

Name : _____ Section : _____ Roll No: _____

General Instructions:

- The Question paper contains three sections.
- Section A has 24 questions. Attempt any 20 questions.
- Section B has 24 questions. Attempt any 20 questions.
- Section C has 12 questions. Attempt any 10 questions.
- The total number of questions to be attempted is 50.
- All questions carry equal marks.
- There is no negative marking.

SECTION – A

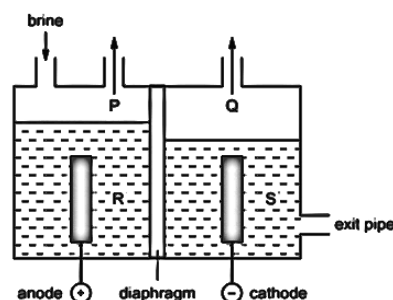
Section A consists of 24 questions. Attempt any 20 questions from this section.

The first attempted 20 questions would be evaluated.

1. The diagram shows the electrolysis of concentrated sodium chloride solution (brine).

Which gas is given off at the cathode?

- Oxygen
- Hydrogen
- Carbon dioxide
- Chlorine



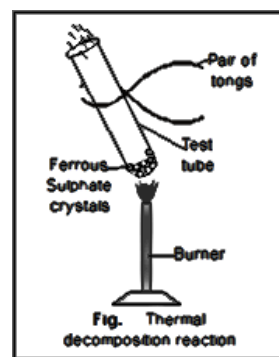
2. Which of the following indicators turns red in an acidic solution?

- Phenolphthalein
- Blue litmus solution
- Turmeric
- Methyl orange

- (i) and (ii)
- (ii) and (iii)
- (iii) and (iv)
- (ii) and (iv)

3. Identify the gases evolved in the experiment shown:

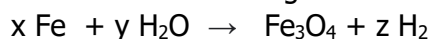
- SO_2 , H_2S
- SO_2 , SO_3
- SO_3 , CO_2
- SO_2 , O_2



4. Which of the following reactions cannot take place?

- $\text{Zn} + \text{CuSO}_4 \rightarrow \text{ZnSO}_4 + \text{Cu}$
- $\text{Mg} + \text{FeSO}_4 \rightarrow \text{MgSO}_4 + \text{Fe}$
- $\text{Pb} + \text{CuCl}_2 \rightarrow \text{PbCl}_2 + \text{Cu}$
- $\text{Zn} + \text{MgSO}_4 \rightarrow \text{ZnSO}_4 + \text{Mg}$

5. Identify 'x', 'y' and 'z' in the following balanced reaction:



- 4, 3, 4
- 4, 4, 3
- 3, 4, 4
- 3, 3, 4

6. Calcium sulphate hemihydrate is the chemical name of:

- Plaster of Paris
- Gypsum
- Baking soda
- Washing soda

7. Which of the following is an endothermic reaction?
- Dilution of sulphuric acid.
 - Decomposition of vegetable matters into compost.
 - Respiration in human beings.
 - Decomposition of calcium carbonate to calcium oxide and carbon dioxide on heating.

8. In an attempt to demonstrate electrical conductivity through an electrolyte, the following apparatus was set up.

Which among the following statements is/are correct?

- Bulb will not glow because electrolyte is not acidic.
- Bulb will glow because NaOH is a strong base and gives ions for conduction.
- Bulb will not glow because circuit is incomplete.
- Bulb will not glow because it depends upon the type of electrolytic solution.

- (i) and (iii)
- (ii) and (iv)
- (ii) only
- (iv) only

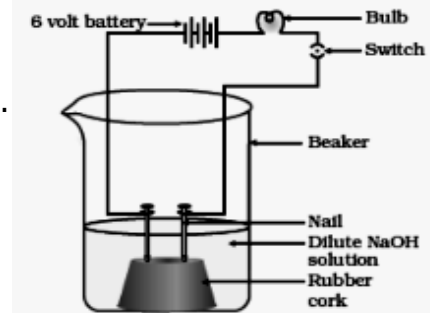
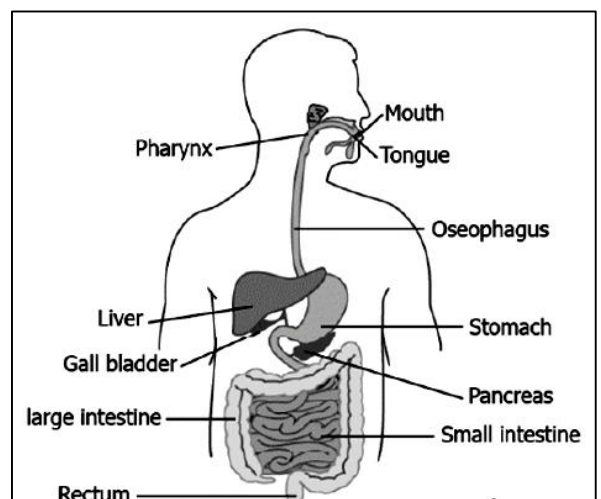


Fig. 2.1

9. Rings of cartilage, present in the throat ensure that
- air is filtered.
 - air is at room temperature.
 - air passage does not collapse.
 - air is free of microbes.
10. The image shows the human digestive system.

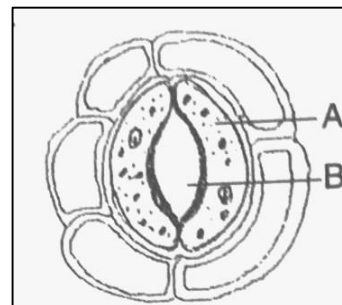
Digestion of food starts from which organ of the digestive system?

- Mouth due to the presence of saliva.
- Oesophagus that moves the food in gut.
- Liver that releases juices for fat breakdown.
- Stomach which helps in mixing food with digestive juices.



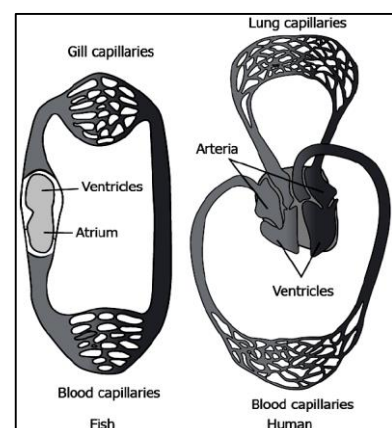
11. Given is the figure of a stomata. Select the correct labelling for this diagram.

- A- Stomatal pore, B- Guard cell
- A- Chloroplast, B- Guard cell
- A – Guard cell, B – Stomatal pore
- A – Stomatal pore, B – Chloroplast



12. The image shows the circulation of blood in fishes and humans. How is the circulation of blood in fish different from that in humans?

- The heart in fish is bigger in size.
- The flow of blood in fish is unidirectional.
- The blood goes through heart only once in fishes.
- The heart of fish has more chambers compared to that of a human.

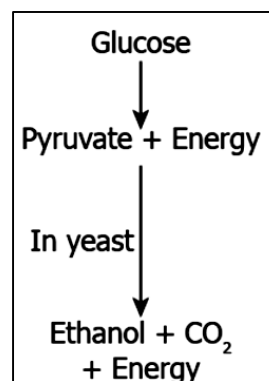


13. Given below are the functions of some parts of human circulatory system. Identify the correct match.
- A) Pulmonary vein – takes oxygenated blood from body parts to heart.
 B) Arteries – takes oxygenated blood from heart to lung.
 C) Aorta – takes deoxygenated blood from heart to body parts.
 D) Vena cava – takes deoxygenated blood from body parts to right atrium.
14. Identify the option that indicates the correct enzyme that is secreted in location L, M and N. L, M and N represent small intestine, mouth and stomach of the human being.

	L	M	N
A	lipase	trypsin	pepsin
B	amylase	pepsin	trypsin
C	trypsin	amylase	lipase
D	lipase	amylase	pepsin

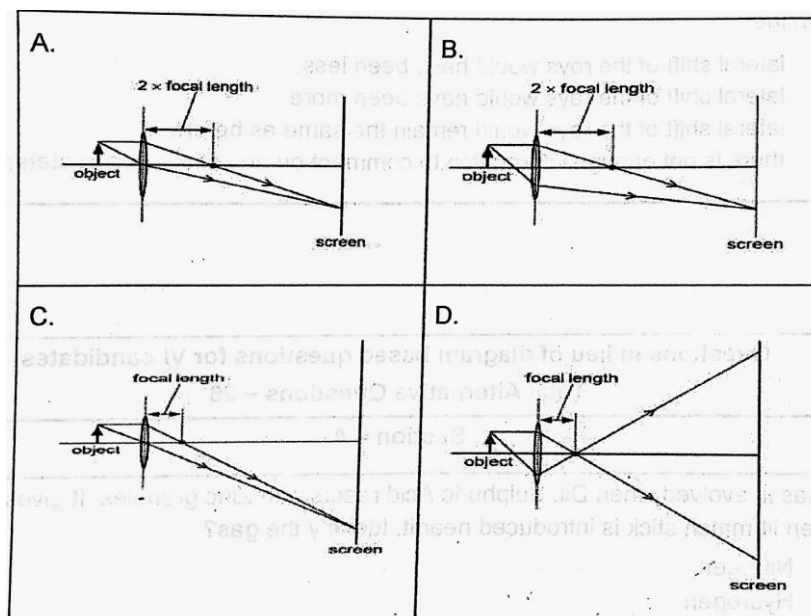
15. In normal inspiration, the diaphragm is
 A) arched B) flattened C) perforated D) None of the above

16. The image shows the flow diagram for the breakdown of glucose in yeast.

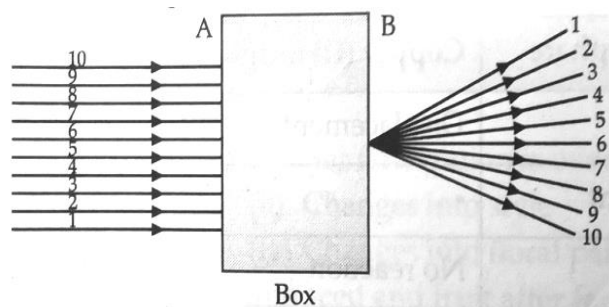


Under which condition these types of products are obtained?

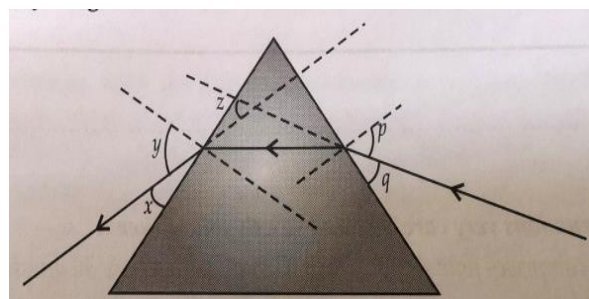
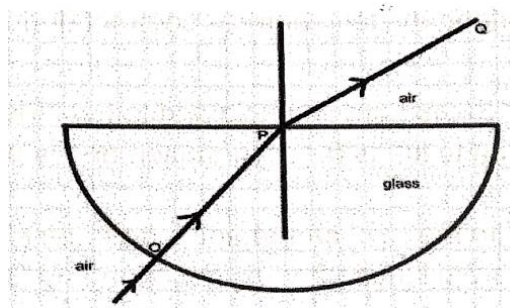
- A) in the presence of oxygen.
 B) in the absence of carbon dioxide.
 C) the presence of carbon dioxide.
 D) in the absence of oxygen.
17. In the headlights of a vehicle, the bulb is placed:
 A) between pole and focus B) very near to focus
 C) between focus and centre of curvature D) at centre of curvature
18. Which diagram shows image formation of an object on a screen by a converging lens?



19. In which of the following, image of an object placed at infinity will be highly diminished and point sized:
 A) concave mirror only B) convex mirror only C) convex lens only
 D) convex mirror, concave mirror, convex lens and concave lens
20. A light ray enters from rarer medium A to denser medium B. The refractive index of medium B relative to medium A will be:
 A) greater than unity B) less than unity
 C) equal to 1 D) zero
21. A ray of light travelling in air falls obliquely on the surface of a calm pond. It will:
 A) go into water without deviating from its path.
 B) deviate away from the normal.
 C) turn back on its original path.
 D) deviate towards the normal.
22. A beam of light is incident through the holes on side A and emerges out of the holes on the other face of the box as shown in the figure. Which of the following could be inside the box?
 A) Concave Lens
 B) Rectangular Glass Slab
 C) Prism
 D) Convex Lens



23. The angle of incidence from air to glass at point O on the hemispherical glass slab is:
 A) 45°
 B) 0°
 C) 90°
 D) 180°
24. Study the following ray diagram:
 In this diagram, the angle of incidence, the angle of emergence and the angle of deviation respectively have been represented by:
 A) y, p and z
 B) x, q and z
 C) p, y and z
 D) p, z and y



SECTION – B

Section-B consists of 24 questions. Attempt any 20 questions from this section.
 The first attempted 20 questions would be evaluated.

25. Which of the statements about the reaction given below is correct?

$$\text{MnO}_2 + 4\text{HCl} \rightarrow \text{MnCl}_2 + 2\text{H}_2\text{O} + \text{Cl}_2$$

 A) MnO_2 is getting reduced whereas HCl is getting oxidised.
 B) MnO_2 is getting oxidised whereas HCl is getting reduced.
 C) MnO_2 is reducing agent.
 D) HCl is oxidising agent.
26. Which of the following salts does not contain water of crystallization?
 A) Baking soda B) Plaster of Paris
 C) Washing soda D) Gypsum

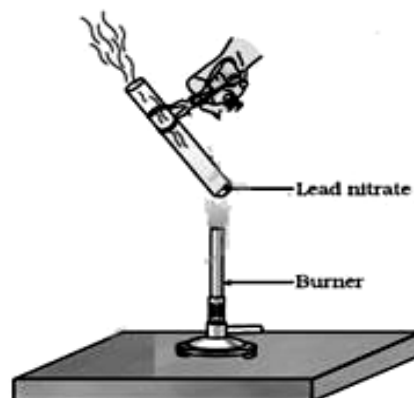
27. Which of the given options correctly represents the parent acid and parent base of calcium carbonate?

Option	Parent Acid	Parent Base
A	HCl	NaOH
B	H_2CO_3	$\text{Ca}(\text{OH})_2$
C	H_3PO_4	CaSO_4
D	H_2SO_4	CaSO_4

28. Look at the following diagram.
It shows the heating of lead nitrate powder.

Identify the correct observation.

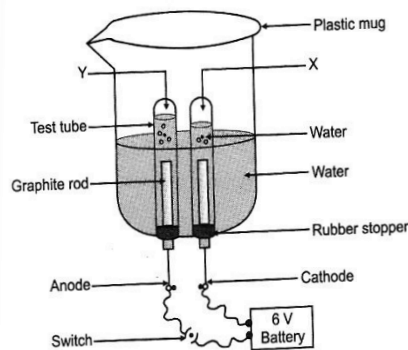
- A) White fumes appear in the tube.
B) A brown residue is left.
C) A yellow residue is left.
D) A colourless residue is left.



29. The following diagram shows the electrolysis of water.

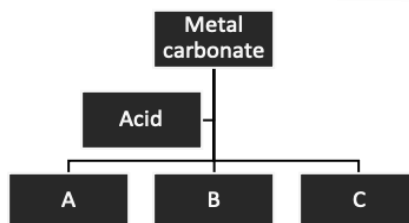
The molar ratio of hydrogen and oxygen gases liberated during the above set up is:

- A) 2:1
B) 1:1
C) 1:2
D) 4:15



30. Identify A, B and C.

- A) Salt, Carbon dioxide and Hydrogen
B) Salt, Oxygen and Water
C) Salt, Carbon dioxide and Water
D) Salt, Hydrogen and Water



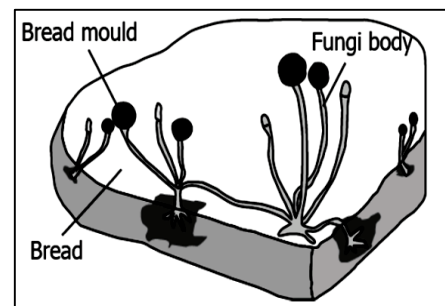
Question Nos. 31 to 36 consist of two statements – Assertion (A) and Reason (R).
Answer these questions selecting the appropriate option given below:

- A) Both A and R are true and R is the correct explanation of A.
B) Both A and R are true and R is not the correct explanation of A.
C) A is true but R is false.
D) A is false but R is true.

31. Assertion: Carbonic acid is a weak acid.
Reason: Carbonic acid ionizes completely in aqueous solution.
32. Assertion: The balancing of chemical equation is based on law of conservation of mass.
Reason: In a chemical reaction, total mass of the reactants is equal to the total mass of the products.
33. Assertion: Plants lack excretory organs.
Reason: Plants usually absorb essential nutrients from soil.

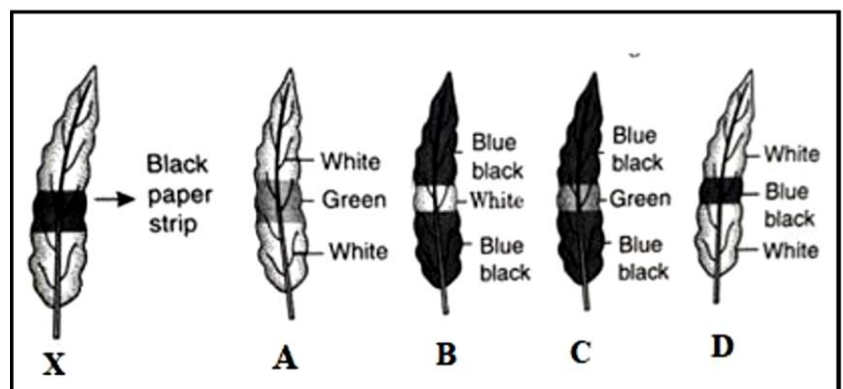
34. Assertion: Herbivores have longer small intestine as compared to Carnivores.
Reason: Food takes more time to digest in Carnivore.
35. Assertion: Speed of light increases when travel from rarer to denser medium.
Reason: Speed of light is more in rarer medium.
36. Assertion: If an object is placed at a distance of 15cm from a convex mirror of focal length 15 cm, its image will be formed at infinity.
Reason: Distance of image in convex mirror can never be infinity.
37. How is water taken up from soil to the xylem tissue of the plant roots?
A) Xylem attracts water molecules.
B) Roots act as a suction pump for taking water.
C) Soil expels the water with pressure to the xylem.
D) Difference in the ion concentration creates a gradient for water movement.
38. How does platelets help in preventing leakage of blood from the site of injury?
A) Platelets form clot by plugging the site of injury.
B) Platelets uses component of broken vessel to form clot.
C) Red blood cells divide and replace the broken vessel at the site of injury.
D) Red blood cells and platelets migrate to site of injury and secrete substance that forms new vessel.
39. The blood leaving the tissues, becomes richer in:
A) Carbon Dioxide
B) Water
C) Haemoglobin
D) Nitrogen

40. The image shows the bread moulds on a bread.
How does these fungi obtain nutrition?
A) By eating the bread on which it is growing.
B) By using nutrients from the bread to prepare their own food.
C) By breaking down the nutrients of bread and then absorbing them.
D) By allowing other organisms to grow on the bread and then consuming them.



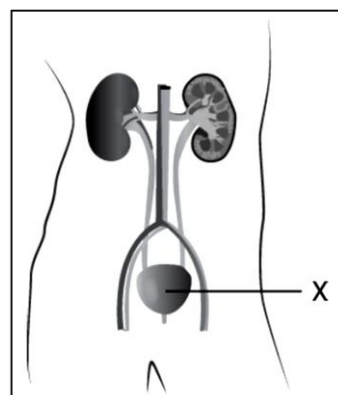
41. A leaf from a de-starched plant is covered with black paper strip as shown below in X.
Find the leaf which shows result of starch test after 8 hours.

- A) leaf A
B) leaf B
C) leaf C
D) leaf D



42. The image shows the excretory system in humans.
What is the importance of the labelled part in excretory system?

- A) It produces urine.
B) It filters waste from the blood.
C) It stores the urine till urination.
D) It carries urine from kidney to outside.



43. The power of a concave lens of focal length 2 metre is:
 A) -1.5 D B) -1 D C) -0.5 D D) + 0.5 D
44. An object is placed at a distance $f/2$ a convex lens of focal length f , then distance of image will be:
 A) $+f/2$ B) $+f/3$ C) $+f/4$ D) $-f$
45. Student determines the focal length of a device X by focusing image of a distant object on a screen placed 20cm from the device on the same side as the object. The device X is:
 A) concave lens of focal length 10 cm B) convex lens of focal length 10 cm
 C) concave mirror of focal length 10 cm D) concave mirror of focal length 20 cm
46. Real images formed by the light rays after reflection or refraction when they:
 1. actually meet or intersect at a point
 2. actually converges at a point
 3. appears to meet when they are produced in backward direction
 4. appears to diverge from a point
 Which of the given statements are correct:
 A) 1 & 2 B) 2 & 4 C) 1 & 4 D) 2 & 3
47. Refractive index of diamond with respect to glass is 1.6. Absolute refractive index of glass is 1.5. The absolute refractive index of diamond is:
 A) 1.4 B) 2.4 C) 3.4 D) 4.4
48. If a ray strikes a surface of glass slab at 30° then the angle of emergence would be:
 A) 30° B) 90° C) 60° D) 0°

SECTION – C

Section-C consists of three cases followed by questions. There are a total of 12 questions in this section. Attempt any 10 questions from this section. The first attempted 10 questions would be evaluated.

CASE

Frothing in Yamuna:

The primary reason behind the formation of the toxic foam is high phosphate content in the wastewater because of detergents used in dyeing industries, dhobi ghats and households. Yamuna's pollution level is so bad that parts of it have been labelled 'dead' as there is no oxygen in it for aquatic life to survive. The increased toxicity of river Yamuna harms the ecology all around. The phosphates present in river water lead to the phenomenon of eutrophication by which a water body becomes rich in nutrients and minerals leading to the growth of algae. The growth of algae in turn becomes an impediment to the flow of oxygen and sunlight in the deep depths of water thereby hurting aquatic life.

49. Predict the pH value of the water of river Yamuna if the reason for froth is high content of detergents dissolved in it.
 A) 2-5 B) 5-7 C) 10-11 D) 7
50. High content of phosphate ion in river Yamuna may lead to:
 A) decreased level of dissolved oxygen and increased growth of algae.
 B) decreased level of dissolved oxygen and no effect of growth of algae.
 C) increased level of dissolved oxygen and increased growth of algae.
 D) decreased level of dissolved oxygen and decreased growth of algae.
51. The following table provides the pH values of four solutions P, Q, R and S.

Solution	pH value
P	2
Q	9
R	5
S	11

Which of the following correctly represents the solutions in increasing order of hydronium ion concentration?

A) $P > Q > R > S$

B) $P > S > Q > R$

C) $S < P < Q < R$

D) $S < Q < R < P$

52. If a sample of water containing detergents is provided to you, which of the following methods will you adopt to neutralize it?

A) Treating the water with baking soda.

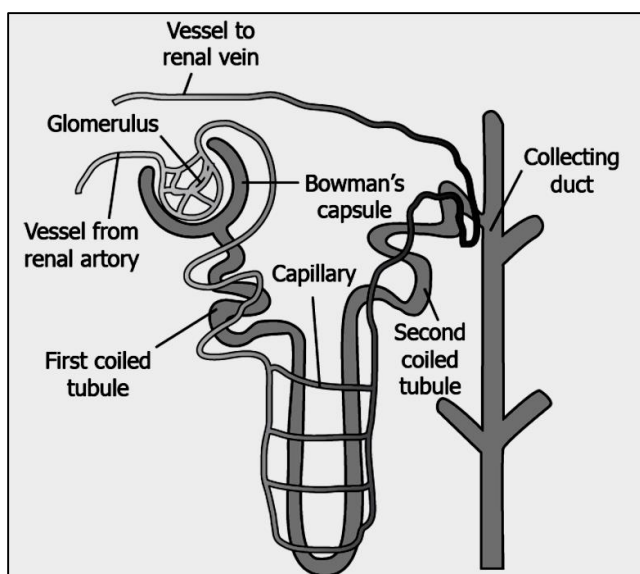
B) Treating the water with vinegar.

C) Treating the water with caustic soda.

D) Treating the water with washing soda.

CASE

Humans create by-products that are not only useless for the cells of the body, but could even be harmful. These waste by-products are therefore needed to be removed from the body and discarded outside by a process called excretion. Again, if the basic rules for body design in multi-cellular organisms are followed, a specialised tissue for excretion will be developed, which means that the transportation system will need to transport waste away from cells to this excretory tissue. Hence transportation and excretion are coordinated to remove the waste from body. Following is the diagram associated with the removal of waste.



53. The actual filtration region in the shown diagram is present in cup shaped structure called _____.
 A) Collecting duct
 B) Bowman's capsule
 C) Renal artery
 D) Renal vein
54. The amount of water re-absorbed by the shown diagram depends on:
 A) how much excess water is there in the body.
 B) how much glucose is present in body.
 C) how much of dissolved waste is there to be excreted.
 D) Both A and C
55. Just as CO_2 is removed from the blood in the lungs, which among the following nitrogenous waste is removed from blood in the kidneys?
 A) Dead cells
 B) Urea
 C) Oxygen
 D) Water
56. How can we purify the blood by artificial method?
 A) Filtration
 B) Dialysis
 C) Reabsorption
 D) Sphygmomanometer

CASE

A beam of white light splits into seven constituent colours when it passes through a glass prism. The splitting occurs because of different angles of bending for each colour. This gives rise to formation of coloured spectrum.

57. By which optical phenomena does the splitting of white light into its seven colours occurs?
A) Refraction B) Scattering C) Reflection D) Dispersion
58. When white light enters a prism, it gets split into its constituent colours due to:
A) Prism material has high density.
B) Different refractive index for different wavelength of each colour.
C) Each colour has same velocity in prism.
D) Scattering of light.
59. Which colour of white light suffers least deviation when a beam of white light passes through prism?
A) Violet B) Red C) Green D) Yellow
60. Angle of deviation is the angle between:
A) Incident ray and refracted ray B) Incident ray and emergent ray
C) Refracted ray and emergent ray D) Normal and emergent ray

-X-X-X-X-X-X-

