8th All India RPS OLYMPIAD

Online & Offline Mega Event

QUESTION PAPER (PHASE – I)

CLASS – VIII

RPS SCIENCE LEAGUE

PHYSICS (20)

Q1. In Newton's second Law $\vec{F} = m\vec{a}$(for constant mass m), $\vec{a}$ is the acceleration of the mass m with respect to

(A) any observer (B) any inertial observer

(C) an observer at rest only (D) an observer moving with uniform speed only

Q2. A body of mass 80 g is moving with a constant velocity of $4cm/s$ on a horizontal frictionless table. The force on the body (in dynes) is: -

(A) Zero (B) 39200 (C) 78400 (D) 8000

Q3. Two blocks of mass 2 kg and 3 kg are connected by a light string and placed on a smooth horizontal table. A horizontal force of 10 N pulls the 3 kg block, what is the acceleration of 2 kg block?

(A) 1 m/s^2 (B) 2 m/s^2 (C) 3 m/s^2 (D) 4 m/s^2

Q4. A 100 g tennis ball coming at a speed of 20 m/s is hit straight back by a bat to speed of 40 m/s. The magnitude of the average force F on the ball, when it is in contact for 5 ms with the bat is: -

(A) 1200 N (B) 6000 N (C) 2400 N (D) 1000 N

Q5. A rectangular container with base $5cm \times 10cm$ contains 5 kg of water. What is the pressure exerted by water at the bottom of the container- (g = 9.8 m/s^2)

(A) 1 atm (B) 10^4 pa (C) 490 N/m^2 (D) 9800 Pa

Q6. The pressure at the bottom of a tank containing a liquid does not depend on-

(A) Acceleration due to gravity (B) Height of the liquid column

(C) Area of the bottom surface (D) Density of the liquid

Q7. Hydraulic press is based on:

(A) Newton's law (B) Pascal's law (C) Gravity law (D) Stoke's law

Q8. Ice piece are floating in a beaker A containing water and also in a beaker B containing miscible liquid of specific gravity 1.2. When ice melts, the level of-

(A) Water increases in A (B) Water decreases in A

(C) Liquid in B decrease (D) Liquid in B increases

Q9. 10,000 alpha particles pass per minute through a straight tube of radius r. What is the resulting electric current?

(A) 5×10^{-16}A (B) 0.5×10^{-18}A

(C) 0.5×10^{-16}A (D) 1.5×10^{-16}A

Q10. When no current flows through a conductor:

(A) the free electrons do not move

(B) the average speed of a free electron over a large period of time is zero.

(C) the average velocity of a free electron over a large period of time is zero.

(D) the average of square of velocities of all the free electrons at an instant is zero.

Q11. A steady current is passing through a linear conductor of non-uniform cross-section. The net quantity of charge crossing any cross-section per second is

(A) independent of area of cross-section

(B) directly proportional to the length of conductor

(C) directly proportional to the area of cross-section

(D) inversely proportional to the length of conductor

Q12. Two forces of 3 N and 4 N act on a body at right angles to each other. What is the magnitude of the resultant force?

(A) 1 N (B) 12 N (C) 7 N (D) 5 N

Q13. A 4 Ω resistor and a 12 Ω resistor are connected in parallel across a 12 V battery. What is the total current drawn from the battery?

(A) 4 A (B) 1 A (C) 3 A (D) 16 A

Q14. Power provided by a battery is maximum when

(A) Internal resistance equal to external resistance

(B) Internal resistance is greater than external resistance

(C) Internal resistance is less than external resistance

(D) None of these

Q15. A 100 watt bulb working on 200 volt and a 200 watt bulb working on 100 volt have

(A) Resistances in the ratio of 4:1

(B) Maximum current ratings in the ratio of 1:4

(C) Resistances in the ratio of 2:1

(D) Maximum current ratings in the ratio of 1:2

Q16. The magnetic field at the centre of a circular coil of radius r carrying current is B_1. The field at the centre of another coil of radius $\frac{r}{2}$ carrying same current is B_2 then ratio of B_1/B_2 is :-

(A) 1:2 (B) 2:1 (C) 1:1 (D) 4:1

Q17. When the current flowing in a circular coil is doubled and the number of turns of the coil is halved, the magnetic field at its centre will become: -

(A) Same (B) Four times (C) Half (D) Double

Q18. A heater of resistance 22 Ω is connected to a 220 V supply and runs for 10 minutes. How much heat is produced?

(A) 2.2×10^4 J (B) 1.32×10^5 J (C) 1.32×10^6 J (D) 2.2×10^6 J

Q19. A straight conductor carrying current is placed in a uniform magnetic field. At what angle between the current and the field is the magnetic force on the conductor maximum?

(A) 0° (B) 90° (C) 45° (D) 180°

Q20. Which of the following statements about spherical mirrors and lenses is correct?

(A) A convex lens always forms a virtual image.

(B) A convex lens diverges a parallel beam of light.

(C) A concave mirror always forms a virtual image.

(D) A convex lens forms a real, inverted image when the object is beyond its focus, and a virtual, erect image when the object is between the focus and the lens.

CHEMISTRY(20)

Q21. Rihan experimented by adding some sugar to a glass of water. He marked the water level before and after stirring. After the sugar had completely dissolved, he observed that the water level had slightly decreased. What is the reason for the decrease in water level after sugar dissolves?

(A) Sugar Evaporates

(B) Sugar Particles occupy Interparticle spaces

(C) Water particles disappear

(D) Sugar turn Into a gas

Q22. Diffusion in gases is faster than in liquids because:

(A) Gas particles are close together (B) Gas particles do not move

(C) Gas particles move faster and have more space (D) Gas particles are Heavier

Q23. Potassium permanganate spreads faster in hot water because_____.

(A) hot water dissolves more solids

(B) water particles move faster at high temperature

(C) hot water has more space

(D) colour becomes lighter

Q24. Interparticle force of attraction are strongest in:

(A) Gases (B) Liquids (C) Solids (D) Vapours

Q25. A student poured 100ml of water into three containers of different shapes. In each case, the water took the shape of container, but the volume remained the same. Which property of liquid best demonstrated by this activity?

(A) Liquids have fixed shape and volume

(B) Liquids are compressible

(C) Liquids have no volume and shape

(D) Liquids have fixed volume but no fixed shape

Q26. Which of the following forms a true solution in water:

(A) Starch (B) Sugar (C) Chalk powder (D) Egg albumin

Q27. Homogeneous mixture among the following is:

(A) Milk (B) Cloud (C) Smoke (D) Air

Q28. Which of the following is NOT a compound?

(A) Marble (B) Washing soda (C) Brass (D) Quick lime

Q29. Some of the following are true solutions:

I: Urea solution **II: Gelatin** **III: Glucose solution**

IV: NaCl solution **V: Butter** **VI: Blood**

Select true solutions:

(A) I, III, IV (B) II, V, VI (C) I, II, III (D) IV, V, VI

Q30. Carbon burns in oxygen to form carbon dioxide. The properties of carbon dioxide are:

(A) Similar to oxygen.

(B) Similar to carbon.

(C) Totally different from both carbon and oxygen.

(D) Much similar to both carbon and oxygen.

Q31. Match Column I and Column II:

Column I	**Column II**
(i) Malleable	**(A) Iodine**
(ii) Ductile	**(B) Bromine**
(iii) Lustre	**(C) Drawn into wires**
(iv) Liquid	**(D) Beaten into sheets**

(A) (i)-D, (ii)-C, (iii)-A, (iv)-B

(B) (i)-C, (ii)-D, (iii)-A, (iv)-B

(C) (i)-D, (ii)-C, (iii)-B, (iv)-A

(D) (i)-A, (ii)-B, (iii)-C, (iv)-D

Q32. Bronze contains:

(A) Gold and copper (B) Copper and zinc

(C) Copper and silver (D) Copper and tin

Q33. The solution in which more solute can be dissolved at a given temperature is called:

(A) Saturated solution (B) Unsaturated solution

(C) Supersaturated solution (D) None of the above

Q34. Aquatic species feel more comfort in cold water as compared to hot water. Why?

(A) Amount of dissolved oxygen is more in cold water.

(B) Amount of dissolved oxygen is less in cold water.

(C) Amount of dissolved oxygen is more in hot water.

(D) Amount of dissolved oxygen don't depend upon temperature.

Q35. Match Column I and Column II:

Column I	Column II
(i) Copper	(A) Compound
(ii) Sugar	(B) Element
(iii) Milk	(C) Homogeneous Mixture
(iv) Air	(D) Heterogeneous Mixture

(A) (i)-A, (ii)-B, (iii)-D, (iv)-C

(B) (i)-B, (ii)-A, (iii)-D, (iv)-C

(C) (i)-A, (ii)-B, (iii)-C, (iv)-D

(D) (i)-B, (ii)-A, (iii)-C, (iv)-D

Q36. Example of an element among the following is:

(A) Water (B) Ammonia (C) Salt (D) Iron

Q37. Which of the following is NOT a noble gas element?

(A) Helium (B) Argon (C) Xenon (D) Chromium

Q38. Which of the following is NOT true for a compound?

(A) A compound is heterogeneous in nature.

(B) A compound contains different elements in a fixed ratio.

(C) Properties of a compound are entirely different from those of the elements present in it.

(D) Constituents of a compound cannot be separated by simple physical methods.

Q39. The non-metal which is liquid at room temperature is:

(A) Sulphur (B) Chlorine (C) Iodine (D) Bromine

Q40. Matter is made up of:

(A) Large continuous pieces (B) Invisible energy waves

(C) Extremely small particles (D) Liquids only

BIOLOGY (20)

Q41. Which scientific instrument is most suitable for measuring the precise volume of an irregularly shaped solid object using water displacement?

(A) Beaker (B) Measuring cylinder

(C) Pipette (D) Analytical balance

Q42. When designing a controlled scientific experiment, what is the primary purpose of maintaining a control group?

(A) To increase the overall speed of the chemical reaction.

(B) To provide a baseline comparison to determine the effect of the independent variable.

(C) To eliminate all sources of random human measurement error.

(D) To ensure that the dependent variable remains constant throughout the test.

Q43. A student notes down observations in two categories: numerical values with units (e.g., plant height 12 cm) and descriptive features (e.g., leaf color dark green). How are these types of data classified respectively?

(A) Quantitative and Qualitative (B) Dependent and Independent

(C) Primary and Secondary (D) Constant and Variable

Q44. Which microorganism is classified as a eukaryotic, single-celled organism possessing cilia for locomotion and food acquisition?

(A) *Amoeba* (B) *Paramecium* (C) *Lactobacillus* (D) *Penicillium*

Q45. Which disease is caused by a protozoan parasite transmitted through the bite of female mosquitoes?

(A) Tuberculosis (B) Cholera (C) Malaria (D) Polio

Q46. Rhizobium bacteria residing in the root nodules of leguminous plants perform which essential ecological function?

(A) Converting atmospheric nitrogen gas into usable nitrogenous compounds.

(B) Breaking down dead organic litter into carbon dioxide.

(C) Producing antibiotics that kill harmful pathogenic fungi.

(D) Absorbing excess water from plant roots during floods.

Q47. The process of conversion of sugar into alcohol by yeast cells in the absence of oxygen is known as:

(A) Pasteurization (B) Fermentation (C) Nitrification (D) Transpiration

Q48. Which microbe lacks cellular structure and can replicate only inside a living host cell?

(A) *Yeast* (B) *Virus* (C) *Lactobacillus* (D) *Amoeba*

Q49. Bread rises and becomes spongy during baking primarily due to the release of which gas by yeast respiration?

(A) Oxygen (B) Nitrogen (C) Carbon dioxide (D) Hydrogen

Q50. Which nutrient deficiency leads to the condition known as scurvy, characterized by bleeding gums and delayed wound healing?

(A) Vitamin A (B) Vitamin B1 (C) Vitamin C (D) Vitamin D

Q51. A balanced diet for a growing adolescent must contain adequate roughage. What is the primary function of roughage in the human body?

(A) Providing high-energy reserves for physical work.

(B) Aiding the movement of food through the alimentary canal and preventing constipation.

(C) Building strong bones and teeth structure.

(D) Enhancing production of red blood cells.

Q52. Vaccination protects the human body against infectious pathogens by stimulating the production of:

(A) Digestive enzymes (B) Antibodies (C) Red blood cells (D) Hormones

Q53. Which vector is responsible for transmitting the dengue virus to humans?

(A) Housefly (B) Female *Anopheles* mosquito

(C) Female *Aedes* mosquito (D) Rat flea

Q54. Adolescence is typically marked by a sudden burst in height and physical growth. Which endocrine gland secretes the growth hormone responsible for regulating this development?

(A) Thyroid gland (B) Pancreas

(C) Pituitary gland (D) Adrenal gland

Q55. The total variety of life forms existing on Earth, including genetic, species, and ecosystem diversity, is called:

(A) Biosphere (B) Biodiversity (C) Biomass (D) Biome

Q56. Species that are exclusively found in a specific restricted geographical region and nowhere else on Earth are termed:

(A) Extinct species (B) Migratory species

(C) Endemic species (D) Exotic species

Q57. Which legal protected area in India is established specifically to preserve natural flora, fauna, and landscape while strictly prohibiting human activity, grazing, and cultivation?

(A) Wildlife Sanctuary (B) National Park

(C) Reserved Forest (D) Botanical Garden

Q58. Reforestation differs from afforestation because reforestation involves:

(A) Planting trees in an area where forests were previously destroyed or cleared.

(B) Establishing a brand new forest on barren wasteland that never had trees.

(C) Growing only agricultural crops for commercial timber use.

(D) Importing foreign plant species to replace native vegetation.

Q59. In an aquatic food chain, which organism occupies the role of a primary producer?

(A) Small fish (B) Phytoplankton (C) Zooplankton (D) Aquatic birds

Q60. Which gas present in the atmosphere traps heat radiating from the Earth's surface, playing a vital role in maintaining the natural greenhouse effect?

(A) Nitrogen (B) Carbon dioxide (C) Argon (D) Helium