

RRB

Railway Recruitment Board

Junior Engineer

CBT 1

Computer Based Test - Stage 1

- **General Science**
- **General Awareness**

Comprehensive Theory *with* Practice Questions
& Previous Years' Solved Questions





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RRB-Junior Engineer : General Science & General Awareness

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Preface

The post of Railway Recruitment Board-Junior Engineer has always been preferred by Engineers due to job stability. Indian Railways is one of the biggest Government employers in India. With the exam being just a few months away, it is time for the candidates planning to appear for the exam to pull up their socks and start their RRB-JE preparation.



The RRB-JE exam is conducted in two stages as shown in table given below.

Papers	Subjects	Maximum Marks	Duration
CBT-1 : Objective Type	(i) Mathematics	30 Marks	90 Minutes
	(ii) General Intelligence and Reasoning	25 Marks	
	(iii) General Awareness	15 Marks	
	(iv) General Science	30 Marks	
	Total	100 Marks	
CBT-2 : Objective Type	(i) General Awareness	15 Marks	120 Minutes
	(ii) Physics and Chemistry	15 Marks	
	(iii) Basics of Computers and Applications	10 Marks	
	(iv) Basics of Environment and Pollution Control	10 Marks	
	(v) Technical Abilities (viz, CE, ME, EE, EC, CS etc)	100 Marks	
	Total	150 Marks	

Note: There shall be negative marking for incorrect answers in CBTs. Each question carries 1 mark and 1/3rd of the marks allotted for each question shall be deducted for each wrong answer. Candidates shortlisted in Stage 1 will be called for Stage 2.

This book comprises both the General Science & General Awareness subjects. Besides, previous years' RRB-JE questions have been also included in a separate section. MADE EASY has taken due care to present detailed theory and MCQs without compromising the accuracy of answers.

Apart from Railway Recruitment Board-Junior Engineer Exam, this book is also useful for Public Sector Examinations and other competitive examinations for engineering graduates. I hope this book will prove as an important tool to succeed in RRB-JE and other competitive exams.

I have true desire to serve student community by providing good source of study materials and quality guidance. Any suggestion from the readers for improvement of this book is most welcome.

With Best Wishes

B. Singh

CMD, MADE EASY

Exam Syllabus

(Computer Based Test 2019-First Stage)

Mathematics: Number systems, BODMAS, Decimals, Fractions, LCM and HCF, Ratio and Proportion, Percentages, Mensuration, Time and Work, Time and Distance, Simple and Compound Interest, Profit and Loss, Algebra, Geometry, Trigonometry, Elementary Statistics, Square Root, Age Calculations, Calendar & Clock, Pipes & Cistern.

General Intelligence and Reasoning: Analogies, Alphabetical and Number Series, Coding and Decoding, Mathematical operations, Relationships, Syllogism, Jumbling, Venn Diagram, Data Interpretation and Sufficiency, Conclusions and Decision Making, Similarities and Differences, Analytical reasoning, Classification, Directions, Statement – Arguments and Assumptions etc.

General Awareness: Knowledge of Current affairs, Indian geography, culture and history of India including freedom struggle, Indian Polity and constitution, Indian Economy, Environmental issues concerning India and the World, Sports, General scientific and technological developments etc.

General Science: Physics, Chemistry and Life Sciences (up to 10th Standard CBSE syllabus).



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Physics

1

Chapter

Physics is a branch of science which is concerned with all aspects of nature on both the microscopic and macroscopic level. Its scope of study encompasses not only the behavior of objects under the action of forces but also the nature of gravitational, electromagnetic, nuclear forces among others. The ultimate objective of physics is to formulate comprehensive principles that bring together and explain all such phenomena.

UNITS & MEASUREMENT

Unit & Measurement

- Unit is the chosen standard used for measuring a physical quantity.
- There are basically two types of unit:
 - 1. Fundamental Unit:** These units are a set of measurements, defined arbitrarily and from which other units are derived. Examples: meter, kilogram, second, etc.
The fundamental unit of some of the physical quantities are given below:

International System of Units (S.I.)		
Physical	Fundamental	Symbol
Mass	Kilogram	kg
Length	Metre	m
Time	Second	s
Temperature	Kelvin	K
Electric-current	Ampere	A
Luminous intensity	Candela	Cd
Quantity of matter	Mole	mol

Systems of units	Length	Mass	Time
C.G.S. System	Centimetre	Gram	Second
F.P.S. System	Foot	Pound	Second
M.K.S. System	Metre	Kilogram	Second

- 2. Derived Unit:** All the units which are expressed in terms of fundamental units are known as derived units. Examples: Newton, Joule, etc.
- Internationally, there are four types of unit systems. These are:
 - 1. S.I. Units/System:** It is the modern form of the metric system, and is the most widely used system of measurement. It comprises a coherent system of units of measurement built on seven base units namely kilogram, meter, second, candela, ampere, kelvin and mol.
 - 2. CGS System:** The centimeter-gram-second (CGS) system of units is a variant of the metric system based on centimetre as the unit of length, gram as unit of mass, and the second as the unit of time.
 - 3. FPS System:** The foot-pound-second (FPS) system is a system of units built on three fundamental units: the foot for length, the pound for mass and the second for time.
 - 4. MKS System:** The MKS system of units is a physical system of units that expresses any given measurement using base units of the metre, kilogram, and second.

MOTIONS



Basics of Motion

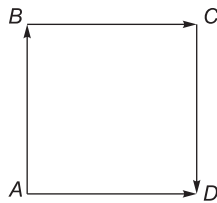
A body is said to be in motion if it changes its position with respect to its surroundings as time goes on. A body is said to be at rest if it does not change its position with time, with respect to its surroundings.

Types of Motion

- (i) When a particle or a body moves along a straight path, its motion is Rectilinear or translatory motion.
- (ii) When a particle or a body moves in a circular path, its motion is circular motion. When a body spins about its own axis, it is said to be in rotational motion.
- (iii) When a body moves to and fro or back and forth repeatedly about a fixed point in a definite interval of time, it is said to be in vibrational or oscillatory motion.

The path travelled by an object during its motion is called trajectory. The actual path length during the motion is called distance and, the straight distance between the initial and final position of the motion in a particular direction is called displacement.

Let a particle travel, starting from point A and go to point D along the path $ABCD$ in a given interval of time. The total path length ($= AB + BC + CD$) is the distance travelled and the shortest path length (AD) in the direction A to D is the displacement within the same time-interval.



Speed

The time rate of change of position of an object in any direction i.e. the rate of change of distance of an object with respect to time is known as speed.

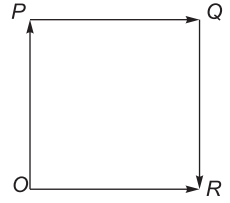
$$\text{Speed} = \frac{\text{displacement}}{\text{time taken}}$$

Velocity

The rate of change of displacement of an object with respect to time is known as velocity.

$$\text{Velocity} = \frac{\text{displacement}}{\text{time}}$$

Let a square $OPQR$ of side length 2 metre. A particle travels along its side starting from O to R via P and Q . It takes a total time of 2 seconds. The total distance travelled is $OP + PQ + QR = 2 + 2 + 2 = 6$ metres whereas the total displacement is $OR = 2$ metres. Hence



$$\text{Average Speed} = \frac{\text{distance}}{\text{time}} = \frac{6}{2} = 3 \text{ m/s}$$

$$\text{Average Velocity} = \frac{\text{displacement}}{\text{time}} = \frac{2}{2} = 1 \text{ m/s}$$

Acceleration

The rate of change of velocity with respect to time is called acceleration.

$$\text{Acceleration} = \frac{\text{Change in velocity}}{\text{time taken}}$$

When a body completes equal displacement in equal interval of time, its velocity is constant and hence, it does not have an acceleration. When a body shows equal change in velocity in equal interval of time its velocity is not constant but it has a constant acceleration.

Equation of Motion

For a body moving with a uniform velocity

If a body completes a displacement ' S ' in time ' t ' with a uniform velocity ' V ', then,

$$\text{Displacement} = \text{velocity} \times \text{time}$$

or $S = vt$... (i)

For a body moving with a uniform acceleration

If a body starting with an initial velocity ' u ' moves with a uniform acceleration ' a ' for a time ' t ' and attains a final velocity ' v ' after travelling a displacement ' s ' then,

$$S = ut + \frac{1}{2} at^2 \quad \dots \text{(iii)}$$

$$v^2 = u^2 + 2as \quad \dots \text{(iv)}$$

When the velocity of a body increases, it has a positive acceleration and when the velocity decreases, it has a negative acceleration.

PHYSICS

Practice Questions

- Q.1** A liquid is kept in a regular cylindrical vessel up to a certain height. If this vessel is replaced by another cylindrical vessel having half the area of cross-section of the bottom, the pressure on the bottom will
- Remain unaffected
 - Be reduced to half the earlier pressure
 - Be increase to twice the earlier pressure
 - Be reduced to one-fourth the earlier pressure
- Q.2** In SONAR, we use
- Ultrasonic waves
 - Infrasonic waves
 - Radio waves
 - Audible sound waves
- Q.3** Which one of the following reactions is the main cause of the energy radiation from the Sun?
- Fusion reaction
 - Fission reaction
 - Chemical reaction
 - Diffusion reaction
- Q.4** Two identical piano wires have same fundamental frequency when kept under the same tension. What will happen if tension of one of the wire is slightly increased and both the wire are made to vibrate simultaneously?
- Noise
 - Beats
 - Resonance
 - Non-linear effects
- Q.5** Which one among the following correctly defines a unit magnetic pole in SI units?
It is the pole which when placed in air at a distance of
- 1 foot from an equal and a similar pole repels it with a force of 1 pound
 - 1 metre from an equal and similar pole repels it with a force of 1 newton
 - 1 cm from an equal and a similar pole repels it with a force of 1 dyne
 - 1 metre from an equal and a similar pole repels it with a force of 1 newton/m²
- Q.6** Which one of the following phenomena is associated with the fire flies giving cold light in night?
- Fluorescence
 - Phosphorescence
 - Chemiluminescence
 - Effervescence
- Q.7** When a ball drops onto the floor it bounces back. Why does it bounce?
- The floor is perfectly fluid
 - The floor heats up on impact
 - Newton's third law implies that for every action (drop), there is a reaction (bounce)
 - The floor exerts a force on the ball during the impact
- Q.8** When you pull out the plug connected to an electric appliance, you will often observe a spark. To which property of the appliance is this related?
- Resistance
 - Inductance
 - Capacitance
 - Wattage
- Q.9** In scuba diving, while ascending towards the water surface, there is a danger of bursting the lungs. It is because
- Graham's law of diffusion
 - Archimedes' principle
 - Boyle's law
 - Henry's law
- Q.10** The most familiar form of radiant energy in sunlight that cause tanning and has the potential for causing melanoma in humans is called
- Infra-red radiation
 - Visible radiation
 - Ultra-violet radiation
 - Microwave radiation
- Q.11** An athlete diving off high springboard can perform a variety of exercise in the air before entering the water body. Which one of the following parameters will remain constant during the fall?
- The athlete's linear momentum
 - The athlete's angular momentum
 - The athlete's kinetic energy
 - The athlete's moment of inertia

- Q.97** What is the wavelength of visible spectrum ?
 (a) 1300 Å - 3000 Å
 (b) 3900 Å - 7600 Å
 (c) 7800 Å - 8000 Å
 (d) 8500 Å - 9800 Å
- Q.98** The sky appears blue because of
 (a) Atmospheric water vapour
 (b) Scattering of light
 (c) Reflection on sea water
 (d) Emission of blue wavelength by the sun
- Q.99** Oil rises up the wick in a lamp because
 (a) Oil is very light
 (b) Of the diffusion of oil through the wick
 (c) Of the surface tension phenomenon
 (d) Of the capillary action phenomenon
- Q.100** The hydraulic brakes used in automobiles is a direct application of:
 (a) Archimedes principle
 (b) Toricellian law
 (c) Bernoulli's theorem
 (d) Pascal's law
- Q.101** For a body moving with non-uniform velocity and uniform acceleration
 (a) Displacement - Time graph is linear
 (b) Displacement - Time graph is non-linear
 (c) Velocity - Time graph is nonlinear
 (d) Velocity - Time graph is linear
- Q.102** Lambert's law is related to
 (a) Reflection (b) Refraction
 (c) Interference (d) Illumination
- 103.** Decibel is the unit used for
 (a) Speed of light
 (b) Intensity of heat
 (c) Intensity of sound
 (d) Radio wave frequency
- 104.** The atmospheric layer reflecting 'radio waves' is called
 (a) Ozonosphere (b) Ionosphere
 (c) Stratosphere (d) Mesosphere
- 105.** The mass-energy relation is the outcome of
 (a) quantum theory
 (b) general theory of relativity
 (c) field theory of energy
 (d) special theory of relativity
- 106.** Danger signals are generally red as red light
 (a) is least bright
 (b) undergoes least deviation
 (c) has lowest velocity
 (d) gives comfort to eye
- 107.** Heat from the sun reaches earth by the process of
 (a) Conduction (b) Convection
 (c) Radiation (d) All of the above
- 108.** The instrument for measuring intensity of earthquakes is called
 (a) Ediograph
 (b) Pantagraph
 (c) Ergograph
 (d) Seismograph

Answer Key**General Science | Chapter 1 • Physics**

- | | | | | | | | | |
|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 1. (c) | 2. (a) | 3. (a) | 4. (b) | 5. (b) | 6. (c) | 7. (d) | 8. (a) | 9. (c) |
| 10. (c) | 11. (b) | 12. (d) | 13. (d) | 14. (d) | 15. (d) | 16. (b) | 17. (c) | 18. (b) |
| 19. (b) | 20. (c) | 21. (b) | 22. (c) | 23. (b) | 24. (c) | 25. (b) | 26. (b) | 27. (a) |
| 28. (b) | 29. (d) | 30. (b) | 31. (a) | 32. (a) | 33. (a) | 34. (b) | 35. (a) | 36. (a) |
| 37. (c) | 38. (b) | 39. (c) | 40. (c) | 41. (b) | 42. (a) | 43. (b) | 44. (d) | 45. (c) |
| 46. (b) | 47. (c) | 48. (c) | 49. (c) | 50. (d) | 51. (b) | 52. (d) | 53. (c) | 54. (a) |
| 55. (c) | 56. (b) | 57. (b) | 58. (d) | 59. (a) | 60. (b) | 61. (b) | 62. (a) | 63. (d) |
| 64. (c) | 65. (c) | 66. (d) | 67. (a) | 68. (c) | 69. (d) | 70. (a) | 71. (b) | 72. (b) |
| 73. (d) | 74. (a) | 75. (b) | 76. (c) | 77. (a) | 78. (b) | 79. (b) | 80. (d) | 81. (a) |
| 82. (c) | 83. (c) | 84. (a) | 85. (b) | 86. (b) | 87. (c) | 88. (b) | 89. (c) | 90. (b) |
| 91. (c) | 92. (c) | 93. (b) | 94. (b) | 95. (c) | 96. (a) | 97. (b) | 98. (b) | 99. (d) |
| 100. (d) | 101. (b) | 102. (d) | 103. (c) | 104. (b) | 105. (d) | 106. (b) | 107. (c) | 108. (d) |

MATTER

Matter

- Anything that has mass and occupies space is called matter. Matter can be classified on the basis of physical state and chemical constitution. In the physical state it is found in the form of solids, liquids and gases. These three forms of matter are found because of intermolecular force (force among atoms and molecules).
- Solids have a definite shape because of strong intermolecular force. The molecular force is not so strong in liquids, and therefore, liquids do not have a definite shape and have fluidity. Because of extremely weak intermolecular force, gases move freely and can occupy any space. According to chemical composition, matter can be classified into elements, compounds and mixtures.

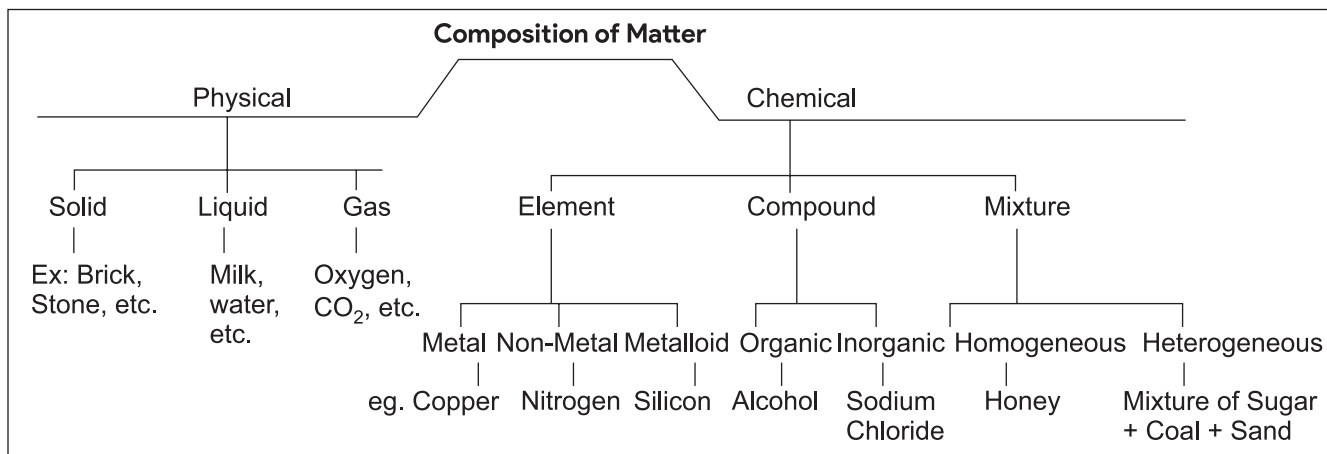
Composition of Matter

- Substance:** A substance is a matter which cannot be separated into other kinds of matter by any physical force.

- Element:** It is the purest form of a substance which cannot be broken into simpler substances by any chemical or physical process. Only one kind of atom is present in an element. There are 118 known elements, out of which 27 are man-made.

Elements can be divided into three groups: metals, non-metals and metalloids.

- Metals:** Any chemical element that is an effective conductor of electricity and heat can be defined as a metal. These are 90 in number.
 - Non-metals:** These are substances that do not exhibit such characteristic properties of metals as hardness, mechanical adaptability, or the ability to conduct electricity. There are 24 non-metals, out of which 12 found in solid state, one in liquid (Br) state and 11 in gaseous state.
 - Metalloids:** Metalloids possess the characteristics of both metal and non-metal, e.g. Silicon (Si), Germanium (Ge) and Antimony (Sb).
- Compound:** Two or more elements chemically combined to form a substance is called a compound.



CHEMISTRY

Practice Questions

- Q.1** Age of fossil may be found out by determining the ratio of two isotopes of carbon. The isotopes are
(a) C-12 and C-13
(b) C-13 and C-14
(c) C-12 and C-14
(d) C-12 and carbon black
- Q.2** Which one among the following statement about an atom is not correct?
(a) Atoms always combine to form molecule.
(b) Atoms are the basic units from which molecules and ions are formed.
(c) Atoms are always neutral in nature.
(d) Atoms aggregate in large numbers to form the matter that we can see, feel and touch.
- Q.3** Which one among the following statements is correct?
(a) All bases are alkalis.
(b) None of the bases is alkali.
(c) There are no more bases except the alkalis.
(d) All alkalis are bases but all bases are not alkalis.
- Q.4** The elements of a group in the periodic table
(a) have similar chemical properties
(b) have consecutive atomic numbers
(c) are isobars
(d) are isotopes
- Q.5** Which one among the following agents is added to domestic LPG cylinder to help in the detection of gas leakage?
(a) Methanol (b) Ethanol
(c) Ethyl Mercaptan (d) Chloroform
- Q.6** From which one among the following water source, the water is likely to be contaminated with fluorine?
(a) Ground water
(b) Rain water
(c) River water
(d) Pond water
- Q.7** Gypsum ($\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$) is added to clinker during cement manufacturing to
(a) decrease the rate of setting of cement
(b) bind the particle of calcium silicate
(c) facilitate the formation of colloidal gel
(d) impart strength to cement
- Q.8** One of the occupational health hazards commonly faced by the workers of ceramic, pottery or glass industries is
(a) stone formation in gall bladder
(b) melanoma
(c) stone formation in kidney
(d) silicosis
- Q.9** Which one of the following properties change with valency?
(a) Atomic weight
(b) Molecular weight
(c) Density
(d) Equivalent weight
- Q.10** The polymeric fibre used as substitute for wool in making synthetic blankets, sweater, etc., is
(a) Nylon (b) Teflon
(c) Orlon (d) Bakelite
- Q.11** Scuba divers are at high risk due to high concentration of dissolved gases while breathing air at high pressure under water. The tanks used by Scuba divers are filled with
(a) air diluted with helium
(b) O_2
(c) N_2
(d) a mixture of nitrogen and helium
- Q.12** Which one among the following is not a periodic property i.e., does not show any trend on moving from one side to the other in the Periodic Table?
(a) Atomic size
(b) Radioactivity
(c) Valency
(d) Electronegativity
- Q.13** The rusting of iron nail
(a) decreases its weight
(b) increases its weight
(c) does not affect weight but iron is oxidised
(d) does not affect weight but iron is reduced

BASICS OF BIOLOGY

Basics of Biology

Animals

Classification of animals

- When any plane passing through the central axis of the body divides the organism in two halves that are approximately mirror images it is called Radial symmetry and the animals showing radial symmetry are called *Radiata*.
- When the body can be divided into identical left and right halves in only one plane. This kind of symmetry is called bilateral symmetry and such animals are called *Bilateria*.
- Almost 99 percent of animals are invertebrates (animals without backbone) and the remaining represents the vertebrates (animals with backbone). Also, the animals are categorised into two major groups, non-chordates and chordates, on the basis of the presence or absence of *notochord* at some stage in their life.
- The animal kingdom is divided into 35 Phyla (singular: Phylum) of which 11 are considered as major Phyla.

1. Phylum Protozoa (Unicellular Protist Animals)

- They are microscopic organisms in which a single cell performs all the vital activities.
- They are aquatic (fresh water and marine) and cosmopolitan in distribution. Some forms are parasitic. The protozoan cell body is either naked, (for example, amoeba) or surrounded by a non-rigid pellicle (Cellulose is absent in pellicle).
- Different types of locomotory organs are found in protozoans.
- Locomotory organs are absent in the parasitic forms (Sporozoa) of protozoans.

- Most protozoans are free-living and aquatic. They are holozoic and feed largely on bacteria, microscopic algae and minute animals such as rotifers or on other protozoans including members of their own species. Some protozoans are holophytic i.e. they prepare their own food by photosynthesis (e.g. Euglena). The parasitic protozoans feed on materials obtained from the hosts (e.g. Monocystis).

Examples:

- (i) **Free living:** Euglena, Amoeba, Paramecium, Noctiluca and Elphidium.
- (ii) **Parasitic:** Monocystis, Entamoeba, Plasmodium, Trypanosoma and Giardia.

2. Phylum Porifera (Pore Bearing Animals)

- These are commonly known as *sponges*. They are the most primitive group of multicellular animals. About 5000 species of sponges are known. Most of them are marine and remain attached to rocks. A few live in fresh water.
- The sponges are *diploblastic*.
- Sponges reproduce *asexually* by fragmentation.

3. Phylum Cnidaria

- The phylum name is derived from the *stinging cells* or *cnidoblasts* present on the ectoderm of tentacles and body of the carnivorous animals. Cnidarians have achieved tissue grade of organisation and they exhibit a blind sac body plan and radial symmetry.
- Cnidarians are *diploblastic* animals in which the body wall consists of only two layers or cells, an outer ectoderm and an inner endoderm, separated by a gelatinous layer of mesoglea.
- **Examples:** Hydra, Obelia, Porpita, Vellela, Physalia (Portuguese man of war), Aurelia (Jellyfish), Adamsia (Sea anemone), Pennatula (Sea-pen) and Gorgonia (Sea-fan).

4. Phylum Ctenophora

- Ctenophores are marine animals with transparent and flat or oval body shape. *Polyphase* is absent in their life cycle. These are bilaterally symmetrical and devoid of cnidoblast cells.
- The presence of a *special sense organ* at the opposite end of the mouth (aboral end) is the characteristic of the members of this phylum. They reproduce only by *sexual* means and do not exhibit larval phase in their life cycle.

5. Phylum Platyhelminthes (Flatworms)

- These are dorsoventrally flattened and, hence, commonly known as *flatworms*. These are mostly parasites.
- These are *triploblastic* and unsegmented animals exhibiting bilateral symmetry.
- They reproduce both *asexually* and *sexually*.
- They are *hermaphrodites* or *bisexual* i.e., both male and female sex cells are produced by the same individual.
- **Examples:** Taenia (Tapeworm), Fasciola (Liver Fluke), Schistosoma (Blood fluke) etc.

6. Phylum Nematelminthes (Round Worms)

- These are also known as *nematodes*. Their bodies appear circular in cross-section, hence, the name *roundworm*. Though not apparent they are possibly the most abundant and numerous among animals.
- Roundworms are bilaterally symmetrical, triplo-blastic and pseudocoelomate animals with an organ system grade of organization.
- Round worms have a tube within a tube body plan with mouth, faringes, intestine and anus.
- Sexes are usually separate, often with small male and large female individuals.
- **Examples:** Ascaris, Wuchereria (Filaria worm), Ancylostoma (Hook worm), Enterobius (Pin worm) and Rhaditis.

7. Phylum Annelida

- Metamerically segmented animals with a true coelom.
- **Examples:** Nereis, Aphrodite (sea mouse), Phere-tima (Earthworm), Tubifex, Hirudinaria (Leech), Chaetopterus, Erebella, and Bonnellia.

8. Phylum Mollusca (Soft Bodied Animals)

- They are triploblastic coelomates and usually with bilateral symmetry. They are terrestrial, marine and fresh water inhabitants.
- **Examples:** Pilla (apple snail), Achatina

(land snail), Lamellidens (mussel), Pinctada (peal oyster), Sepia (cuttlefish), Loligo (squid), Octopus (devilfish), Doris (sea-lemon), Aplysia (sea-hare) and Teredo (shipworm).

9. Phylum Arthropoda

- The phylum Arthropoda constitutes the largest group of animals with about 900,000 species. These are triploblastic, coelomate and bilaterally symmetrical animals.
- Arthropods have a segmented body, each segment bearing a pair of jointed *appendages* covered by a jointed exoskeleton.
- Arthropods are *unisexual*.
- **Examples:** Araneus (garden spider), Limulus (king crab), Buthus (scorpion), Eupagurus (hermit crab), Cancer (common crab), Macrobrachium (prawn), Lepisma (silverfish), Periplaneta (cockroach), Apis (bee), Anopheles (mosquito), Musca (housefly), Leptocorisa (paddy pest: gandhi poka), Triops (tadpole fish), Daphnia (water flea), Cyclops, Squilla, Astacus (crayfish), Lepas and Balanus (Barnacle).

10. Phylum Chordata (Scordates)

- Chordata refers to the group of animals which possess *notochord* either throughout or during early embryonic life. Notochord is a stiff and flexible rod of tissues lying ventral to nerve chord. All the chordates are triploblastic, coelomate and bilaterally symmetrical.
- Phylum Chordata is divided into four subphyla viz. subphylum Hemichordata or stomochordata, subphylum Urochordata or Tunicata, subphylum Cephalochordata or Acrania and subphylum Vertebrata.

Difference between Chordates & Non-chordates	
Chordates	Non-Chordates
1. Notochord Present.	1. Notochord absent.
2. Central nervous system is dorsal, hollow and single.	2. Central nervous system is ventral, solid and double.
3. Pharynx perforated by gill slits.	3. Gill slits are absent.
4. Heart is ventral.	4. Heart is dorsal.
5. A post anal meta-merically segmented tail is present.	5. Terminal part (pygidium) is unsegmented.