



Medical College Admission Test : 2007-2008

Zoology

1. Which one of the following information is incorrect-

- A. An active ovum is derived from a germ cell.
- B. DNA is the only permanent chemical substance of the chromosome.
- C. RNA is only present in nucleus. ✓
- D. More than one thousand sperm is produced in each minute.

Exp:

- A. From a single germ cell 4 cells are produced out of which 3 are polar body which are subsequently destroyed and one ovum is produced. So (A) is correct.
- B. Chemical substances of chromosomes are protein, DNA, in which DNA is permanent. So (B) is correct.
- C. RNA is present not only in the nucleus but also in the cytoplasm. So (C) is incorrect.
- D. More than one thousand sperm is produced in each minute which is also correct.

2. Which one is the derivative of ectoderm?

- A. Respiratory system
- B. Blood circulatory system
- C. Skeletal system
- D. Nervous system ✓

Exp :

- A. Respiratory system is derived from endoderm.
- B. Skeletal system is an example of connective tissue which is a derivative of mesoderm.
- C. Blood circulatory system is derived from mesoderm because it is a connective tissue.
- D. Nervous system is derived from ectoderm. So nervous system is the answer.

Other derivatives of ectoderm.

- (i) Epidermis of skin, glands of skin, hair, nail, horns and squamous of fishes.
- (ii) Eye and internal ear.
- (iii) Mucous membrane of anus.
- (iv) Enamel of teeth and mucous membrane of mouth cavity.
- (v) Whole nervous system and some muscles are derived from ectoderm.

3. Which information is incorrect-

- A. Matrix contain chondrins is cartilage.
- B. Connective tissue is derived from mesoderm.
- C. Fibroblast helps in synthesis of white (collagen) fibre.
- D. Cardiac muscle is voluntary. ✓

Exp :

- A. Matrix of cartilages contain a solid, elastic substance called chondrin which is composed 2 protein chondromucoid and chondroalbuminoid. So (A) is correct.
- B. Connective tissue is derived from mesoderm. So (B) is also correct.
- C. Fibroblast helps in formation of collagen fibres. So (C) is correct.
- D. Cardiac muscle is not voluntary because it's action is not under the control of animals will. So D is incorrect.

4. Which cranial nerve is associated with olfaction-

- A. Trigeminal
- B. Glossopharyngeal
- C. Olfactory ✓
- D. Hypoglossal

Exp :

Serial No.	Name	Source	Distribution	Type	Function
I	Olfactory	Forebrain	Nose	Sensory	olfaction
V	Trigeminal	Medulla Oblongata	Face	Mixed	Movement of organ & General sense.
IX	Glossopharyngeal	Medulla Oblongata	Tongue	Mixed	Taste & Tongue movement
XII	Hypoglossal	Medulla Oblongata	Tongue	Motor	Movement of tongue

So it is found that nerve associated with smell or olfaction is olfactory nerve.

5. Which part of the eye makes the images of substance-

- A. lens
- B. Pupil
- C. Cornea
- D. Retina ✓

Exp:

- ☆ Light rays are curved by the lens and fall on the retina.
- ☆ Due to transparency of cornea light rays enter to the interior of eyeball.
- ☆ Pupil helps in appropriate amount of light fall on the retina.
- ☆ Images of substance are formed on retina. So answer will be Retina.





6. Which organ maintains equilibrium of the body- Exp:

- A. Incus
- B. Vestibular apparatus ✓
- C. Organ of corti
- D. Cochlea.

Exp: Incus is a ossicle of ear which transmits sound vibration. Organ of corti is sensory cell which lies in the basilar membrane and associated with the perception of sound. Cochlea is acts as a hearing organ. So body equilibrium is maintained by vestibular apparatus.

7. In case of Filaria worm which information is incorrect?

- A. Di ethayl carbamazine is a potent drug in filariasis treatment.
- B. Human are the primary host of this parasite.
- C. Microfilrae is found more in the peripheral circulation in day. ✓
- D. Expression of disease occur after 1 year of entrance of parasite in the body.

Exp: In case of Filariasis Di ethayl carbamazine or invermectin is a potent drug. Sexual reproduction of parasites occur with in the lymph node of human. So humans are the primary and mosquito is the secondary host. From 10 PM to 2 AM microfilarae is found more in the peripheral circulation. Not in daytime. Expression of disease occur after 1 year of entrance of parasite. So answer will be (C).

8. Which statement of the following is incorrect.

- A. Sino-atrial node is situated in the wall of right atrium.
- B. The veins which come to atria are valve less.
- C. Pulmonary artery starts from right ventricle.
- D. Mitral valve is situated between the right ventricle and right atrium. ✓

Exp: Here all are correct except (D). D is not correct because mitral valve situated between left ventricle and left atrium.

9. Which enzyme is present in the saliva?

- A. Pepsin
- B. Protease
- C. Lipase
- D. Ptyalin ✓

☆ Pepsin is a proteolytic enzyme which present in gastric juice.
 ☆ Protease is also proteolytic enzyme which absent in saliva.
 ☆ Lipase one is lipolytic enzyme which mainly present in the pancreatic juice.
 ☆ Ptyalin is the only carbohydrate digestive enzyme present in the saliva.

10. Human skull is consists of ---- bones.

- A. 31
- B. 27
- C. 21
- D. 29 ✓

Exp: Human skull is made by 29 bones out of which 8 forms cranium and 14 forms face. Rest 7 forms 1 hyoid and 6 ossicles of ear.

<u>Cranium</u>		<u>Facial</u>	
Frontal	1	Maxilla	2
Parietal	2	Mandible	2
Temporal	2	Lacrimal	2
Occipital	1	Inferior nasal concha	2
Sphenoid	1	Zygomatic	2
<u>Ethmoid</u>	<u>1</u>	Nasal	2
	= 8	Vomer	1
		<u>Palatine</u>	<u>2</u>
			= 14

11. Who classify the blood of human being-

- A. Theodor schwann
- B. Karl Landsteiner ✓
- C. Willium Hervey
- D. Carolus Linnaeus

Exp: Theodor schwann- gave cell theory.
 Willium Hervey- discover blood circulation.
 Karl Landsteiner- Classify human blood.
 Carolus linnaeus- Father of taxonomy.

12. How much days are required to exit nymph from zygote-

- A. 32
- B. 25
- C. 20
- D. 30 ✓

Exp: From zygote nymph exit after 1 month. So D is the answer others are false.

13. Which statement is false in case of cockroach?

- A. Super position image is formed in bright light. ✓
- B. Hemolymph is colourless plasma and contains about 9 million haemocytes.
- C. Cockroach is omnivorous.
- D. Due to absense of pigments the hemolymph can not play any role in respiration.

Exp: Cockroach do not make superposition image in bright light, rather it is formed in dim light. In bright light it makes apposition or mosaic image. So (A) is incorrect. Others are true.

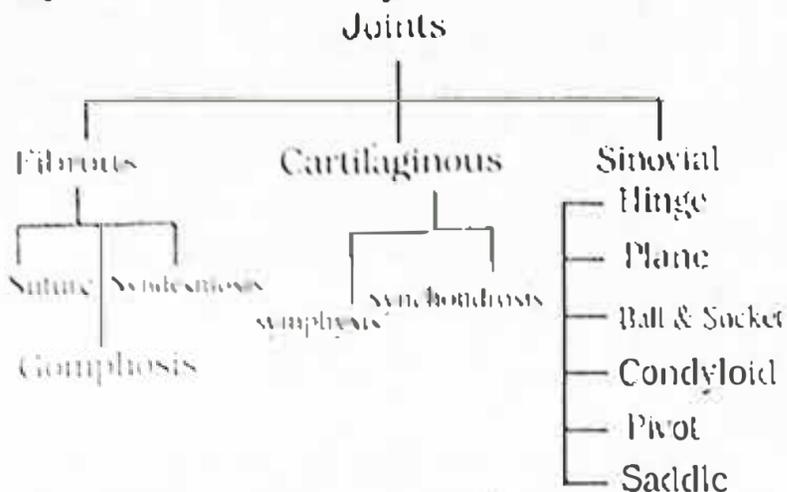




14. Symphysis- which type of joint it is-

- A. Condylloid
- B. Fibrous
- C. Cartilaginous ✓
- D. Sinovial

Exp: Classification of Joints-



So, Symphysis is the cartilaginous joint.
So, answer is (C).

15. Which of the following is false-

- A. Extraction of drugs from transgenic animals is called molecular farming.
- B. Plasmid is usually collected from E. Coli in recombinant DNA Technology.
- C. Germs are identified by monoclonal antibody.
- D. Insulin is one type of enzyme which is secreted by pancreatic α Cell. ✓

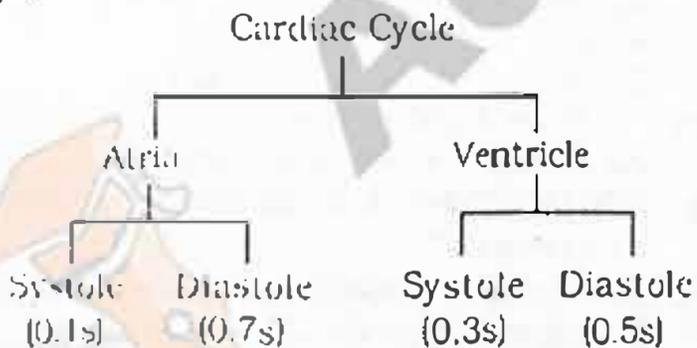
Exp:

Insulin is not an enzyme. It is a hormone, which is secreted by pancreatic β cell of islets of Langerhans, not from α cell. Rest are true. So, ans is (D).

16. What is the time duration of diastole of atria of heart?

- A. 0.7s ✓
- B. 0.3s
- C. 0.1s
- D. 0.5s

Exp :



So, time duration of diastole of atria- 0.7 second.

17. Latent Period of P. falciparum

- A. 11-16 days
- B. 8-15 days ✓
- C. 12-20 days
- D. 18-40 days

Exp :

- P. falciparum 8-15 days.
- P. malariae 18-40 days.
- P. ovale..... 11-16 days.
- P. vivax 12-20 days.

Physics 1st Paper

1. Which force of the following associates electrons with the nucleus to form atom?

- A. weak nuclear force.
- B. Electro magnetic force. ✓
- C. Gravitational force.
- D. Strong nuclear force.

Exp:

- ☆ Electro magnetic force- associates electron to the nucleus to form atom.
- ☆ Gravitational force- converge the stars to form galaxy.
- ★ Strong nuclear force- associates proton and neutron to form nucleus.
- ☆ Weak nuclear force- responsible for the β fission of nucleus.

2. Green House effect can be explained by-

- A. Law of conservation
- B. Wien's law ✓
- C. Stefan's law
- D. Newton's law of cooling.

Exp:

According to Wien's law as the T increases wave length (λ_m) decreases. Rays coming from sun when enter to green house it is easily done because the temperature of sun is extreme so λ_m is very small.

Then at night radiation can not come out of green house because temperature of the interior of green house is not so high so wave length at which radiation occur is very large, which can not transmit through glass. So heat trapped in the house and make it warm all day.

So, green house effect is explained by Wien's law.

3. In Fahrenheit scale which one of the following is the ice point?

- A. 32°F ✓
- B. 0°F
- C. 12°F
- D. 22°F

Exp:

	Ice point	Steam point
Fahrenheit Scale	32°F	212°F
Celsius Scale	0°C	100°C
Kelvin Scale	273.15K	373.15K

4. Temperature of triple point of water is-

- A. 100.13K
- B. 137.14K
- C. 212.18K
- D. 273.16K ✓

Exp:

Triple point of water is a temperature in which water, ice, and steam are in an equilibrium at a definite pressure. The temperature is 273.16K.





5. A man of 74.6 Kg weight can pass through 20 steps of 25cm height at 10s. Calculate the power (w) of the individual.

- A. 367.54
B. 364.54 ✓
C. 365.54
D. 366.54

Exp: Here,

Mass, $m = 74.6 \text{ Kg}$

Height, $h = \frac{25 \times 20}{100} \text{ m} = 5 \text{ m}$

Time, $t = 10 \text{ s}$

$g = 9.8 \text{ ms}^{-1}$

We know, $w = \frac{mgh}{t} = \frac{74.6 \times 9.8 \times 5}{10} = 365.54 \text{ w}$.

So ans is (B).

6. The filament of the head light of a car can flow 5A electric current. The potential difference is 6v. What is the resistance of filament in ohm?

- A. 2.0
B. 1.2 ✓
C. 1.0
D. 1.5

Exp:

Here, Electric Current, $I = 5 \text{ A}$

Potential difference, $V = 6 \text{ V}$

Resistance, $R = ?$

We know,

$V = IR \therefore R = \frac{V}{I} = \frac{6}{5} = 1.2 \Omega$

So ans. is (B)

7. In which process the temperature of the system kept remaining in a constant level, changes done in the pressure and volume-

- A. Adiabatic
B. Isobaric
C. Thermodynamic
D. Isothermal ✓

Exp:

In isothermal process the temperature is constant and change occur in pressure and volume. In adiabatic process the system is isolated thermally and changes done in pressure and volume. Isothermal is a slow and adiabatic is a rapid process. In isobaric process keeping pressure constant the volume of gas is changed. So, ans. is (D)

8. Thermometer for measuring temperature of body are graduated in which scale-

- A. International scale of temperature
B. Celsius scale
C. Fahrenheit scale ✓
D. Thermodynamic scale.

Exp:

To measure temperature of the body Fahrenheit scale is suitable and it is used. It is graduated from 95°F to 110°F . Another name of Fahrenheit scale is clinical thermometer. So ans is (C),

8. 100 division of Celsius scale equal to division Fahrenheit scale.

- A. 212
B. 173
C. 100
D. 180 ✓

Exp:

In Celsius scale : Ice point is 0° and steam point 100°C .

In Fahrenheit scale : Ice point is 32° and steam point 212°C .

$\therefore 100^\circ \text{C} - 0^\circ \text{C} = 212^\circ \text{F} - 32^\circ \text{F}$

$\therefore 100^\circ \text{C} = 180^\circ \text{F}$

So, Answer is (D).

Physics 2nd Paper

1. Which information is incorrect about LASER?

- A. Light is very bright and intense.
B. Composed of one or more chromatic light. ✓
C. Light is sharp and directed toward a definite point.
D. Light is coherent.

Exp:

Characteristics of LASER

(i) Intensity of the ray is very high.

(ii) Rays are accurately parallel.

(iii) It is a monochromatic ray.

(iv) Light ray's are coherent.

(v) Rays are not absorbed by water.

LASER is made up of monochromatic ray.

So, (B) is incorrect.

2. Which is the near point (cm) of a normal eye?

- A. 28
B. 15
C. 23
D. 25 ✓

Exp:

The lowest distance at which the eyes can see an object easily is called near point of eye. In normal eye it is 25cm. The highest distance at which the eyes can see an object easily is called far point of eye. For normal eye it is infinity. So, ans is (D).

3. If an object is situated $2f$ distant to the lens then the shape of the image in the convex lens will be-

- A. Magnified
B. Larger than object
C. Equal to the object ✓
D. Smaller than object

Exp:

We know radius of curvature is equal to the double of focal length ($2f$). If an object is situated in the centre of the curvature ($2f$ distant from pole) the image of that object will be situated also in the centre of the curvature and size will be equal to that, so answer is (C).





4. Which ray is used for the destruction of cancer cells of human being-
 A. Ultraviolet ray B. Beta ray
 C. Alpha ray D. Gamma ray ✓

Exp:

Gamma ray is an electromagnetic wave of very minute wave length. If it falls upon the cancer cells, the cells are destroyed. So γ ray is used for the radiotherapy treatment of cancer & ans is (D).

5. The capacity of a capacitor is 40F, when potential is 8v then what will be the given charge?
 A. 325C B. 308C
 C. 300C D. 320C ✓

Exp:

Here, Capacity, $C = 40F$, Charge, $Q = ?$, Potential, $V = 8V$.

We know, $C = \frac{Q}{V}$, $Q = CV = 40 \times 8C = 320C$. So, ans is (D).

6. Two charge of 1C is situated 1 Km apart from each other in the air medium, then what will be the interactive force between them?
 A. $9 \times 10^3 N$ B. 9×10^3
 C. 6×10^3 D. 10×10^3

Exp:

Here, Charge, $Q = 1C$

Distance, $d = 1 \text{ Km} = 10^3 \text{ m}$

$$\text{We know, } F = \frac{1}{4\pi\epsilon_0} \cdot \frac{Q_1 Q_2}{d^2} = 9 \times 10^9 \cdot \frac{1}{10^6} = 9 \times 10^3 N.$$

So, answer is (A).

7. Which is not property of γ -ray?
 A. Null wavelength
 B. Neutral in charge
 C. Velocity is equal to that of light.
 D. mass $9.1 \times 10^{-31} \text{ Kg}$ ✓

Exp:

γ ray is an electromagnetic wave of no mass. So (D) is not a property of γ ray.

Properties of γ ray :

- (i) γ ray is chargeless.
- (ii) γ ray has no mass.
- (iii) γ ray is a high frequency electromagnetic wave or photon.
- (iv) It is able to produce fluorescent effect.
- (v) Ionization power of γ ray is less but can pass through wide sheet of substances.

8. From which ray x-ray is produced?
 A. α ray B. cathod ray ✓
 C. positive ray D. γ -ray.

Exp:

Cathod ray is a flow of electron of high velocity. when it falls on a metallic surface

then an electromagnetic wave is produced which is called x-ray. So cathod ray is used to produce x ray. So, ans is (B).

9. In which of the following concave lens is used-
 A. Magnifying glass B. Spectacles ✓
 C. Microscope D. Camera

Exp:

In magnifying glass, microscope, camera parallel light rays are converge to a point, so convex lens is used here. In case of Myopia (Where converging power of the eye is increased) concave lens is used in spectacles. So, ans is (B).

10. Which type of lens is used to treat the case of Myopia. (Short sightedness)-
 A. Plane B. Convex
 C. Concave ✓ D. Convexo-concave

Exp :

In patient of myopia the converging power of lens is increased and image is formed in front of retina. So if here concave lens is used then it deminishes the converging power of the lens and image is appropriately focused on the retina. So concave lens is used in case of short sightedness or myopia. So here ans is (C).

11. The filament of head light of a car can flow 5A electric current. The potential difference of two ends of the filament is 6v. The resistance of filament is-
 A. 2.0Ω B. 1.0Ω
 C. 1.2Ω ✓ D. 1.5Ω

Exp: Here, Electric current, $I = 5A$

Potential difference, $V = 6v$

Resistance, $R = ?$

We know, $R = \frac{V}{I} = \frac{6}{5} \Omega = 1.2 \Omega$. So, ans is (C).

Chemistry 2nd Part

1. Which statement is not correct?
 A. Order of electro negativity $F < Cl < Br < I$
 B. Halogens mean fluorine, Chlorine, Bromine, Iodine.
 C. Halogens means sea salt producer.
 D. Halogen molecules are diatomic and non-metallic.

Exp:

Electro negativity of the Halogens are-

Halogens	Electro negativity
F	4
Cl	3.5
Br	3
I	2.5

So order of electro negativity of halogens are-

$F > Cl > Br > I$

So, A is incorrect. Rests are correct.





2. Which one is not correct example of corresponding compounds-

- A. Unsaturated Ketone : Acroline ✓
- B. Aliphatic aldehyde : Ethanal
- C. Aromatic Ketone : Benzophenone.
- D. Saturated aldehyde : Propanal

Exp :

Compounds	Formula
Acroline	$\text{CH}_2 = \text{CH} - \text{CHO}$
Ethanal	$\text{CH}_3 - \text{CHO}$
Benzophenone	
Propanal	$\text{CH}_3 - \text{CH}_2 - \text{CHO}$

From above chart we see that Acroline contain $-\text{CHO}$ group so it is aldehyde not ketone. So (A) is incorrect. Ethanal has no double bond and contains $-\text{CHO}$ group. So it is aliphatic aldehyde.

Benzophenone is an aromatic compound containing benzene ring. It also contains $\text{>C} = \text{O}$ group. So it is an aromatic ketone. Propanal has only single bond and $-\text{CHO}$ group. So it is an example of saturated aldehyde.

So Answer will be (A).

3. Which of the following is incorrect for Nitrogen and Phosphorus-

- A. Enthalpy of nitrogen molecule $\Delta H = + 495 \text{ kJmol}^{-1}$. So N_2 is found freely in the atmosphere. ✓
- B. Usually both Nitrogen and Phosphorus form covalent compound.
- C. Both element form stable hydride with hydrogen.
- D. in room temperature N_2 is gas and P is solid.

Exp:

Enthalpy of Nitrogen is-

$$\Delta H = +945 \text{ kJmol}^{-1}$$

$$\text{not } \Delta H = + 495 \text{ kJmol}^{-1}$$

So A is incorrect. Rests are correct.

4. Which one is false for the aromatic hydro carbons-

- A. Aromatic compounds are cyclic. e.g. Benzene C_6H_6
- B. Coal tar is the chief source of aromatic compound.
- C. Coal tar contains hydrated acidic, basic and neutral aromatic compounds.
- D. Aromatic hydroxy compound such as phenol are neutral. ✓

Exp:

Aromatic hydroxy compounds such as

phenol () are acidic. They convert the colour of blue litmus to red and produce salts in reaction with bases.

So (D) is not correct. Answer will be (D). Rests are correct.

5. Which one is false for the organic compounds-

- A. Mainly formed by ionic bond. ✓
- B. Soluble in ether and benzene.
- C. There is no residue after burn.
- D. Mechanism of reaction is complex and slow.

Exp:

We know that ionic bondage is formed between the metals and nonmetals. Organic compounds are mainly contains carbon and hydrogen and their derivatives. They are formed by covalent bond. This covalent bonds are formed by the face to face or side to side overlapping of pure or hybrid orbitals. So answer is (A). Rests are correct.

6. Which of the following is not an use of ethylene-

- A. Industrial production acetone and alkyl chloride requires ethylene. ✓
- B. Now-a-days liquid ethylene is more used in anesthesia rather than ether.
- C. To ripe the fruits such as banana, tomato.
- D. Ethylene is used to produce artificial thread called Teflon.

Exp:

Industrial production of isopropyl alcohol, acetone, alkyl chloride requires propylene. So A is not an use of ethylene. So ans is A.

Uses of ethylene :

- (i) Production of alcohols.
- (ii) Oxy acetylene flame production.
- (iii) To ripe the fruits artificially.
- (iv) In anesthesia.
- (v) Production of different compounds-
e.g.- Ethylene di chloride. (Solvent)
Ethylene oxide (fume)
Mastard gas (Toxic gas)
Formaldehyde Teflon (Artificial thread)
Polyethylene (Plastic)

7. Which one of the following is incorrect for aliphatic/Aromatic compounds-

- A. Halogenation, Nitration, Sulphonation etc. electrophilic substitution reaction not occur in aromatic compounds. ✓
- B. Percentage of Carbon is less in aliphatic compound than aromatic.
- C. Though aromatic compounds are unsaturated but they are not oxidized by KMnO_4 .

Aliphatic Hydroxy compounds (Alcohol) are neutral.

Exp:

Aromatic compounds are unsaturated but they do not give addition reaction. They take part in different types of electrophilic substitution reaction such as halogenation, nitration, Sulphonation etc. So A is not correct. Rests are correct.

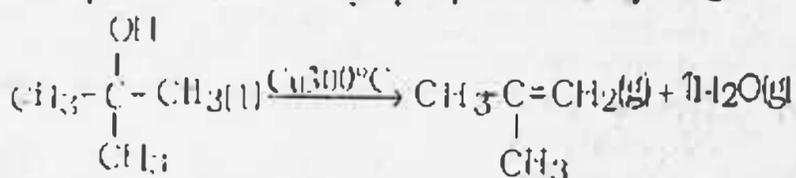




8. Which one is incorrect for alcohols-
- Tertiary alcohols produce hydrogen when its flows over the hot copper catalyst. ✓
 - Primary alcohols produce aldehyde then carboxylic acids.
 - Secondary alcohols are oxidized first into ketone than carboxylic acid.
 - Tertiary alcohols are not easily oxidized.

Exp:

When 2-methyl-2-propanol steam is flowed over the heated copper catalyst then it produce 2-methyl-propene, not hydrogen.



So (A) is incorrect. So answer will be A. Rests are correct.

9. Which one is not true example of isomer of carbonyl compounds-
- Keto-enol tautomerism : Propanal ✓
 - Chain isomerism : 2 methyl propanal
 - Position isomerism : 3 pentanone.
 - Functional isomerism : allyl alcohol.

Exp:

Carbonyl compounds exerts 4 types of isomerism.

- Chain isomerism : Butanal & methyl propanal.
- Position isomerism : 2 pentanones and 3 pentanone.
- Functional isomerism : Propanone, propanal and allyl alcohol.
- Keto-enol tautomerism : Keto propanone and enol propanone.

10. Which one is not correct-

- Meta phosphoric acid- HPO_2 ✓
- Phosphinic acid- H_3PO_2
- Phosphonic acid- H_3PO_3
- Ortho phosphoric acid- H_3PO_4

Exp:

We know formula of meta phosphoric acid is HPO_3 . But here mentioned is HPO_2 . So it is not correct. Rests are correct.

Chemistry 1st Paper

1. Mass number of chlorine is 35. Which one is the correct proton and neutron number of it.
- Proton-20, Neutron-15
 - Proton-17, Neutron-18 ✓
 - Proton-18, Neutron-17
 - Proton-15, Neutron-20

Exp:

We know. Atomic number of chlorine 17 and proton number and atomic number is same. So It has 17 proton.

$$\text{Neutron number} = \text{mass number} - \text{proton number} \\ = 35 - 17 = 18$$

∴ Proton number of chlorine 17 and neutron number 18.

2. The nucleotide having same proton number but different mass number is called-
- Isotope ✓
 - Isomer
 - Isobar
 - Isotone

Exp:

Isomer means different molecules having same formula. Isotone means different elements having same number of neutron. Isobar means atoms having same mass number but different proton number. Isotopes means different types of atoms of an element having different atomic mass number. So answer will be 'isotope'.

3. In constant temperature and pressure 2 gas, one is unknown and another is chlorine is pass and their rate of passage is 6 : 5. If density of chlorine is 36 than density of unknown will be-

- 40
- 25 ✓
- 50
- 20

Exp:

We know,

$$\frac{r_1}{r_2} = \frac{\sqrt{d_2}}{\sqrt{d_1}}$$

$$\Rightarrow \frac{6}{5} = \frac{\sqrt{36}}{\sqrt{d_1}}$$

$$\Rightarrow \frac{36}{25} = \frac{36}{d_1}$$

$$\Rightarrow d_1 = 25$$

So Ans is 25.

4. ${}_{29}^{64}\text{Cu}$ and ${}_{30}^{64}\text{Zn}$ are-

- Isotone
- Isobar ✓
- Isotope
- None of above

Exp :

Isotope : Atoms of different mass number of same element. Cu & Zn are different element. So they are not isotope.

Isotone : Atoms of different element having same neutron number.

Here. Neutron number of Cu = $64 - 29 = 35$ and neutron number of Zn = $64 - 30 = 34$

So they are not isotone.

Isobar : Atoms of different element having same mass number. ${}_{29}^{64}\text{Cu}$ and ${}_{30}^{64}\text{Zn}$

both molecule contain same mass number 64. So they are isobar.





5. Which statement is incorrect-
- A. Mass of a CO₂ molecule is $7.3065462 \times 10^{-23}$ g.
- B. Mass of a Na atom is 3.82×10^{-23} g
- C. 1g H₂ contains 6.022×10^{23} H₂ atom.
- D. Number of molecules of O₂ in 16 g is 3.011×10^{23} g. ✓

Exp:

- A. Molecular weight of CO₂ = 44
∴ 44g CO₂ = 1 mol
Again, 1 mol of CO₂ contains 6.022×10^{23} CO₂ atom.

So, 6.022×10^{23} CO₂ atom has mass 44g

$$\therefore 1 \text{ CO}_2 \text{ atom has mass} = \frac{44}{6.022 \times 10^{23}} \text{g}$$

$$= 7.365462 \times 10^{-23} \text{g}$$

∴ A is correct

B. Atomic mass of Na = 23

So 1 mol Na = 23g

∴ 23g Na contains 6.022×10^{23} Na atom.

∴ 1 Sodium atom has $\frac{23}{6.022 \times 10^{23}}$ g mass.

$$= 3.82 \times 10^{-23} \text{g}$$

∴ B is correct.

C. H₂ → 1 mol = 1g

∴ 1g H₂ has 6.022×10^{23} H atom.

So, C is correct.

D. Molecular weight of O₂ = 32

∴ 1 mol O₂ = 32g

Again, 1 mol or 32g contains 6.022×10^{23} molecules.

∴ 16g contains $\frac{6.022 \times 10^{23}}{2}$ molecules.

$$= 3.011 \times 10^{23}$$

mol 3.011×10^{23} g

So, D is incorrect.

6. Atomic weight of Na, C, O is 23, 12, and 16 respectively, which of the following is false in case of Na₂CO₃.

A. Percentage of carbon = 11.3%

B. Molecular weight of Na₂CO₃ = 106

C. Percentage of sodium = 43.4%

D. Percentage of O₂ = 54.3% ✓

Exp:

$$\text{Molecular weight of Na}_2\text{CO}_3 = 23 \times 2 + 12 + 16 \times 3$$

$$= 106$$

So (B) is correct.

$$\text{Percentage of carbon} = \frac{\text{atomic mass of C}}{106} \times 100\%$$

$$= \frac{12}{106} \times 100\%$$

$$= 11.3\%$$

So (A) is correct.

$$\text{Percentage of sodium} = \frac{\text{atomic mass of Na} \times 2}{106} \times 100\%$$

$$= \frac{23 \times 2}{106} = 43.4\%$$

So (C) is true.

$$\text{Percentage of oxygen} = \frac{\text{atomic mass of O}_2 \times 3}{106} \times 100\%$$

$$= \frac{16 \times 3}{106} \times 100\% = 45.3\% \text{ (Not } 54.3\%)$$

So (D) is false.

7. Which one of the following is not a correct isotope for hydrogen-

A. Hydrogen

B. Tritium

C. Deuterium

D. None of above ✓

Exp:

Hydrogen, Deuterium, Tritium all are isotopes of hydrogen having atomic number 1 and mass number is 1, 2, 3 respectively.

So answer is D.

8. Which one is false-

A. Meson- Temporary fundamental particle.

B. Alpha particle- Composite particle.

C. Positron- Permanent fundamental particle. ✓

D. Proton- Permanent fundamental particle.

Exp:

Fundamental particles are of 3 types-

(i) Permanent fundamental particles- proton electron and neutron.

(ii) Temporary fundamental particles- Neutrino, antineutrino, positron and meson.

(iii) Composite particle- Deuteron, Alpha particle. We see that positron is not permanent fundamental element it is temporary. So C is false.

9. If the temperature of a reaction is rise from 25°C to 35°C then the rate of reaction becomes 3 fold increased. Calculate the activation energy.

A. 83.58 KJmol⁻¹

B. 85.83 KJmol⁻¹

C. 38.85 KJmol⁻¹

D. 83.85 KJmol⁻¹ ✓

Exp:

Here, Initial temperature T₁ = 25°C = 298K

Final temperature T₂ = 35°C = 308K

Suppose,

Initial rate constant K₁ = K

∴ Final rate constant K₂ = 3K

Activation energy, E_a = ?

We Know-

$$\log \frac{K_2}{K_1} = - \frac{E_a}{2.30R} \times \frac{T_1 - T_2}{T_1 T_2}$$

$$\Rightarrow \log \frac{3K}{K} = - \frac{E_a}{2.303 \times 8.314} \times \frac{298 - 308}{298 \cdot 308}$$

$$\Rightarrow E_a = 83849 \text{ Jmol}^{-1}$$

$$\Rightarrow E_a = 83.849 \text{ KJmol}^{-1}$$

So D is the answer.





10. Which information is not true for ionic compound?

- A. Melting point and boiling point of ionic compounds are very high and they are volatile. ✓
- B. All ionic compounds remain in crystal state when they are solid.
- C. Rate of reaction between them is very fast.
- D. Ionic crystals are fragile.

Exp:

We know that ionic compounds are formed by the electrostatic attraction between two oppositely charged particles.

So their melting and boiling points are very high and they are not volatile. So A is incorrect. Rests are true.

Characteristics of ionic compounds:

- (i) Nature- Polar
- (ii) Direction of bond- absent.
- (iii) Ionised in melting or soluble state.
- (iv) Soluble in water or other polar solvent and insoluble in organic solvent (non-polar).
- (v) High melting and boiling point.
- (vi) Not volatile.

1. Which one is the correct value of molar gas constant (R)-

- A. Caloric unit. $R = 1.987 \text{ Cal K}^{-1} \text{ mol}^{-1}$.
- B. Litre atmosphere unit $R = 0.082 \text{ L atm K}^{-1} \text{ mol}^{-1}$.
- C. SI unit. $R = 8.314 \text{ JK}^{-1} \text{ mol}^{-1}$.
- D. CGS Unit. $R = 8.32 \text{ JK}^{-2} \text{ mol}^{-1}$. ✓

Exp:

The correct value of R (Molar gas constant) in CGS unit is $8.316 \times 10^7 \text{ ergK}^{-1} \text{ mol}^{-1}$. So answer is D. Rests are correct.

2. Which one is not correct for periodic table?

- A. Group VIII of 4th row contains Fr, Rh and Mt. ✓
- B. 2nd and 3rd row both has 8 elements.
- C. Potassium and krypton are element 4th row.
- D. In 6th row 32 elements are present from Cs to Rn.

Exp:

A. 4th period's group VIII contains Fe, Co, Ni. So A is not correct.

B. Period Number of elements

1st	2
2nd & 3rd	8
4th & 5th	18
6th	32
7th	incomplete.

C, D are correct because both K and Kr are element of 4th period and in 6th period 32 elements are present from Cs to Rn.

13. The volume of a jar 500 ml. In this chlorine is present at 100 cm Hg and it is connected with a other jar containing N_2 gas at 80 cm Hg pressure. The volume of it is 1000 ml. If stopcock is released then what will be the pressure (cm Hg) of mixed gas.

- A. 76.86
- B. 68.67
- C. 86.67 ✓
- D. 67.86

Exp:

After mixing volume of mixture, $V = (500 + 1000) \text{ ml} = 1.5 \text{ L}$

Pressure of mixture. $P = ?$

Suppose.

The partial pressure of chlorine and Nitrogen is P_3 and P_4 .

So, according to Boyle's Law.

For Chlorine	For Nitrogen
$P_3 \times V = P_1 \times V_1$	$P_3 \times V = P_1 \times V_1$
$\Rightarrow P_3 = \frac{P_1 \times V_1}{V}$	$\Rightarrow P_3 = \frac{P_1 \times V_1}{V}$
$= \frac{100 \times 0.5}{1.5} \text{ cmHg}$	$= \frac{100 \times 0.5}{1.5} \text{ cmHg}$
$= 33.33 \text{ cmHg}$	$= 33.33 \text{ cmHg}$

According to Dalton's Law

Pressure of mixture $P =$ Partial pressure of Chlorine +

Partial pressure of Nitrogen.

$= (33.33 + 53.33) \text{ cm Hg}$
 $= 86.66 \text{ cm Hg}$

or 86.67 cm Hg. So ans is (C)

14. Which one is false-

- A. Inter molecular attraction between the molecules of liquid is less than solid.
- B. In liquid crystal state substance exhibits optical properties.
- C. Ionic compound remain in crystal form when they are solid.
- D. Boiling point of NaCl (815°C) is above than room temperature. ✓

Exp:

The boiling point of NaCl is 1465°C and 815°C . Which is above than room temperature. So (D) is not true. Rests are true.

15. Which one not correct classification of crystals-

- A. Hexagonal- CaCO_3 ✓
- B. Cubic- NaCl
- C. Orthorhombic- KNO_3
- D. Monoclinic- $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$





Exp:

Types of crystal	Example
A. Cubic	NaCl, Diamond, Metals
B. Tetragonal	SnCl ₂ , SnO ₂
C. Orthorhombic	KNO ₃ , NaSO ₄
D. Monoclinic	Na ₂ SO ₄ · 10H ₂ O Monoclinic S (S ₈) FeSO ₄ · 7H ₂ O
E. Triclinic	K ₂ Cr ₂ O ₇ · H ₃ BO ₃ CuSO ₄ · 5H ₂ O
F. Rhombohedral	CaCO ₃
G. Hexagonal	Graphite, Quartz

16. Which one is incorrect for chemical calculation?

- A. Rational number of atoms = $\frac{\text{Percentage mass}}{\text{Atomic mass}}$
- B. Percentage composition in HNO₃ is H=1.60%, N= 22.22% O = 76.18%
- C. Percentage of Crystal water in CuSO₄ · 5H₂O is 36.08%
- D. Percentage of P₂O₅ in calcium phosphate = 48.5% ✓

Exp:

Formula of Calcium phosphate is Ca₃(PO₄)₂

So molecular weight = 40×3+(31+16×4)×2 = 310

Molecular weight of P₂O₅ = (31×2+16×5) = 142

Again



So one molecule of P₂O₅ present in one molecule of Ca₃(PO₄)₂

310 of mass of Ca₃(PO₄)₂ contains 142 of mass of P₂O₅

∴ 100 of mass of Ca₃(PO₄)₂ contains $\frac{142 \times 100}{310}$ of

mass of P₂O₅ = 45.8%

But in the question it is given that 48.5%.

So (D) is not correct.

Percentage composition of HNO₃ -

Formula- HNO₃

It contain

1 atom of H₂

1 atom of N₂

3 atom of O₂

Total mass of H₂ atom = 1.008 × 1 = 1.008

Total mass of N₂ atom = 14.0 × 1 = 14.0

Total mass of O₂ atom = 16.0 × 3 = 48.0

So molecular weight = (1.008+14.0+48.0)
= 63.008

∴ In nitric acid-

Percentage amount of H₂ = $\frac{1.008 \times 100}{63.008} = 1.60\%$

Percentage amount of N₂ = $\frac{14 \times 100}{63.008} = 22.22\%$

Percentage amount of O₂ = $\frac{48 \times 100}{63.008} = 76.18\%$

∴ Percentage composition of HNO₃

H = 1.60%, N = 22.22%, O = 76.18%

So, (B) is correct.

Formula of blue vitriol = CuSO₄ · 5H₂O

So its molecular weight

= [63.5+32.06+16×4+5×(1.008×2+16)]

= [63.5+32.06+64+90.08]

= 249.64

5 molecule of H₂O present in 1 molecule of CuSO₄ · 5H₂O

∴ Out of 249.64 mass of Blue vitriol 90.08 mass of H₂O

∴ Out of 100 mass of Blue vitriol $\frac{90.08 \times 100}{249.64}$ mass of H₂O
= 36.08

So (C) is correct.

Botany

1. Which of the following is correct order of grazing food cycle-

A. Primary consumer → Producer → Tertiary consumer → Secondary consumer → Highest consumer.

B. Producer → Primary consumer → Tertiary consumer → Secondary consumer → Highest consumer.

C. Producer → Primary consumer → Secondary consumer → Tertiary consumer → Highest consumer. ✓

D. Primary consumer → Producer → Secondary consumer → Tertiary consumer → Highest consumer.

Exp:

Grazing Food Cycle : This food cycle begins from the

producer and through various consumers ends in highest consumer.

Producer → Primary consumer → Secondary consumer →

Tertiary consumer → highest consumer.

So, Ans is (C).

2. Which information is not correct-

A. Respiration is one type of reduction reaction. ✓

B. Leaf is the main organ of transpiration.

C. Core of monocotyledonous are large.

D. Successful sprouting of seeds depends on Imbibition.

Exp:

Carbohydrates which are produced in the leaf of plants by photosynthesis is utilized by plants to produce energy by oxidation with O₂ and produce CO₂, H₂O and ATP. So It is a oxidation reaction, not reduction.

We know the oxygen addition is called oxidation and In respiration O₂ addition occur with food substance. So It is obviously oxidation.





3. Which of the following is monocot plant?

- A. Pumpkin B. Gram
C. Maize ✓ D. Sunflower

Exp:

Other examples of monocot plants are rice, coconut, banana, sugar cane etc. Pumpkin, Gram, Sunflower, Datura, Jackfruit etc are Dicot plant.

4. Which one is not an ingredient of biogas-

- A. CO₂ B. CH₄
C. N₂ ✓ D. H₂

Exp:

Components of Biogas-

- Methane (CH₄) → 60-70%
Carbon-di-oxide (CO₂) → 25-35%
Hydrogen (H₂) → 1-5%
Oxygen (O₂) → 0.01%

So it is clear that Nitrogen is not a component of biogas. So ans is (C)

5. Number of ATP produced in aerobic respiration-

- A. 40 B. 28
C. 32 D. 38 ✓

Exp:

In aerobic respiration 38 ATP is produced from 1 molecule of glucose.

Phase of respiration	Produced substances	Expenditure	Net production
Glycolysis	2 Pyruvic Acid 4 ATP	2 NADH ₂ 2 ATP	6 ATP 2 ATP
Formation of Acetyl Co A	2 Acetyl Co-A 2 CO ₂ 2 NADH ₂	2 Pyruvic Acid	2 CO ₂ 6 ATP
Kreb's Cycle	4 CO ₂ 6 NADH ₂ 2 FADH ₂ 2 GTP	2 Acetyl Co A	4 CO ₂ 18 ATP 4 ATP 2 ATP

Total = 38 ATP

6. Yeast is used as a source of which vitamin?

- A. Vitamin A B. Vitamin C ✓
C. Vitamin D D. Vitamin B₁₂

Exp:

Yeast is used as a source of Vitamin B₁, Vitamin B₂, Vitamin C

Special Note :

E. Coli bacteria in intestine produce vitamin B₁₂, vitamin E and vitamin K.

7. Which one is not a requisite of osmosis-

- A. Atmospheric pressure and temperature will be constant.
B. Two solution of different concentration should present

- C. Solutions should be separated by not permeable membrane. ✓
D. The solvent in the solutions should be same.

Exp :

In case of osmosis the separating membrane should be semi permeable through which solvent can pass but not solute. So C is not correct. Rest are correct.

8. Which is the acceptable amount of arsenic per one litre of water in Bangladesh?

- A. 0.08 mg B. 0.3mg
C. 0.01mg D. 0.05mg ✓

Exp:

For Bangladesh the acceptable amount of is 0.05 mg/L of water. For other countries it is 0.01 mg/L of water.

9. Which chemical substance of air is responsible for cancer?

- A. Cadmium B. Lead
C. Carbon monoxide D. Hydro carbon ✓

Exp:

Incomplete burning various hydrocarbon emits hydrocarbon in the air which is responsible for cancer of liver. So, this is ans.

Cadmium- Nervous disorder, chest pain, vomiting.

Lead- Anaemia, chest pain, vomiting, diarrhoea, carbon mono

Oxide- Toxicity.

10. In which type of cell division chromosome number of daughter cell is half of the chromosome number of mother cell?

- A. Cytokinesis B. Amitosis
C. Mitosis D. Meiosis ✓

Exp:

Amitosis is a cell division where one cell simply divides into 2 daughter cell. It is seen in prokaryotes. Mitosis is called equational division. Here chromosome number of mother and daughter cell are equal. Meiosis is called reductional division because here chromosome number of daughter cell is half of the chromosome number of mother cell.

So Ans will be meiosis. Cytokinesis is not cell division. It is a phase of cell division where cytoplasm of daughter cell is separated.

11. Which of the following information is not correct?

- A. Pseudomonas bacteria produce vitamin B
B. Cell wall is present in bacteria
C. Bacteria multiply by di-division
D. Presence of E. Coli in food and water indicates fecal contamination





Exp:

Pseudomonas bacteria does not produce vitamin. It is responsible for the binding of N₂ of air to the soil by nitrification. vitamin B₁₂ is synthesized by E.Coli. Other vitamins synthesized by E. Coli.

- Vitamin- B₁₂ Vitamin- B₂
- Vitamin- K Vitamin- E
- Folic Acid Nicotine
- Biotin, etc.

12. Which disease is not caused by virus-

- A. Measles B. Dengue
- C. Typhoid ✓ D. Herpis

Exp:

All disease mentioned above are caused by viruses except Typhoid, it is caused by bacteria.

Disease caused by virus	Disease caused by Bacteria
1. Rabies	Tuberculosis- Mycobacterium tuberculosis
2. Influenza	Leprosy- Mycobacterium leprae
3. Polio	Pneumonia- Diplococcus pneumoniae
4. Measles	Typhoid- Salmonella typhosae
5. Encephalitis	Diphtheria-Coinobacterium diphtherae
6. Camari pox	Cholera- Vibrio cholerae
7. Herpis	Tetanus- Clostridium tetani etc.
8. Chicken pox	
9. Hepatitis	
10. Mumps	
11. Dengue	
12. AIDS etc.	

13. Which one is not correct for virus?

- A. Nucleus is absent in virus
- B. Prions is absent in virus
- C. Virus can not survive without living cell
- D. Metabolic enzyme present ✓

Exp:

Characteristics of virus:

- A. Viruses are acellular, sub microscopic, cytoplasm less granules. They are devoid of nucleus.
- B. They can not live without living cell.
- C. Body is made up of nucleoprotein and DNA and RNA do not present at a time.

- D. Virus do not contain digestive enzyme.
 - E. Their adaptation power is very strong.
- Prions are only protein covering of virus which can cause disease in the animals. So ans will be D.

English & General Knowledge

1. Who of the following is called lady with the lamp?
 - A. Queen Elizabeth I
 - B. Florence Nitingle ✓
 - C. Mother Teresa
 - D. Queen Cleopetra
2. The smallest thana of Bangladesh in respect to population-
 - A. Sir mongol B. Sonagazi
 - C. Zuraichari ✓ D. Tongi
3. The tradition of putting number in the jury of football players begins from-
 - A. 1925 B. 1939
 - C. 1929 D. 1935 ✓
4. The first currency of Bangladesh was introduced-
 - A. 26th march 1972 B. 16th December 1971
 - C. 4th February 1972 D. 4th March 1972
5. Which country of the following has no sea port-
 - A. Paraguay B. Egypt
 - C. Belgium D. Uruguay
6. When UNICEF declares the Sundarban as a world heritage site-
 - A. 14th April 1995
 - B. 6th December 1996
 - C. 16th December 1996
 - D. 26th March 1995
7. Which river starts and ends in Bangladesh?
 - A. Gomoti B. Mohanonda
 - C. Halda D. Karnaphuli
8. Stamps of which country does not mention the name of that country-
 - A. South Korea B. United Kingdom
 - C. United States D. Austria
9. The ranking of DHAKA as a mega city-
 - A. 7th ✓ B. 11th
 - C. 13th D. 19th
10. Who introduce police in the Indian subcontinent
 - A. Mr. Bard B. Manarch Akbar
 - C. Lord Canning ✓ D. Monarch Shah Jahan.

