RAMAGYA SCHOOL, NOIDA
XI/SCIENCE (MAY)/2017-18
OLYMPIAD PRACTICE WORKSHEET

1. From a container of wine, a thief has stolen 15 litres of wine and replaced it with same quant ity of
   water. He again repeated the same process. Thus in three attempts the ratio of wine and wa ter became 343 : 169. The initial amount of wine in the container was (A) 75 litres (B) 100 litres (C) 136 litres (D) 120 litres
2. The diagonal BD of a cyclic quadrilateral ABCD bisects –ABC. It is given that AC = BC, –BDC = 80°, –ACB = 20°. –BAD is _____ (A) 110° (B) 120° (C) 130° (D) 140°
3. A sound wave passes from a medium A to another medium B. The velocity of sound in B is gr eater
   than that in A. Assume that there is no absorption or reflection at the boundary. As the wave moves across the boundary (A) The frequency of sound will not change (B) The wavelength will increase (C) The wavelength will decrease (D) The intensity of sound will not change
4. **A neutral organic compound *P* of molecular formula C_2H_6O on oxidation with potassium dichromate and sulphuric acid gives a compound *Q* which gives brisk effervescence with sodium bicarbonate. Compound *P* is an important constituent of wine and it reacts with *Q* to give a sweet smelling substance *R*. *P*, *Q* and *R* respectively**

   a. ***P* – CH_3COOH, *Q* – C_2H_5OH, *R* – $C_2H_5COOCH_3$**

   b. ***P* – CH_3CH_2OH, *Q* – CH_3CH_2COOH, *R* – $CH_3CH_2COOCH_3$**

   c. ***P* – CH_3CH_2COOH, *Q* – CH_3CH_2OH, *R* – $CH_3COOCH_2CH_3$**

   d. ***P* – CH_3CH_2OH, *Q* – CH_3COOH, *R* – $CH_3COOCH_2CH_3$**

5. **Aluminium carbonate reacts with dilute nitric acid to form aluminium nitrate, water and carbon dioxide. The reaction can be written as $Al_2(CO_3)_3 + xHNO_3 \longrightarrow yAl(NO_3)_3 + zCO_2 + 3H_2O$ The stoichiometric constants *x*, *y* and *z* are**

(A) 6, 2, 4 (B) 6, 2, 3 (C) 2, 4, 6 (D) 4, 2, 3

---

6. **Match both the columns and mark the correct option from the codes given below.**

7.

Column I	**Column II**

(a)	Action of dilute sulphuric acid on Zn	(i) Ammonia
(b)	Heating limestone	(ii) Oxygen
(c)	Heating potassium chlorate	(iii) Hydrogen
(d)	Heating ammonium chloride	(iv) Carbon dioxide

	a	b	c	d
(A)	(ii)	(iv)	(i)	(iii)
(B)	(iii)	(iv)	(ii)	(i)
(C)	(iv)	(iii)	(i)	(ii)
(D)	(iii)	(i)	(iv)	(ii)

7. Statement I : pH of hydrochloric acid solution is less than that of acetic acid solution of the same concentration.

Statement II : In equimolar solutions, the number of titratable protons present in hydrochloric acid is less than that present in acetic acid.

(A) Both statements I and II are true and statement II is the correct explanation of statement I.

(B) Both statements I and II are true but statement II is not the correct explanation of statement I.

(C) Statement I is true but statement II is false.

(D) Statement I is false but statement II is true.

8. A student poured some bromine water in a test tube. He passed vapours of two hydrocarbons from the jars ***X*** and ***Y***, one after the other. He observed that on passing vapours from jar ***Y*** the reddish brown colour of bromine got discharged. When he reacted both the gases separately with oxygen, he observed that both the gases on combustion gave carbon dioxide and water vapour. What inference does he draw from his experiments?

a. Jar *X* contains a saturated hydrocarbon while jar *Y* contains unsaturated hydrocarbon.

b. Jar *X* contains an unsaturated hydrocarbon while jar *Y* contains saturated hydrocarbon.

(C) Jar *X* and *Y* contain saturated hydrocarbons. (D) Jar *X* and *Y* contain unsaturated hydrocarbons.

9. **For two gases, *A* and *B* with molecular weights M_A and M_B, it is observed that at a certain temperature *T*, the mean velocity of *A* is equal to the u_{rms} of *B*. Thus, the mean velocity of *A* can be made equalto the mean velocity of *B*, if**

10.

(A) A is at temperature *T* and *B* at *T'*; *T*>*T'* **(B) Both *A* and *B* are raised to a higher temperature**

(C) Both *A* and *B* are lowered in temperature **(D) None of these**

10. Al and Ga have nearly the same covalent radii because of

Greater shielding e ffect of *s* electrons of Ga atoms **(B) Poor shielding effect of *s* electrons of Ga atoms**

(C) Poor shielding effect of *d* electrons of Ga atoms **(D) Greater shielding effect of *d* electrons of Ga atoms**

11. When an article is sold for ` 703, loss incurred is 25% less than the profit earned on selling it at

a. 836. What is the selling price of the article when it earns a profit of 20% ?

i. 912(B) ` 1576(C) ` 1532(D) ` 1092(A)

12. In a class of 80 students, 25 passed in Maths and Physics, 25 passed in Physics and English, 20 passed in Maths and English. 10 student passed in all the three subjects. How many students passed only in Maths ?

(A) 20 **(B) 15** **(C) 12** **(D) Can't be determined**

13. How many meaningful words can be formed with the first, the third, the seventh and the ninth letters of the word "SEPARATION" using each letter only once in each word ?

(A) Two **(B) Three** **(C) Four** **(D) More than four**

14. Today is Varun's birthday. One year from today he will be twice as old as he was 12 years ago. How old is Varun today?

(A) 20 years **(B) 22 years** **(C) 25 years** **(D) 27 years**

15. A sound wave passes from a medium *A* to another medium *B*. The velocity of sound in *B* is greater than that in *A*. Assume that there is no absorption or reflection at the boundary. As the wave moves across the boundary

(A) The frequencyof sound will not change **(B) The wavelength will increase**

(C) The wavelength will decrease **(D) The intensityof sound will not change**

16.

16. A particle is projected from the origin in *x-y* plane. Acceleration of particle in negative *y* direction is α. If equation of path of the particle is $y = ax - bx^2$, then initial velocity of the particle is

(A) $\frac{\alpha}{2b}$ **(B)** $\frac{\alpha(1+a^2)}{2b}$ **(C)** $\frac{\alpha}{a^2}$ **(D)** $\frac{\alpha b}{a^2}$

17. **An object is projected from origin in *x-y* plane in which velocity changes according to relation**

$\vec{v} = a\hat{i} + bx\hat{j}$ **. Path of particle is**

(A) Hyperbolic **(B) Circular** **(C) Elliptical** **(D) Parabolic**

18. **Statement I : A solid and hollow sphere of same diameter and same material when heated through the same temperature will expand by the same amount.**

Statement II : The change in volume is independent of the original mass but depends on original volume.

(A) Both statements I and II are true and statement II is the correct explanation of statement I.

(B) Both statements I and II are true but statement II is not the correct explanation of statement I.

(C) Statement I is true but statement II is false. **(D) Statement I is false but statement II is true.**

19. Statement I : When a bottle of cold carbonated drink is opened, a slight fog forms around the opening.

Statement I : Adiabatic expansion of the gas causes lowering of temperature and condensation of water vapours.

(A) Both statements I and II are true and statement II is the correct explanation of statement I.

(B) Both statements I and II are true but statement II is not the correct explanation of statement I.

(C) Statement I is true but statement II is false.

(D) Statement I is false but statement II is true.

20. Column I gives some devices and column II gives some processes on which the functioning of these devices depend. Match the device in column I with the processes in column II and select the correct option from the codes given below.

Column I	Column II
(i) Bimetallic strip	(p) Radiation from a hot body
(ii) Steam engine	(q) Energy conversion
(iii) Incandescent lamp	(r) Melting
(iv) Electric fuse	(s) Thermal expansion of solids

(A) (i) - (p), (ii) - (q), (iii) - (r), (iv) - (s) **(B) (i) - (q), (ii) - (s), (iii) - (p), (iv) - (r)**

(C) (i) - (r), (ii) - (p), (iii) - (s), (iv) - (q) **(D) (i) - (s), (ii) - (q), (iii) - (p), (iv) - (r)**