Holidays Homework
Class-XI (SCIENCE)
Chemistry

1. The electronic configuration of H^- is
   i) $1s^o$ iii) $1s^1$
   ii) $1s^2$ iv) $1s^1\ 2s^1$
2. Magnetic quantum number specifies:
   i) Size of orbitals ii) shape of orbitals
   iii) Orientation of orbitals in space
   iv) Nuclear stability
3. When the value of n=2, m can have
   i) 1 value ii) 3 values
   iii) 4 values iv) 7 values
4. Which of the following are isoelectronic with one another?
   i) Na^+ and Ne ii) K^+ and O
   iii) Ne and O iv) Na^+ and K^+
5. A 200 g cricket ball is thrown with a speed of 3×10^3 cm/s, what will be its de-Broglie wavelength?
   i) 1.1×10^{-32} cm ii) 2.2×10^{-32} cm
   iii) 0.55×10^{-32} cm iv) 11.0×10^{-32} cm
6. If the speed of the electron in the Bohr's first orbit is x, then speed of the electron in the 3rd orbit would be:
   i) x/9 ii) x/3
   iii) 3x iv) 9x
7. Uncertainity in the position of an electron moving with a velocity 300 m/s, accurate upto 0.001% will be :
   i) 19.2×10^{-2} m ii) 5.76×10^{-2} m
   iii) 1.92×10^{-2} miv) 3.84×10^{-2} m
8. Calculate the energy in joule corresponding to light of wavelength 45 nm:
   i) 6.67×10^{15} ii) 6.67×10^{11}
   iii) 4.42×10^{-15} iv) 4.42×10^{-18}
9. The frequency of light emitted for the transition n=4 to n=2 of He^+ is equal to the transition in H atom corresponding to which of the following?
   i) n= 3 to n= 1 ii) n= 2 to n= 1
   iii) n= 3 to n= 2 iv) n= 4 to n= 3
10. The number of atoms in 0.1 mole of a triatomic gas is :
    i) 6.026×10^{15} ii) 1.806×10^{23}
    iii) 3.600×10^{23} iv) 1.800×10^{22}
11. The molarity of a solution obtained by mixing 750 mL of 0.5 M HCl with 250 mL of 2 M HCl will be:
    i) 0.875 M ii) 1.78 M
    iii) 1.02 M iv) 2.05 M
12. 1.0 g of magnesium is burnt with 0.56 g O_2 in a closed vessel. Which reactant is left in excess and how much?
    i) Mg, 0.16g ii) O_2, 0.16g
    iii) Mg, 0.44 g iv) O_2, 0.28 g
13. The number of grams of H_2SO_4 required to dissolve 5 g of $CaCO_3$ is:
    i) 10.24 ii) 4.9
    iii) 5.12 iv) 2.56
14. Two samples of lead oxide were separately reduced to metallic lead by heating in a current of hydrogen. The weight of lead from one oxide was half the weight of lead obtained from the other oxide. The data illustrates:
    i) Law of reciprocal proportions
    ii) Law of constant proportions
    iii) Law of conservation of mass
    iv) Law of definite proportions
15. Two elements A (at. Wt.75) and B (at. Wt. 16) combine to yield a compound. The % by weight of A in the compound was found to be 75.08. the formula of the compound is:
    i) A_2B ii) A_2B_3
    iii) AB iv) AB_2
16. What is the reason for anamolous electronic configuration of chromium and copper?
17. How many nodes are present in 3s, 4p, 5d orbitals? Also, define the term' nodes'.
18. Which of the following are degenerate orbitals:
    $3d_{xy}$, $4d_{xy}$, $3d_z^2$, $3d_{yz}$, $4d_{yz}$, $4d_z^2$
19. The arrangement of orbitals on the basis of energy is based on their (n+l) value. Lower the value of (n+l), lower is the energy. For the orbitals having same values of (n+l), the orbital with lower value of n will have lower energy.
    I. Based upon the above information, arrange the following orbitals in the increasing order of energy.
    (a) 1s, 2s, 3s, 2p
    (b) 4s, 3s, 3p, 4d
    (c) 5p, 4d, 5d, 4f, 6s
    (d) 5f, 6d, 7s, 7p

II. Based upon the above information, solve the questions given below:

(a) Which of the following orbitals has the lowest energy?

4d, 4f, 5s, 5p

(b) Which of the following orbitals has the highest energy?

5p, 5d, 5f, 6s, 6p

20. An atom having atomic mass number 13 has 7 neutrons. What is the atomic number of the atom?
21. Wavelengths of different radiations are given below:

    λ (A)= 300 nm, λ(B) = 300 μm λ(C) = 3 nm λ (D) =30 Ǻ

    Arrange these radiations in increasing order of their energies.

    (HINT: $E = h\frac{c}{\lambda}$)
22. The Balmer series in the hydrogen spectrum corresponds to the transition from n= 2,3,4……. to n=1. The series lies in the visible region. Calculate the wave number of line associated with the transitions in Balmer series when electron moves to n= 4 orbit.
23. According to de- Broglie, matter should exhibit dual behaviour. However, a cricket ball of mass 100 g does not move like a wave when it is thrown at a speed of 100 km/h. Calculate the wavelength of the ball and explain why it does not show wave nature.
24. Write the difference between orbit and orbital.
25. MATCHING TYPE QUESTIONS

    I. Match the quantum numbers with the information provided:

QUATUM NUMBERS	INFORMATION PROVIDED
Principal quantum number	Orientation of the orbital
Azimuthal quantum number	Energy and size of orbital
Magnetic quantum number	Spin of electron
Spin quantum number	Shape of the orbital

    II. Match the following rules with their statements:

RULES	STATEMENT
HUND'S RULE OF MAXIMUM MULTIPLICITY	No two more electrons in an atom can have same set of four quantum numbers.
AUFBAU PRINCIPLE	It is impossible to determine the exact position and exact momentum of a subatomic particle simultaneously.
PAULI EXCLUSION PRINCIPLE	Pairing of electron in the orbitals belonging to the same subshell does not take place until each orbital is singly occupied.
HEISENBERG UNCERTAINITY PRINCIPLE	In the ground state of atoms, orbitals are filled in the order of their increasing energies.

    Also, give the meaning of maximum multiplicity , Aufbau and exclusion.

26. Calculate the energy and frequency of the radiation emitted when an electron jumps from n=3 to n=2 in a hydrogen atom.
27. What were the limitations of Bohr's Model of an atom?
28. Write electronic configuration of Mg^{2+}, Fe, Ni^{2+}. (Atomic number of Mg=12, Ni= 28, Fe=26).
29. What is the difference between 'l' and 'L'?
30. Why is the energy level diagram of hydrogen different from multi electron species?

PHYSICS

1. The instantaneous speed is always equal to the magnitude of instantaneous velocity. Why?
2. Can a particle in one dimensional motion with zero speed have a non-zero velocity?
3. Rest and motion are relative terms. Explain.

4. Define instantaneous velocity and instantaneous speed. In what respects do these differ from each other?
5. What do you mean by relative velocity of a body w.r.t. another body? Obtain an expression for the same.
6. Draw the position-time graphs for two particles in one-dimensional motion when their relative velocity is:-
   (i) zero (ii) non-zero.
7. Under what conditions is the average velocity equal to the instantaneous velocity?
8. Why does time occur twice in a unit of acceleration?
9. Is the acceleration of a car greater when the accelerator is pushed to the floor or when brakes pedal is pushed hard?
10. Can a body have zero velocity and finite acceleration?
11. Can the direction of velocity of a body change when its acceleration is constant?
12. Two balls of different masses are thrown vertically upwards with same initial speed. Which one will rise to the greater height?
13. Can there be acceleration in motion of a body when the velocity of body is zero?
14. Deduce s= v_0t + 1/2 at^2 from velocity time graph. The body has initial velocity Vo and uniform acceleration, a.
15. Derive the relation v^2- v_0^2 =2as, where the letters have their usual meaning.

PDA

1. The dimensions of $\frac{\varepsilon_0 E^2}{2}$ (where ε_0 = absolute permittivity of free space and E = Electric field intensity) are **(I.I.T. 2000)**

(A) $[MLT^{-2}]$ (B) $[MLT]$

(C) $[ML^2T^{-1}]$ (D) $[ML^{-1}T^{-2}]$

2. The physical quantities not having the same dimensions are **(AIEEE 2003)**

(A) torque and work

(B) momentum and Planck's constant

(C) stress and Young's modulus

(D) speed and $(\mu_0 \varepsilon_0)^{-1/2}$

3. The dimensions of $\frac{1}{\mu_0 \varepsilon_0}$, where symbols have their usual meaning are **(AIEEE 2003)**

(A) $[L^{-1}T]$ (B) $[L^{-2}T^2]$

(C) $[L^2T^{-2}]$ (D) $[LT^{-1}]$

4. Which one of the following represents the correct dimensions of coefficient of viscosity (η) **(AIEEE 2004)**

(A) $[ML^{-1}T^{-2}]$ (B) $[ML^{-1}T^{-1}]$

(C) $[MLT^{-1}]$ (D) $[ML^{-2}T^{-2}]$

5. Out of the following pairs, which one doesn't have identical dimensions ? **(AIEEE 2005)**

(A) M. I and moment of force

(B) work and torque

(C) angular momentum and Planck's constant

(D) impulse and momentum

6. Which of the following units denotes the dimensions $[ML^2/Q^2]$, where Q denotes the electric charge ? **(AIEEE 2006)**

(A) H (B) H m^{-2}

(C) Wb (D) Wb m^{-2}

7. Two full turns of the circular scale of a screw gauge cover a distance of 1 mm on its main scale. The total number of divisions on the circular scale are 50. Further it is found that the screw gauge has a zero error of 0.03 mm. While measuring a diameter of a thin wire, a student notes the main scale reading of 3 mm and the number of circular scale divisions in line with the main scale as 35. The diameter of the wire is **(AIEEE 2008)**

(A) 3.32 mm (B) 3.37 mm

(C) 3.67 mm (D) 3.38 mm

8. Identify the pair whose dimensions are equal **(AIEEE 2008)**

(A) torque and work (B) stress and energy

(C) force and stress (D) force and work

9. The respective number of significant figures for the numbers 23.023, 0.003 and 2.1×10^{-3} are **(AIEEE 2010)**

(A) 5, 1, 2 (B) 5, 1, 5

(C) 5, 5, 2 (D) 5, 5, 5

10. Which one of the following represents the correct dimensions of the coefficient of viscosity? **[AIEEE 2004]**

(A) $[ML^{-1}T^{-1}]$ (B) $[MLT^{-1}]$

(C) $[ML^{-1}T^{-2}]$ (D) $[ML^{-2}T^{-2}]$

11. The dimensions of magnetic field in M, L, T and C (coulomb) are given as **[AIEEE 2008]**

(A) $[MLT^{-1}C^{-1}]$ (B) $[MT^2C^{-2}]$

(C) $[MT^{-1}C^{-1}]$ (D) $MT^{-2}C^{-1}]$

12. A body of mass m = 3.513 kg is moving along the x-axis with a speed of 5.00 ms^{-1}. The magnitude of its momentum is recorded as **[AIEEE 2008]**

(A) 17.6 kg ms^{-1} (B) 17.565 kg ms^{-1}

(C) 17.56 kg ms^{-1} (D) 17.57 kg ms^{-1}

13. In an experiment the angles are required to be measured using an instrument, 29 divisions of the main scale exactly coincide with the 30 divisions of the vernier scale. If the smallest division of the main scale is half a degree (= 0.5°), then the least count of the instrument is **[AIEEE 2009]**

(A) half minute (B) one degree

(C) half degree (D) one minute

14. A screw gauge gives the following reading when used to measure the diameter of a wire.

Main scale reading : 0 mm

Circular scale reading : 52 divisions

Given that 1 mm on main scale corresponds to 100 divisions of the circular scale. The diameter of wire from the above data is **[AIEEE 2011]**

(A) 0.052 cm (B) 0.026 cm

(C) 0.005 cm (D) 0.52 cm

BIOLOGY

1. Which is a missing link between birds and reptiles?
   a) Struthio b) Casuarias
   c) Apteryx d) Archaeopteryx
2. Which is the flightless bird?
   a) Fowl b) Passer
   c) Kiwi d) None of these
3. National Bird of India is
   a) Pavo cristatus b) Psittacula eupatoria
   c) Streptopelia decaoto d) Hierococcyx varius
4. Owl is
   a) Diurnal bird b) Vespertine bird
   c) Crepuscular bird d) Nocturnal bird
5. Which animal in Indian has become extinct?
   a) Rhinoceros b) Cheetah
   c) Wolf d) Giraffe
6. Mammals are characterized by
   a) Hair on the body
   b) Mammary glands
   c) External glands
   d) All the above
7. Mammals have evolved from
   a) Birds b) Reptiles
   c) Amphibians d) None of the above
8. The ape found in India is
   a) Orange Utan b) Gibbon
   c) Chimmpanzee d) Gorilla
9. A mammal which can imitate human laughter is
   a) Dolphin b) Seal
   c) Walrus d) Whale
10. Filaria, Malaria, Dengue, sleeping sickness and yellow fever are due to
    a) Insects b) Mosquitoes
    c) Bacteria d) Viruses
11. Which disease is spread by housefly?
    a) Dengue fever b) Encephalitis
    c) Filariasis d) Gangrene
12. Rearing of silkworm is/silk industry is related to
    a) Apiculture b) Pisiculture
    c) Sericulture d) Horticulture
13. Vector of malaria is
    a) Male culex b) Female Anopheles
    c) Female aedes d) Female culex
14. Green glands found in some arthropods take part in
    a) Excretion b) Respiration
    c) Digestion d) Both A and B
15. The most important character of chordate is
    a) Dorsal hollow nervous system b) Vertebral column
    c) Kidneys d) None of these
16. Notochord is used in
    a) Attachment of muscles
    b) Development of dorsal nerve cord
    c) Formation of gill slits
    d) Development of kidneys
17. The largest poisonous Indian snake is
    a) Krait b) King cobra
    c) Cobra d) Python
18. A poisonous lizard is
    a) Varanus b) Phrynosoma
    c) Heloderma d) Ophisaurus
19. Name the fresh water sponge
    a) Spongia b) Sycon
    c) Euplectella d) Spongilla
20. Which is a collared cell
    a) Scleroblast b) Silicoblast
    c) Chromocyte d) Choanocyte
21. Skeleton of sponge is
    a) Ectodermal b) Endodermal
    c) Exoskeleton d) Endoskeleton
22. Undigested food of Hydra is expelled from
    a) Mouth b) Anus
    c) General surface d) Hypostome
23. Jelly fish is
    a) Adamsia b) Aurelia
    c) Scoliodon d) Torpedo
24. Coral reef is formed of
    a) Siliceous matter b) Limestone
    c) Chitin d) Lava
25. Worms of Platyhelminthes are
    a) Roundworms b) Flatworms
    c) Segmented worms d) Unisexual
26. Taenia solium belongs to phylum
    a) Aschelminthes b) Mollusca
    c) Platyhelminthes d) Annelida
27. Flame cells are excretory organs of
    a) Hydra b) Hydrilla
    c) Cockroach d) Planaria
28. The unique characteristic of annelid is
    a) Coelom b) Nephridia
    c) Hermaphrodite d) Alimentary canal is complete
29. Excretory organs of an earthworm are
    a) Nephridia b) Flame cells
    c) Malphigian tubules d) Green glands
30. Blood pigment of annelids is
    a) Haemoglobin b) Cyanin
    c) Haemanin d) Haemocyanin

31. Blue green algae used in rice fields to increase fertility is
    a) Rivularia b) Nostoc
    c) Aulosira d) Anabaena
32. The common mode of reproduction in bacteria is
    a) Fission b) Budding
    c) Sexual reproduction d) Sporulation
33. Bacteria having a tuft of flagella at one end are called
    a) Peitrichous b) Monotrichous
    c) Lophotrichous d) Amphitrichous
34. The fixation of free nitrogen by bacteria in the soil is done by
    a) Azotobacter b) Nitrosomonas
    c) Nitrobacter d) Thiobacillus
35. Halophiles can comfortably live in
    a) Dead sea b) Dal lake
    c) Arabian sea d) Godavari
36. The bacterium which reduces the fertility of soil is
    a) Nitrosomonas b) Bacillus denitrificans
    c) Azotobacter sp. d) Nitrobacter
37. Food poisoning is caused by
    a) Clostridium botulinum
    b) Salmonella typhosa
    c) Clostridium tetani
    d) None of these
38. The organisms which are included in the kingdom Monera are
    a) Unicellular b) Without a definite nucleus
    c) Uninucleate d) Coenocytes
39. The cell wall of bacteria contains
    a) Cellulose b) Hemicelluloses
    c) Peptidoglycan d) All the above
40. Rod-shaped bacteria are
    a) Mycobacteria b) Cocci
    c) Vibrios d) Bacilli
41. Binary fission in Amoeba occurs by
    a) Mitosis b) Meiosis
    c) Amitosis d) None of the above
42. Amoeba is
    a) Herbivorous b) Carnivorous
    c) Sanguivorous d) Omnivorous
43. Female anopheles pours its saliva while biting skin of man so as
    a) To release sporozoites
    b) To cause irritation
    c) To prevent blood clotting
    d) None of the above
44. Who first of all discovered Penicillin
    a) Alexander Fleming b) Robert Fleming
    c) Ian Fleming d) None of these
45. Agaricus is a member of
    a) Ascomycetes b) Deuteromycetes
    c) Basidiomycetes d) Phycomycetes
46. Vegetative reproduction in yeast takes place by
    a) Akinetes b) Aplanospores
    c) Ascospores d) Budding
47. Fungal cell wall is composed of
    a) Chitin b) Chitin or cellulose
    c) Hemicelluloses d) Cellulose
48. Lichens show
    a) Commensalism b) Mutualism
    c) Parasitism d) Mycorrhizal association
49. Common bread mould is
    a) Aspergillus b) Penicillium
    c) Erysiphe d) Rhizopus
50. Haemocoel occurs in
    a) Earthworm b) Hydra
    c) Cockroach d) Leech
51. The smuts of crop plants are caused by
    a) Puccinia b) Cystopus
    c) Ustilago d) Agaricus
52. Mushrooms belong to kingdom
    a) Plantae b) Animalia
    c) Protista d) Fungi
53. Unicellular green alga is
    a) Ulothrix b) Spirogyra
    c) Chlamydomonas d) All the above
54. Mode of sexual reproduction in Spirogyra is
    a) Isogamous b) Anisogamous
    c) Heterogamous d) Oogamous
55. The largest alga is
    a) Laminaria b) Macrocystis
    c) Nereocystis d) Sargassum
56. A living fossil is
    a) Pinus b) Ephedra
    c) Cedrus d) Cycas
57. Which of the following is a 'bog moss'/peat moss?
    a) Bryum b) Polytrichum
    c) Sphagnum d) Taxithelium
58. Example of the plant which bears seed but not fruit is
    a) Mango b) Selaginella
    c) Pinus d) Wheat
59. Bryophytes live in habitats that are
    a) Saline b) Dry
    c) Moist d) Exposed
60. Embryo development is
    a) Absent in algae b) Present in fungi
    c) Moist d) Exposed

PDAV