8th All India RPS OLYMPIAD

Online & Offline Mega Event

QUESTION PAPER (PHASE – I)

CLASS – VII

RPS SCIENCE LEAGUE

PHYSICS (20)

Q1. One coulomb charge is equivalent to the charge contained in:

(A) 2.6×10^{19} electrons (B) 6.25×10^{19} electrons

(C) 6.25×10^{18} electrons (D) 2.65×10^{18} electrons

Q2. The commercial unit of electrical energy is:

(A) Watt (B) Watt-hour (C) Kilowatt-hour (D) Kilo-joule

Q3. Heat produced by passing an electric current through a fixed resistor is proportional to the square of:

(A) magnitude of resistance of the resistor (B) temperature of the resistor

(C) magnitude of current (D) time for which current is passed

Q4. If a radio signal takes 1.27 seconds to reach the earth from the surface of the moon, calculate the distance of the moon from the earth. Speed of radio signal = 3×10^8 m/s.

(A) 38.1×10^5 km (B) 2.81×10^5 km (C) 2.81×10^6 km (D) 3.81×10^5 km

Q5. An artificial satellite is moving in a circular orbit of radius 36,000 km. Calculate its speed if it takes 24 hours to revolve around the earth.

(A) 2.61 km/s (B) 4.18 km/s (C) 10.4 km/s (D) 900 km/hr

Q6. If the displacement of an object is zero, then the distance travelled by the object is:

(A) must be zero (B) negative

(C) may or may not be zero (D) infinite

Q7. Speedometer measures:

(A) average speed (B) instantaneous speed

(C) average velocity (D) both A and C

Q8. If the velocity of a body is constant, then its acceleration is:

(A) unity (B) infinite (C) any positive value (D) Zero

Q9. A hot and a cold body are kept in vacuum, separated from each other. Which of the following will cause a decrease in temperature of the hot body?

(A) Convection (B) Conduction

(C) Radiation (D) Temperature remains constant

Q10. Ampere-second stands for the unit of:

(A) power (B) charge (C) voltage (D) energy

Q11. A pendulum bob takes 0.5 second to move from an extreme position to the mean position. Its frequency is:

(A) 0.25 Hz (B) 1 Hz (C) 0.5 Hz (D) 2 Hz

Q12. Two bulbs of rating 50 W and 100 W are put in series across a 220 V mains supply. Then:

(A) Both bulbs will glow equally (B) neither bulb will glow

(C) 50 W bulb will glow brighter (D) 100 W bulb will glow brighter

Q13. Resistance of a metallic conductor:

(A) Increases with increase in temperature (B) Increases with decrease in temperature

(C) Decreases with increase in temperature (D) Always remains constant

Q14. A bulb and an LED are connected in series with a battery, and both are glowing. Now, if the LED is connected with reverse polarity, then:

(A) Only the bulb glows (B) Only the LED glows

(C) Both glow (D) neither of them glows

Q15. A pendulum clock is found to lose time. To correct it:

(A) Decrease the length of the pendulum (B) Increase the length of the pendulum

(C) Increase the amplitude of swing (D) None of these

Q16. Two friends 120 m apart start walking towards each other at 2 m/s and 3 m/s respectively. They meet each other in:

(A) 48 seconds (B) 36 seconds (C) 24 seconds (D) 96 seconds

Q17. Convection is the process of heat transfer that occurs mainly in:

(A) solids only (B) liquids only (C) vacuum (D) liquids and gases

Q18. Two identical Bulb are in series with a battery, and the ammeter reads 0.3A. A third identical bulb is added in series. The ammeter now reads:

(A) 0.45A (B) 0.3A (C) less than 0.3A (D) 0.9A

Q19. A Pendulum has a time period of 2 second. How many times does the bob pass through the mean position in 1 minute?

(A) 30 (B) 60 (C) 15 (D) 120

Q20. When Heat energy is supplied to a substance, its temperature is found to increase, then which of the following is possible?

(A) Change in size (B) Change in state (C) Change in mass (D) None of these

CHEMISTRY (20)

Q21. Which of the following is a physical property of metals?

(A) They are poor conductors of heat

(B) They are good conductors of heat and electricity

(C) They are brittle and break easily.

(D) They do not have any shine.

Q22. What is the standard unit for expressing the calorific value of a fuel?

(A) Kilojoule per kilogram (kJ/kg) (B) Gram per Joule (g/J)

(C) Kilogram per joule (kg/kJ) (D) Calorie per liter (Cal/L)

Q23. Which metal is used in the manufacture of aircraft?

(A) Iron (B) Aluminium (C) Copper (D) Lead

Q24. Which of the following is a non-metallic oxide that causes acid rain?

(A) MgO (B) SO_2 (C) CaO (D) Na_2O

Q25. Which of the following is a general property of acids?

(A) They are bitter in taste and turn red litmus blue.

(B) They are sour in taste and turn blue litmus red.

(C) They are soapy to touch.

(D) They are sweet in taste and neutral to indicators.

Q26. What are the two main products formed when an acid reacts with a base?

(A) Hydrogen gas and water (B) Salt and carbon dioxide

(C) Oxygen gas and acid (D) Salt and water.

Q27. Which of the following is an example of a physical change?

(A) Melting of ice cream (B) Burning of wood

(C) Rusting of iron (D) Cooking of food.

Q28. Which metal is stored in kerosene?

(A) Magnesium (B) Sodium (C) Iron (D) Nickle

Q29. Essential conditions required for the rusting of iron to take place?

(A) Oxygen and moisture (B) Carbon dioxide and nitrogen

(C) Oxygen and high temperature (D) Nitrogen

Q30. When an ant bites, it injects an acidic liquid (formic acid) into the skin. Which of the following can be applied to the skin to neutralise the sting's effect?

(A) Vinegar (B) Lemon juice (C) Moist baking soda (D) Tamarind juice

Q31. China rose indicator turns _____ in an acidic medium and _____ in a basic medium.

(A) green, dark pink (B) yellow, red (C) blue, colourless (D) dark pink, green

Q32. Which type of combustion occurs suddenly without any apparent cause or external heat application?

(A) Rapid combustion (B) Controlled combustion

(C) Explosion (D) Spontaneous combustion.

Q33. What is meant by "Ignition temperature" of a substance?

(A) The lowest temperature at which a substance catches fire

(B) The temperature at which a substance turns into gas.

(C) The maximum temperature a burning fuel can reach.

(D) The normal room temperature of a substance.

Q34. The pure crystals of a substance can be obtained from its impure solution by which of the following processes?

(A) Distillation (B) Crystallisation (C) Sublimation (D) Filtration

Q35. Which of the following processes represents a chemical change?

(A) Tearing a paper sheet. (B) Boiling water

(C) Burning a magnesium ribbon (D) Dissolving salt in water.

Q36. What happens when a red litmus paper is dipped into a solution of washing soda (sodium carbonate)?

(A) It turns green in colour (B) It turns blue in colour

(C) It remains red (D) It becomes completely colourless.

Q37. Which of the following methods cannot be used to prevent rusting?

(A) Painting (B) Alloying

(C) Galvanisation (D) Washing with water

Q38. Which property of metals by which they can be beaten into thin sheets?

(A) Ductility (B) Sonorosity

(C) Malleability (D) Lustre

Q39. Acid present in apple is:

(A) Citric acid (B) Malic acid

(C) Oxalic acid (D) Acetic acid

Q40. Which one of the following is an organic acid?

(A) Hydrochloric acid (B) Oxalic acid

(C) Nitric acid (D) Sulphuric acid

BIOLOGY (20)

Q41. The number of chromosomes in parents and offspring of a particular species remains constant due to:

(A) doubling of chromosomes after zygote formation

(B) halving of chromosomes during gamete formation

(C) doubling of chromosomes after gamete formation

(D) halving of chromosomes after gamete formation

Q42 . During adolescence, several changes occur in the human body. Mark one change associated with sexual maturation in boys:

(A) loss of milk teeth (B) increase in height

(C) cracking of voice (D) weight gain

Q43. Which state launched the She Pad Project to provide sanitary napkins in government and aided schools?

(A) Karnataka (B) Kerala (C) Odisha (D) Gujarat

Q44. Which of the following is another name for salivary amylase, the enzyme responsible for initiating starch digestion in the buccal cavity?

(A) Pepsin (B) Ptyalin (C) Trypsin (D) Rennin

Q45. Identify the odd one out based on the role of different parts of the human digestive system.

(A) Buccal cavity (B) Stomach (C) Small intestine (D) Oesophagus

Q46. Given below are events that lead to pregnancy and development of the embryo:

(i) Fertilization of egg

(ii) Maturation of egg

(iii) Release of egg

(iv) Embedding of the embryo in the thickened uterine wall

Which of the following options gives the correct order of sequence in which they occur?

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

Q47. What is the recommended practice for safely disposing of a used disposable sanitary pad?

(A) Flush it directly down the toilet bowl.

(B) Leave it unwrapped in an open wastebasket for easy disposal later.

(C) Bury it directly in uncovered outdoor soil to allow natural decomposition.

(D) Wrap it securely in paper and dispose of it in a covered trash bin.

Q48. Which of the following statements about the menstrual cycle is NOT correct?

(A) Menstruation occurs when pregnancy has not occurred and the uterine lining is shed.

(B) Ovulation involves the release of an ovum from an ovary.

(C) The menstrual cycle is controlled by hormonal changes.

(D) Menstruation occurs because the released ovum travels through the fallopian tube and directly tears the uterine lining.

Q49. A government school introduces a menstrual hygiene initiative that provides affordable menstrual products, awareness sessions, and guidance on safe disposal. Which outcome best represents the overall objective of such an initiative?

(A) To stop menstruation among adolescent girls.

(B) To make every student's menstrual cycle exactly 28 days long.

(C) To improve menstrual hygiene, access to products, awareness, dignity and school participation.

(D) To eliminate the natural hormonal changes associated with puberty.

Q50. During puberty, several physical and reproductive changes occur in adolescents. Which of the following statements is scientifically correct?

(A) The pituitary gland directly produces all sex hormones responsible for secondary sexual characteristics.

(B) Puberty begins at exactly the same age in all individuals because hormonal changes follow a fixed schedule.

(C) Hormones released by the pituitary gland stimulate the gonads to produce sex hormones, which contribute to reproductive maturity and secondary sexual characteristics.

(D) Secondary sexual characteristics appear only after an individual becomes capable of

reproduction, never before.

Q51. In which of the following groups of organisms, food material is broken down outside the body (extracellular digestion) followed by absorption?

(A) Mushroom, green plants, Amoeba (B) Yeast, mushroom, bread mould

(C) Paramecium, Amoeba, Cuscuta (D) Cuscuta, lice, tapeworm

Q52. Which is the correct sequence of parts in the human alimentary canal?

(A) Mouth → stomach → small intestine → oesophagus → large intestine

(B) Mouth → oesophagus → stomach → large intestine → small intestine

(C) Mouth → stomach → oesophagus → small intestine → large intestine

(D) Mouth → oesophagus → stomach → small intestine → large intestine

Q53. The inner lining of the stomach is protected by one of the following from hydrochloric acid. Choose the correct option:

(A) Pepsin (B) Mucus (C) Salivary amylase (D) Bile

Q54. Choose the function of the pancreatic juice from the following:

(A) Trypsin digests proteins and lipase carbohydrates

(B) Trypsin digests emulsified fats and lipase proteins

(C) Trypsin and lipase digest fats

(D) Trypsin digests proteins and lipase digests fats

Q55. Which of the following statement(s) is (are) true about respiration?

(i) During inhalation, ribs move inward and diaphragm is raised

(ii) In the alveoli, exchange of gases takes place i.e., oxygen from alveolar air diffuses into blood and carbon dioxide from the blood into the alveolar air

(iii) Haemoglobin has a greater affinity for carbon dioxide than oxygen

(iv) Alveoli increase surface area for exchange of gases

(A) (i) and (iv) (B) (ii) and (iii) (C) (i) and (iii) (D) (ii) and (iv)

Q56. During the process of exhalation, the ribs move:

(A) down and inwards. (B) up and inwards.

(C) down and outwards. (D) up and outwards.

Q57. Breathing is a process that:

(i) provides O_2 to the body. (ii) breaks down food to release energy.

(iii) helps the body to get rid of CO_2. (iv) produces water in the cells.

Which of the following gives the correct combination of functions of breathing?

(A) (i) and (ii) (B) (ii) and (iii) (C) (i) and (iii) (D) (ii) and (iv)

Q58. A housefly lands on dry sugar crystals. Why can it not take them in directly as solid particles?

(A) It has no digestive enzymes.

(B) Its mouthparts are adapted mainly for sponging liquids and dissolved food.

(C) It can feed only on living organisms.

(D) It has chewing mouthparts but no teeth.

Q59. A protein-rich meal enters the stomach. Which sequence correctly describes the role of gastric secretions?

(A) HCl activates pepsinogen → pepsin begins protein digestion → proteins are broken into smaller peptides.

(B) Pepsinogen digests proteins → HCl converts peptides into amino acids.

(C) HCl emulsifies proteins → bile salts digest them into peptides.

(D) Lipase converts proteins into amino acids → pepsin absorbs them.

Q60. Which of the following statements correctly compares the small intestine and the large intestine in humans?

(A) The small intestine is shorter and wider than the large intestine.

(B) The small intestine is longer and narrower than the large intestine.

(C) The small intestine and large intestine are approximately equal in length and width.

(D) The small intestine is longer and wider than the large intestine.