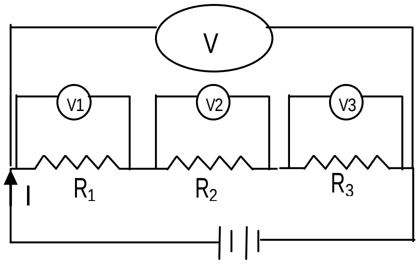
NELLORE DISTRICT COMMON EXAMINATION BOARD
HALF YEARLY EXAMINATIONS-JANUARY-2016
GENERAL SCIENCE , Paper – I

(Physical Sciences)
(English Version)

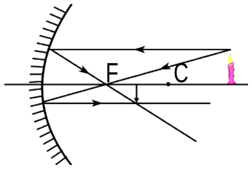
Class-10 - Principles of Evaluation - PART-A

<table>
<tr><th>Q.No</th><th colspan="2">Points for Evaluation</th><th>Marks allotted</th><th>Total Marks</th></tr>
<tr><td>1.</td><td colspan="2">Evaporation : Process of escaping of molecules from the surface of a liquid at any temperature is called evaporation. Evaporation is a cooling process. It is a surface phenomenon.
Boiling : The process in which the liquid phase changes to gaseous phase at a constant temperature and pressure is called boiling. Boiling does not cause cooling. Boiling is a bulk phenomenon</td><td>Any related 2 points each
4x$\frac{1}{2}$</td><td>2</td></tr>
<tr><td>2.</td><td colspan="2">Place a coin at the bottom of the transparent cylindrical vessel. Now pour water until you get the image of the coin on the water surface This is the phenomenon of total internal reflection.</td><td>1</td><td>2</td></tr>
<tr><td></td><td colspan="2">If the angle of incidence is more than critical angle, then total internal reflection occurs.</td><td>1</td><td></td></tr>
<tr><td>3.</td><td colspan="2">The fuse is a thin wire of low melting point.
When overload occurs, the fuse will melt due to heat. The circuit opens. The flow of current stopped. So there will be no damage in the house.</td><td>Any four points related
3x$\frac{1}{2}$</td><td>2</td></tr>
<tr><td></td><td colspan="2">So I appreciate the role of fuse as it plays a necessary and important role in household wiring.</td><td>$\frac{1}{2}$</td><td></td></tr>
<tr><td>4.</td><td colspan="2">Connect the terminals of a coil to Galvanometer.
Push a bar magnet towards the coil. Then the needle in the deflects.
If the magnet is moved away from the coil, the needle in the galvanometer again deflects but in the opposite direction.
If there is a continuous change of magnetic flux the current is generated.</td><td>Any matter related
1$\frac{1}{2}$</td><td>2</td></tr>
<tr><td></td><td colspan="2">Thus Faraday stated the law of induction as - The induced e.m.f. generated in the closed loop is equal to the rate of change of magnetic flux passing through it..</td><td>$\frac{1}{2}$</td><td></td></tr>
<tr><td>5.</td><td colspan="2">Fresh milk has a p^H of 6. By releasing lactic acid by Lacto bascillus bacteria, the milk turns into curd.</td><td>1</td><td>2</td></tr>
<tr><td></td><td colspan="2">As the p^H values of acids are less, The value of p^H of milk decreases, when it turns into curd.</td><td>1</td><td></td></tr>
<tr><td>6.</td><td colspan="2">Path of electron which revolves around the nucleus is called Orbit. The space around the nucleus where the probability of finding electron is maximum is called Orbital.</td><td>1</td><td>2</td></tr>
<tr><td></td><td>These are represented by K,L,M,N,O
Orbit is two dimentional.
The Max.number of electrons in an orbit is $2n^2$
Shape is circular.</td><td>These are Represented by s,p,d,f,g.
Orbital is three dimentional.
The Max.number of electrons in an orbital is 2.
Shape is spherical or dumbbell shaped or double dumbbell shaped or any other.</td><td>Any two points related each
2x$\frac{1}{2}$</td><td></td></tr>
</table>

7.	According to the occupation of differentiating electron the elements are classified into four blocks. They are s, p, d and f-blocks. Group IA to IIA s-block Group IIIA to VIIIA p-block Elements lies between s and p-block elements. d-block The elements arranged at the bottom of the table. f-block	Any related 1 1	2
8.	Ammonia (NH_3) :  (or)  Water molecule (H_2O): 	2x1 Any related 2 figures	2
9.	(T) = $\frac{m_1T_1+m_2T_2}{m_1+m_2}$ = $\frac{50X20+50X40}{50+50}$ = $\frac{1000+2000}{100}$ = $\frac{3000}{100}$ = 30°C (**OR**) (T) = $\frac{T_1+T_2}{2}$ = $\frac{20+40}{2}$ = $\frac{60}{2}$ = 30°C	Formula ½ Answer ½	1
10.	The amount of work done by chemical force to move unit positive charge from anode to cathode. (**Any related one point**)	*	1
11.	If an induced current flows, its direction is always to oppose the change. (**Any related one point**)	*	1
12.	(i) Electronic configuration of Argon : $1s^2$ $2s^2$ $2p^6$ $3s^2$ $3p^6$ (ii) Electronic configuration of Chromium : $1s^2$ $2s^2$ $2p^6$ $3s^2$ $3p^6$ $4s^1$ $3d^5$ (**Any related two points**)	2x½	1
13.	Atom with atomic number 9 belongs to 'p' block Atom with atomic number 27 belongs to 'd' block.	2x½	1
14.	The electrons in inner shells are strongly bounded with the force of attraction of nucleus. They are all ready stable electrons. So electrons in outer most shell are responsible for formation of bond .	2x½	1
15.	Diamonds have high refractive index (2.42). The critical angle of diamond is very less (24.4°). By cutting the faces of diamond in such a way that most of the incident rays at every face get total internal reflection. This is the reason for shining of diamonds. (**Any related four points**)	4 x 1	4
16.	concave lens is used	1	4
	<u>The focal length of this bi-concave lens</u>. (f) u = - ∞ ; v = distance of far point = -D Using lens formula, 1/f = 1/v – 1/u 1/f = 1/ -D f = -D Here 'f' is negative showing that it is a concave lens	3	
17.	Place a prism on the paper. Draw the boundary line with pencil. Name the vertices as P, Q and R. Measure the angle of the prism at 'P' and note down it as 'A' . Now fix two pin on the line which was drawn with an angle to the surface 'PQ'. Observe the images at 'PR' side and fix another two pins such that four pins lie along a straight line.	1	4 NLR-SA-2
	Remove the prism. Extend the incident ray and emergent ray such that they can intersect with each other. The angle between incident ray and emergent ray is called angle of deviation (d).	1	
	Find angle of deviations for different angles of incidence. The minimum value of 'd' is to be taken as angle of minimum deviation (D). Refractive index of prism is calculated by the formula n = = $\frac{Sin(\frac{A+D}{2})}{Sin(\frac{A}{2})}$	1	

<table>
<tr><td></td><td>
</td><td>1</td><td></td></tr>
<tr><td rowspan="4">18.</td><td>Consider three resistors R_1, R_2 and R_3 are connected in series. V_1, V_2 and V_3 are the potential differences between the ends of the resistors R_1, R_2 and R_3 respectively. Let ‘I’ is the flow of current through them in the circuit.</td><td>1</td><td rowspan="4">4</td></tr>
<tr><td>Ohm’s law : $V = I R$
Then $V_1 = I R_1$ $V_2 = I R_2$ $V_3 = I R_3$
Let the resultant potential difference and
R is the resultant resistance. Then $V = I R$</td><td>1</td></tr>
<tr><td>In series arrangement $V = V_1 + V_2 + V_3$
$I R = I R_1 + I R_2 + I R_3$
$R = R_1 + R_2 + R_3$
If resistors connected in series combination then the resultant resistance is equal to the sum of the individual resistances of resistors.</td><td>1</td></tr>
<tr><td>
</td><td>1</td></tr>
<tr><td rowspan="3">19.</td><td>Baking powder is a mixture of baking soda and a mild edible acid such as tartaric acid.</td><td>1</td><td rowspan="3">4</td></tr>
<tr><td>Its formula is $NaHCO_3$.</td><td>1</td></tr>
<tr><td>When baking powder is heated or mixed in water, the following reaction takes place.
$NaHCO_3 + H+ \rightarrow CO_2 + H_2O$ + sodium salt of acid.
Carbon dioxide produced during the reaction causes bread or cake to rise making them soft and spongy.</td><td>2</td></tr>
<tr><td>20.</td><td>four quantum numbers for the differentiating electron of Lithium are
<table>
<tr><td>n</td><td>l</td><td>m_l</td><td>m_s</td></tr>
<tr><td>2</td><td>0</td><td>0</td><td>+½</td></tr>
</table></td><td>1</td><td rowspan="2">4</td></tr>
<tr><td></td><td>(i) Principal quantum number (ii) Azimuthal quantum number
(iii) Magnetic quantum number (iv) Spin quantum number.
<table>
<tr><td></td><td>Symbol</td><td>Scientist</td><td>represents</td><td>Any related matter</td></tr>
<tr><td>PQ</td><td>n</td><td>Bohr</td><td>Shell</td><td>N values of orbits K,L,.. are 1,2,…</td></tr>
<tr><td>AQ</td><td><i>l</i></td><td>Sommerfeld</td><td>Sub shell</td><td><i>l</i> values for s,p,.. sub shells are 0,1,…</td></tr>
<tr><td>MQ</td><td>m_l</td><td>Lande</td><td>Orbital</td><td>values are from $–l$ to $+l$</td></tr>
<tr><td>SQ</td><td>m_s</td><td>Uhlen beck and smith</td><td>Spin of electron</td><td>+½ clock wise
-½ anti clock wise</td></tr>
</table></td><td>2
Any related two points

1
For last column</td></tr>
</table>

21.	The position of element tells us the atomic number, number of valence electrons and valency of the element. This helps in predicting the reactivity, comparative atomic size, metallic character, comparative ionisaion energy, in which type of bonds it can participate. **Ex:** Group 17, the elements have 7 valence electrons. The valency of the elements in that group is 1. All these elements are highly reactive. They are non metals. Atomic size increases, and ionization energy decreases from top to bottom in that group. All the elements can gain one electron for their stability. All can participate in forming covalent bonds.	Any related three points 3 x 1 Example 1	4
22.	The intermixing of atomic orbitals of almost equal energies of an atom	1	4
	<u>Formation of BF$_3$ molecule:</u> (i) Boron(Z=5) is $1s^2 2s^2 2p^1$. (ii) In excited state is $1s^2 2s^1 2p^2$. (iii) Due to hybridization three identical sp^2-hybrid orbitals are formed and Separated in a planar triangular shape. (iv) Flulorine (Z=9) is $1s^2 2s^2 2p^5$. (v) It has unpaired electrons in $2p_z$ orbital. (vi) The three sp^2-hybrid orbitals in boron forms sigma bonds with each of p-orbitals in three Fluorine atoms. Thus BF$_3$ is formed with planar triangular shape.	Any related points 3	
23.		Diagram 3 Part 2	5
24		Diagram 3 Parts 2	5

KEY SHEET - PART-B

S. No	Ans.	S. No	Ans.	S. No	Ans.
1	B	**11**	B	**21**	Fog
2	A	**12**	D	**22**	Convex
3	B	**13**	C	**23**	Power of lens
4	A	**14**	C	**24**	6 Ω
5	B	**15**	D	**25**	Tesla
6	B	**16**	A	**26**	B
7	A	**17**	B	**27**	D
8	B	**18**	B	**28**	A
9	B	**19**	A	**29**	F
10	A	**20**	D	**30**	C

Note : * means allot full marks.

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