

Physics & Chemistry: 100 MCQs

- Target Exam: RRB Junior Engineer (RRB JE)
- Study Notes Prepared for: Entri App Users
- Coverage - Physics, Chemistry, and Life Sciences (Up to 10th Standard CBSE)

Section 1: Physics (50 MCQs)

Q1. An electric iron rated $750W$ operates for $4hours$ daily. What is the electrical energy consumed in 30 days in kWh (units)?

- (a) $45kWh$
- (b) $90kWh$
- (c) $120kWh$
- (d) $60kWh$

Q2. Two resistors of 6Ω and 3Ω are connected in parallel. This combination is connected in series with a 4Ω resistor. What is the equivalent resistance of the circuit?

- (a) 13Ω
- (b) 6Ω
- (c) 9Ω
- (d) 2Ω

Q3. If the distance between two point masses is doubled, the gravitational force between them becomes:

- (a) Double
- (b) Half
- (c) One-fourth
- (d) Four times

Q4. A bullet of mass $20g$ is fired with a velocity of $150m/s$ from a pistol of mass $2kg$. What is the recoil velocity of the pistol?

- (a) $-1.5m/s$
- (b) $-15m/s$

(c) $-0.15m/s$

(d) $-3.0m/s$

Q5. The radius of curvature of a convex mirror is $30cm$. Its focal length is:

(a) $+30cm$

(b) $+15cm$

(c) $-15cm$

(d) $-30cm$

Q6. A power of a lens is $-2.0D$. What is its focal length and type of lens?

(a) $+0.5m$, Convex lens

(b) $-0.5m$, Concave lens

(c) $-2.0m$, Concave lens

(d) $+2.0m$, Convex lens

Q7. An object is placed at a distance of $10cm$ in front of a concave mirror of focal length $15cm$. The nature of the image formed is:

(a) Real, inverted, and enlarged

(b) Virtual, erect, and enlarged

(c) Real, inverted, and diminished

(d) Virtual, erect, and diminished

Q8. Work done by a force acting on an object is zero if the angle between the force vector and displacement vector is:

(a) 0°

(b) 45°

(c) 90°

(d) 180°

Q9. A car accelerates uniformly from 18km/h to 36km/h in 5seconds . Calculate its acceleration.

- (a) 1m/s^2
- (b) 2m/s^2
- (c) 3.6m/s^2
- (d) 0.5m/s^2

Q10. What is the momentum of an object of mass m moving with velocity v ?

- (a) $(mv)^2$
- (b) mv^2
- (c) $\frac{1}{2}mv^2$
- (d) mv

Q11. A wire of length L and resistance R is stretched to double its length keeping mass constant. Its new resistance will be:

- (a) $2R$
- (b) $4R$
- (c) $R/2$
- (d) $R/4$

Q12. What is the value of acceleration due to gravity (g) at the center of the Earth?

- (a) 9.8m/s^2
- (b) Infinite
- (c) Zero
- (d) 4.9m/s^2

Q13. Sound waves cannot travel through:

- (a) Solids

(b) Liquids

(c) Gases

(d) Vacuum

Q14. The frequency of a wave is 50Hz and its wavelength is 4m . What is the speed of the wave?

(a) 200m/s

(b) 12.5m/s

(c) 100m/s

(d) 54m/s

Q15. The commercial unit of electrical energy is kilowatt-hour (kWh). 1kWh equals:

(a) $3.6 \times 10^5\text{J}$

(b) $3.6 \times 10^6\text{J}$

(c) 10^3J

(d) $3.6 \times 10^4\text{J}$

Q16. Commercial electric motors DO NOT use:

(a) An electromagnet to rotate the armature

(b) Effectively large number of turns of conducting wire in the current-carrying coil

(c) A permanent magnet to rotate the armature

(d) A soft iron core on which the coil is wound

Q17. Which of the following phenomena depends on atmospheric refraction?

(a) Reddening of the Sun at sunrise

(b) Blue color of the sky

(c) Advanced sunrise and delayed sunset

(d) Formation of a primary rainbow

Q18. The pitch of a sound wave depends on its:

- (a) Amplitude**
- (b) Frequency**
- (c) Wavelength**
- (d) Speed**

Q19. Loudness of sound is directly proportional to the square of its:

- (a) Frequency**
- (b) Speed**
- (c) Amplitude**
- (d) Time period**

Q20. When light enters from air into glass, its:

- (a) Frequency changes, velocity remains same**
- (b) Wavelength and velocity change, frequency remains constant**
- (c) Wavelength remains same, frequency changes**
- (d) Frequency, wavelength, and velocity all change**

Q21. A body of mass $5kg$ is dropped from a height of $10m$. What is its kinetic energy just before hitting the ground? ($g = 10m/s^2$)

- (a) $250J$**
- (b) $500J$**
- (c) $1000J$**
- (d) $50J$**

Q22. The absolute refractive index of Diamond is 2.42 . What is the speed of light in diamond? ($c = 3 \times 10^8 m/s$)

- (a) $1.24 \times 10^8 m/s$**
- (b) $2.42 \times 10^8 m/s$**

(c) $3.00 \times 10^8 \text{ m/s}$

(d) $1.50 \times 10^8 \text{ m/s}$

Q23. The law stating "The current through a conductor between two points is directly proportional to the voltage across the two points" is:

(a) Joule's Law

(b) Ohm's Law

(c) Faraday's Law

(d) Ampere's Law

Q24. An object placed at $2F_1$ in front of a convex lens will form an image at:

(a) F_2

(b) $2F_2$

(c) Beyond $2F_2$

(d) Infinity

Q25. Which device works on the principle of Electromagnetic Induction?

(a) Electric Motor

(b) Electric Generator

(c) Electric Heater

(d) Galvanometer

Q26. A current-carrying conductor placed in a magnetic field experiences maximum force when the angle between conductor and magnetic field is:

(a) 0°

(b) 45°

(c) 90°

(d) 180°

Q27. The buoyant force acting on an object immersed in a fluid acts in which direction?

- (a) Downward**
- (b) Upward**
- (c) Horizontally**
- (d) In the direction of force applied**

Q28. What is the value of Universal Gravitational Constant (G)?

- (a) $6.67 \times 10^{-11} \text{ N} \cdot \text{m}^2 / \text{kg}^2$**
- (b) 9.8 m/s^2**
- (c) $6.67 \times 10^{11} \text{ N} \cdot \text{m}^2 / \text{kg}^2$**
- (d) $3 \times 10^8 \text{ N} \cdot \text{m}^2 / \text{kg}^2$**

Q29. What type of image is formed on the retina of a human eye?

- (a) Virtual and erect**
- (b) Real and inverted**
- (c) Real and erect**
- (d) Virtual and inverted**

Q30. Presbyopia is corrected by using a:

- (a) Concave lens**
- (b) Convex lens**
- (c) Bifocal lens**
- (d) Cylindrical lens**

Q31. The phenomenon responsible for the twinkling of stars is:

- (a) Total internal reflection**
- (b) Atmospheric refraction**
- (c) Dispersion**

(d) Rayleigh scattering

Q32. Power of a combination of two thin lenses of powers $+ 2.5D$ and $- 1.5D$ in contact is:

(a) $+ 4.0D$

(b) $+ 1.0D$

(c) $- 1.0D$

(d) $+ 3.75D$

Q33. A sound source generates 20 compressions and 20 rarefactions in $0.2seconds$. What is its frequency?

(a) $100Hz$

(b) $50Hz$

(c) $200Hz$

(d) $20Hz$

Q34. The device used for changing resistance in an electric circuit without changing voltage source is:

(a) Voltmeter

(b) Rheostat (variable resistor)

(c) Ammeter

(d) Fuse

Q35. Heat produced (H) in a wire of resistance R when current I flows for time t is given by:

(a) $H = IRt$

(b) $H = I^2Rt$

(c) $H = IR^2t$

(d) $H = VI^2t$

Q36. Right-Hand Thumb Rule is used to determine the direction of:

- (a) Induced current
- (b) Force on a conductor
- (c) Magnetic field around a current-carrying conductor
- (d) Motion of conductor

Q37. The SI unit of electric charge is:

- (a) Ampere
- (b) Coulomb
- (c) Volt
- (d) Watt

Q38. What happens to the inertia of an object when its mass increases?

- (a) Decreases
- (b) Increases
- (c) Remains unchanged
- (d) Becomes zero

Q39. If an object is thrown vertically upwards with velocity u , the maximum height h attained is given by:

(a) $h = \frac{u}{2g}$

(b) $h = \frac{u^2}{2g}$

(c) $h = \frac{u^2}{g}$

(d) $h = 2gu^2$

Q40. Work-energy theorem states that work done on an object is equal to change in its:

- (a) Potential energy
- (b) Kinetic energy
- (c) Total mechanical energy

(d) Momentum

Q41. Rate of doing work is called:

(a) Force

(b) Energy

(c) Power

(d) Momentum

Q42. Speed of sound in air at 0°C is approximately:

(a) 331m/s

(b) 344m/s

(c) 1500m/s

(d) 5000m/s

Q43. An ultrasound signal sent down into the sea takes 3seconds to return. If speed of sound in seawater is 1500m/s , the depth of the sea is:

(a) 4500m

(b) 2250m

(c) 3000m

(d) 1500m

Q44. Overloading of electrical circuits occurs when:

(a) Live wire and neutral wire come into direct contact

(b) Too many appliances are connected to a single socket

(c) Voltage supply suddenly drops

(d) Fuse wire melts

Q45. The magnetic field inside a long straight current-carrying solenoid is:

(a) Zero

(b) Decreases as we move towards its ends

- (c) Same at all points
- (d) Increases as we move towards its ends

Q46. The focal length of a plane mirror is:

- (a) Zero
- (b) $+ 25cm$
- (c) $- 25cm$
- (d) Infinity

Q47. Refractive index of Medium B relative to Medium A is 1.5. Refractive index of Medium A relative to B is:

- (a) 1.5
- (b) 0.67
- (c) 2.25
- (d) 0.5

Q48. Human eye controls the amount of light entering it using the:

- (a) Cornea
- (b) Pupil / Iris
- (c) Ciliary muscles
- (d) Retina

Q49. Scatter of light by colloidal particles in a medium is known as:

- (a) Raman Effect
- (b) Tyndall Effect
- (c) Doppler Effect
- (d) Zeeman Effect

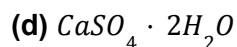
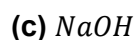
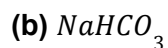
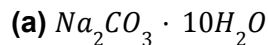
Q50. A fuse wire must have:

- (a) High resistance and high melting point

- (b) Low resistance and low melting point
- (c) High resistance and low melting point
- (d) Low resistance and high melting point

Section 2: Chemistry (50 MCQs)

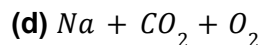
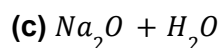
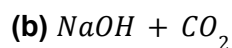
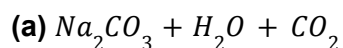
Q51. What is the chemical formula of Washing Soda?



Q52. The reaction $\text{CuO} + \text{H}_2 \xrightarrow{\Delta} \text{Cu} + \text{H}_2\text{O}$ is an example of:

- (a) Combination Reaction
- (b) Redox Reaction
- (c) Decomposition Reaction
- (d) Displacement Reaction

Q53. When Sodium Hydrogen Carbonate ($NaHCO_3$) is heated, the products formed are:



Q54. What is the pH value of acidic rain?

- (a) More than 7.0
- (b) Exactly 7.0

(c) Less than 5.6

(d) Between 6.5 and 7.5

Q55. Which gas is liberated when an acid reacts with a metal carbonate?

(a) Hydrogen gas

(b) Oxygen gas

(c) Carbon Dioxide gas

(d) Nitrogen Dioxide gas

Q56. An element 'X' forms a chloride with formula XCl_2 , which is a solid with a high melting point. 'X' would most likely belong to the same group as:

(a) Sodium (*Na*)

(b) Magnesium (*Mg*)

(c) Aluminum (*Al*)

(d) Silicon (*Si*)

Q57. What happens to the non-metallic character of elements moving left to right across a period in the Modern Periodic Table?

(a) Decreases

(b) Increases

(c) Remains same

(d) First decreases then increases

Q58. Which non-metal is a good conductor of electricity?

(a) Diamond

(b) Graphite

(c) Sulfur

(d) Phosphorus

Q59. Galvanization is a method of protecting steel and iron from rusting by coating them with a thin layer of:

- (a) Copper
- (b) Aluminum
- (c) Zinc
- (d) Tin

Q60. Hydrocarbons having general formula $C_n H_{2n-2}$ are called:

- (a) Alkanes
- (b) Alkenes
- (c) Alkynes
- (d) Cycloalkanes

Q61. Butanone is a 4-carbon compound with the functional group:

- (a) Carboxylic acid
- (b) Aldehyde
- (c) Ketone
- (d) Alcohol

Q62. What is the chemical formula of Bleaching Powder?

- (a) $Ca(OH)_2$
- (b) $CaOCl_2$
- (c) $CaCl_2$
- (d) $CaCO_3$

Q63. Solder, an alloy used for welding electrical wires together, is made of:

- (a) Lead and Tin
- (b) Copper and Zinc

(c) Copper and Tin

(d) Aluminum and Magnesium

Q64. When ethanol reacts with sodium metal, the gas evolved is:

(a) Carbon dioxide

(b) Hydrogen

(c) Oxygen

(d) Methane

Q65. Catenation is the property of self-linking among atoms to form long chains. It is maximum in:

(a) Silicon

(b) Carbon

(c) Nitrogen

(d) Sulfur

Q66. The functional group present in Ethanoic Acid (CH_3COOH) is:

(a) – CHO

(b) – OH

(c) – $COOH$

(d) – CO –

Q67. Which catalyst is used in the hydrogenation of vegetable oils?

(a) Platinum

(b) Nickel

(c) Iron

(d) Manganese dioxide

Q68. What is the chemical name of Plaster of Paris?

(a) Calcium sulphate dihydrate

(b) Calcium sulphate hemihydrate

(c) Calcium carbonate

(d) Calcium oxide

Q69. Which oxide among the following is an amphoteric oxide?

(a) Na_2O

(b) MgO

(c) Al_2O_3

(d) SO_2

Q70. Oxidation is a chemical reaction involving:

(a) Gain of electrons

(b) Loss of electrons

(c) Addition of hydrogen

(d) Removal of oxygen

Q71. Acid present in tamarind is:

(a) Citric acid

(b) Tartaric acid

(c) Oxalic acid

(d) Lactic acid

Q72. Milk of Magnesia is chemically:

(a) $Mg(OH)_2$

(b) $MgSO_4$

(c) $MgCl_2$

(d) $MgCO_3$

Q73. Bronze is an alloy of:

- (a) Copper and Zinc**
- (b) Copper and Tin**
- (c) Copper and Nickel**
- (d) Lead and Tin**

Q74. Electrostatic attraction between positive and negative ions forms:

- (a) Covalent bonds**
- (b) Ionic bonds**
- (c) Hydrogen bonds**
- (d) Metallic bonds**

Q75. The IUPAC name of $CH_3 - CHO$ is:

- (a) Methanal**
- (b) Ethanal**
- (c) Ethanol**
- (d) Methanol**

Q76. Alkaline hydrolysis of fats or oils to form soap is known as:

- (a) Esterification**
- (b) Saponification**
- (c) Hydrogenation**
- (d) Dehydration**

Q77. Solution of 8% acetic acid in water is known as:

- (a) Rectified spirit**
- (b) Vinegar**
- (c) Absolute alcohol**

(d) Formalin

Q78. How many groups and periods are present in the Modern Periodic Table?

(a) 8 Groups, 7 Periods

(b) 18 Groups, 7 Periods

(c) 7 Groups, 18 Periods

(d) 18 Groups, 8 Periods

Q79. Which element has the highest electronegativity in the periodic table?

(a) Chlorine

(b) Fluorine

(c) Oxygen

(d) Sodium

Q80. Elements in the same group of the periodic table have the same number of:

(a) Valence electrons

(b) Shells

(c) Atomic mass

(d) Neutrons

Q81. Modern Periodic Law was proposed by:

(a) Dmitri Mendeleev

(b) Henry Moseley

(c) John Newlands

(d) Johann Wolfgang Döbereiner

Q82. Cinnabar is an ore of:

(a) Mercury

(b) Copper

(c) Iron

(d) Zinc

Q83. Thermite reaction involves heating iron oxide with which metal powder?

(a) Zinc

(b) Copper

(c) Aluminum

(d) Magnesium

Q84. Carbon forms covalent bonds because it is:

(a) Tetravalent and small in size

(b) Monovalent

(c) Electropositive

(d) A heavy metal

Q85. What chemical compound causes the turn of lime water milky when CO_2 is passed through it?

(a) $Ca(HCO_3)_2$

(b) $CaCO_3$

(c) CaO

(d) $CaCl_2$

Q86. What happens when excess CO_2 is passed through lime water?

(a) Milkiness persists

(b) Milkiness disappears due to soluble $Ca(HCO_3)_2$

(c) Solution turns yellow

(d) Precipitate of CaO forms

Q87. pH of pure water at 25°C is:

(a) 0

(b) 7

(c) 14

(d) 1

Q88. Which acid is present in curd/sour milk?

(a) Oxalic acid

(b) Lactic acid

(c) Citric acid

(d) Formic acid

Q89. Chemical formula of Gypsum is:

(a) $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$

(b) $\text{CaSO}_4 \cdot \frac{1}{2}\text{H}_2\text{O}$

(c) CaCO_3

(d) CaO

Q90. Which metal can be cut easily with a knife?

(a) Sodium

(b) Iron

(c) Copper

(d) Aluminum

Q91. Bauxite is an ore of:

(a) Iron

(b) Copper

(c) Aluminum

(d) Zinc

Q92. Hydrocarbons containing single bonds between carbon atoms are called:

- (a) Saturated Hydrocarbons**
- (b) Unsaturated Hydrocarbons**
- (c) Aromatic Hydrocarbons**
- (d) Alkynes**

Q93. Pure gold is too soft for making jewelry. It is hardened by alloying with:

- (a) Copper or Silver**
- (b) Iron**
- (c) Zinc or Lead**
- (d) Aluminum**

Q94. General formula of Alkanes is:

- (a) $C_n H_{2n+2}$**
- (b) $C_n H_{2n}$**
- (c) $C_n H_{2n-2}$**
- (d) $C_n H_{2n+1}$**

Q95. The non-metal which is lustrous in appearance is:

- (a) Sulfur**
- (b) Phosphorus**
- (c) Iodine**
- (d) Carbon**

Q96. What is the nature of Non-metallic oxides?

- (a) Basic**
- (b) Acidic**
- (c) Amphoteric**

(d) Neutral only

Q97. Which acid is present in tomato?

(a) Oxalic acid

(b) Tartaric acid

(c) Methanoic acid

(d) Acetic acid

Q98. What is the process of coating zinc on iron called?

(a) Anodizing

(b) Galvanization

(c) Electroplating

(d) Alloy formation

Q99. Action of concentrated H_2SO_4 on ethanol at $443K$ yields:

(a) Ethene (C_2H_4)

(b) Ethane (C_2H_6)

(c) Ethanoic acid (CH_3COOH)

(d) Methanol (CH_3OH)

Q100. In Newlands' Law of Octaves, the properties of every 8th element were similar to those of the 1st element. This law was valid up to which element?

(a) Cobalt

(b) Calcium

(c) Thorium

(d) Potassium

Answer Key

Q.No	Ans	Q.No	Ans	Q.No	Ans	Q.No	Ans	Q.No	Ans
1	(b)	21	(b)	41	(c)	61	(c)	81	(b)
2	(b)	22	(a)	42	(a)	62	(b)	82	(a)
3	(c)	23	(b)	43	(b)	63	(a)	83	(c)
4	(a)	24	(b)	44	(b)	64	(b)	84	(a)
5	(b)	25	(b)	45	(c)	65	(b)	85	(b)
6	(b)	26	(c)	46	(d)	66	(c)	86	(b)
7	(b)	27	(b)	47	(b)	67	(b)	87	(b)
8	(c)	28	(a)	48	(b)	68	(b)	88	(b)
9	(a)	29	(b)	49	(b)	69	(c)	89	(a)
10	(d)	30	(c)	50	(c)	70	(b)	90	(a)
11	(b)	31	(b)	51	(a)	71	(b)	91	(c)

12	(c)	32	(b)	52	(b)	72	(a)	92	(a)
13	(d)	33	(a)	53	(a)	73	(b)	93	(a)
14	(a)	34	(b)	54	(c)	74	(b)	94	(a)
15	(b)	35	(b)	55	(c)	75	(b)	95	(c)
16	(c)	36	(c)	56	(b)	76	(b)	96	(b)
17	(c)	37	(b)	57	(b)	77	(b)	97	(a)
18	(b)	38	(b)	58	(b)	78	(b)	98	(b)
19	(c)	39	(b)	59	(c)	79	(b)	99	(a)
20	(b)	40	(b)						