



RAMAGYA SCHOOL, NOIDA

XI/SCIENCE/2017-18

OLYMPIAD PRACTICE WORKSHEET

1. Three ladies have each brought a child for admission to a school. The head of the school wishes to interview the six people one by one, taking care that no child is interviewed before its mother. The number of ways of doing this is

- (A) 6
- (B) 36
- (C) 72
- (D) 90

2. The number of revolutions of a wheel, with fixed center and with an outside diameter of 6 m, required to cause a point on the rim to go one km is

- (A) 880
- (B) $440/\pi$
- (C) $500/3\pi$
- (D) 440π

3. Anaerobic respiration releases less energy than aerobic respiration because

- (A) Energy from oxygen is not made available
- (B) Ethyl alcohol is a source of energy
- (C) Carbon dioxide is released
- (D) Less energy is required by fermenting organisms

4. Three bean seedlings were grown in three culture solutions. After six weeks, X had yellow leaves and short internodes, Y has red patches on the stem and Z had green leaves and stem. It can be deduced that

- (A) X lacked magnesium, Y lacked calcium and Z lacked molybdenum
- (B) X lacked calcium, Y lacked nitrogen and Z lacks chlorine
- (C) X lacked calcium, Y lacked nitrogen and Z had all nutrients
- (D) X lacked magnesium, Y lacked nitrogen and Z had all nutrients

5. In the life cycle of a fern the meiosis occurs during the

- (A) Formation of spores
- (B) Formation of gametes
- (C) Germination of a spore
- (D) Development of a zygote

6. Hydrogen sulphide (H_2S) contains 94.11% sulphur, water (H_2O) contains 11.11% hydrogen and sulphur dioxide (SO_2) contains 50% oxygen. Find the ratio of all given elements. After your calculations which law has been verified?

- (A) Law of multiple proportion
- (B) Law of reciprocal proportion
- (C) Law of constant components
- (D) Law of combining volumes

7. An astronaut in the space shuttle orbiting the earth performs a trick for a television audience. She

inflates a helium filled balloon within the shuttle's controlled atmosphere and lets go of it. To the astonishment of all watching, the balloon

- (A) Hovers in place where it was released.
- (B) Rises noticeably away from the earth.
- (C) Falls noticeably towards the earth.
- (D) Drifts backwards opposite to the direction of the shuttle's velocity

8. A boy throws a table tennis ball of mass 20 g upwards with a velocity of $u_0 = 10 \text{ m/s}$ at an angle θ_0 with the vertical. The wind imparts a horizontal force of 0.08 N, so that the ball returns to the starting point. Then, the angle θ_0 must be such that, $\tan \theta_0$ is

- (A) 0.2
- (B) 0.4
- (C) 2.5
- (D) 1.2

9. Find the correct statement from the following.

- (A) In planetary motion, total energy remains constant but total angular momentum may vary
- (B) Both total energy and total angular momentum are constant in planetary motion and the total energy is negative
- (C) Motion of a planet about the Sun and motion of an electron about an attracting nuclear centre are governed by identical relations and the total energy is always positive in both cases
- (D) Both total energy and total angular momentum are constant in planetary motion and the total energy is positive

10. A projectile is thrown such that its range should be 1000 metres, but at highest point it breaks into two equal masses, one of whom falls vertically downwards. The other mass will fall at a distance

- (A) 1500 metres from launching point
- (B) 2000 metres from launching point
- (C) 3000 metres from launching point
- (D) 2500 metres from launching point

11. A spirit level containing a bubble in a liquid is jerked forward. Relative to the level and liquid the bubble moves

- (A) Backwards, due to its inertia;
- (B) Backwards, due to a pressure gradient in the liquid;
- (C) Forwards, due to its inertia;
- (D) Forwards, due to a pressure gradient in the liquid;

12. The fourth state of matter is

- (A) Super fluid
- (B) Plasma
- (C) Liquid crystals
- (D) Small particles suspended in the gas

13. Electric cookers have a coating that protects them against fire. The coating is made of

- (A) Magnesium oxide
- (B) Heavy lead
- (C) Chromium oxide
- (D) Nickel

14. Atom may be regarded as comprising of protons, neutrons and electrons. If the mass attributed to a neutron were halved and that attributed to the electron were doubled, the atomic mass of ${}^{12}_6\text{C}$ would

- (A) Remain approximately the same
- (B) Be approximately doubled
- (C) Be approximately halved
- (D) Be reduced approximately by 25%

15. The chemistry of lithium is very much similar to that of magnesium even though they are placed in

different groups. The reason is

- (A) Both have nearly the same size
- (B) The ratio of their charge to size is nearly the same
- (C) Both have similar electronic configuration
- (D) Both are found together in nature

16. A bottle of dry ammonia and a bottle of dry hydrogen chloride connected through a long tube are opened simultaneously at both ends, the white ammonium chloride ring first formed will be

- (A) At the centre of the tube
- (B) Near the hydrogen chloride bottle
- (C) Near the ammonium bottle
- (D) Throughout the length of the tube

17. A bottle of dry hydrogen gas and nitrogen gas and a bottle of dry hydrogen chloride connected through a long tube are opened simultaneously at both ends, the white ammonium chloride ring first formed will be

- (A) At the centre of the tube
- (B) Near the hydrogen chloride bottle
- (C) Near the ammonium bottle
- (D) Throughout the length of the tube

18. There is a proportional relationship between the size of a projected image on a screen and the distance of the screen from the projector. An image that is projected onto a screen 10 feet away is a rectangle with dimensions of 2 feet by 3 feet. If the screen is moved to a distance of 15 feet from the projector, what will be the dimensions of the larger image projected onto the screen?

- (A) 3 feet by 4.5 feet
- (B) 4 feet by 6 feet
- (C) 4.5 feet by 6.75 feet
- (D) 7 feet by 8 feet

19. Tony and Sunil are participating in a jogathon to raise money for charity. Tony will raise Rs. 20, plus Rs. 2 for each lap he jogs. Sunil will raise Rs. 30, plus Rs. 1.50 for each lap he jogs. The total amount of money each will raise can be calculated using the following expressions where n represents the number of laps run: Tony : $20 + 2n$; Sunil : $30 + 1.50n$

After how many laps will they have raised the same amount of money?

- (A) 3 (B) 6.5 (C) 14.5 (D) 20

20. In an examination of 9 papers, a candidate has to pass in more papers than the number of papers in which he fails in order to get the success. The number of ways in which he can fail

- (A) 128 (B) 256 (C) 255 (D) $9 \times 8!$