ST. JOHN'S HIGH SCHOOL
SECTOR 26, CHANDIGARH
Class 10 Science
Half Yearly Examination (2025-26)

Duration: 3hrs M.M. 80

General Instructions:
(i) This question paper consists of 39 questions in 3 sections. Section A is Biology, Section B is Chemistry, and Section C is Physics.
(ii) All questions are compulsory.

SECTION A (Biology) **27 marks**

Q.1 In human beings, when the process of digestion is completed, the proteins, carbohydrates and fats are respectively converted into: (1)

A. amino acids, glucose and fatty acids
B. amino acids, glucose, fatty acids and glycerol.
C. glucose, fatty acids and glycerol, amino acids
D. sugars, amino acids, fatty acids, and glycerol.

Q.2 The parasitic mode of nutrition is observed in (1)

A. Bryophyllum B. Hibiscus
C. Cuscuta D. Helianthus (Sunflower)

Q.3 The energy released during the process of respiration is used to make an .....molecule from ..... and inorganic ..... (1)

A. ADP; ATP; phosphate B. ATP; ADP; phosphate
C. phosphate; ADP; ATP D. ATP; phosphate; ATP

Q.4 The plant hormone present in greater concentration in the areas of rapidly dividing cells is

A. Auxin B. Cytokinins
C. Gibberellins D Abscisic acid (1)

Q.5 The growth of the pollen tubes towards ovules is an example of .....

A. phototropism B. geotropism
C. chemotropism D hydrotropism (1)

Q.6 The part of the hind brain controlling involuntary actions such as salivation and vomiting in humans is .....

A. medulla B. pons
C. cerebrum D cerebellum (1)

Q.7 A person, while climbing up a rocky hill, comes into a panic state and fear. His body starts reacting in a 'fight or flight' condition to adjust to the dangerous and stressful situation. Name the hormone secreted in the blood of the person in this situation and the gland that secretes it.

A. adrenaline and the adrenal gland, respectively

B. growth hormone and the pituitary gland, respectively

C. thyroxine and thyroid gland, respectively

D. adrenal and adrenaline gland, respectively (1)

Q.8 Two statements, Assertion (A) and Reason (R) are given below. (1)

(A): Transpiration pull helps in the absorption and upward movement of water and dissolved minerals in plants.

(R): The effect of root pressure in the transport of water is more significant at night.

Answer the question by selecting the appropriate option given below:

A. Both (A) and (R) are true, and (R) is the corrcct cxplanation 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.

Q.9 Name the type of nutrition exhibited by amoeba. Explain how food is taken in and digested by this organism. (0.5+1.5)

Q.10 Which signals will get disrupted in case of a spinal cord injury? Trace the sequence of events that occur when you suddenly touch a hot object. (0.5+1.5)

Q.11 a) What is the role of haemoglobin in the process of respiration?

b) How are the lungs designed in human beings to maximise the area for the exchange of gases? (1+2)

Q.12 a) Name the part of nervous system which helps in communication between the central nervous system and other parts of the body. What arc the two components of this system?

b) Complete the given table

Hormone	Endocrine gland	Function
Growth hormone	i	ii
iii	iv	Regulates blood sugar level
v	Ovary	vi

Q.13 a) Differentiate between xylem and phloem based on the following:

i) Direction of transport of the substances

ii) Nature of the substances transported.

b) Trace the path of double circulation of blood in humans in the form of a flowchart? (2+3)

Source –based/ Case-based question

Q.14 The purpose of making urine is to filter out waste products from the blood. The nitrogenous waste, such as urea or uric acid, is removed from the blood by the kidneys. The basic filtration unit in the kidneys as in the lungs, is a cluster of very thin-walled blood capillaries. Each capillary cluster in the kidney is associated with the cup-shaped end of a coiled tube called Bowman's capsule that collects the filtrate. Each kidney has a large number of these filtration units packed close together. Some substances in the initial filtrate, such as glucose, amino acids, salts, and a major amount of water, are selectively reabsorbed as the urine flows along the tube. The urine formed in each kidney eventually enters a long tube called ureter, which connects the kidneys with the urinary bladder

a) What do you think is the cluster of thin-walled blood capillaries present in the kidneys?

A. alveoli B. nephron C. neuron D. glomerulus

b) Just as CO2 is removed from the blood in the lungs, nitrogenous waste such as urea or uric acid are removed from blood in the kidneys. TRUE/ FALSE

c) Draw a neat diagram of the Human Excretory system and label any two organs mentioned in the last sentence of the given paragraph. (1+1+2)

SECTION B (Chemistry) **26 marks**

Q.15 $CH4 + 2O2 \text{ --------} \rightarrow CO_2 + 2H2O$

The above reaction is an example of a/an:

A. Decomposition reaction B. Combination reaction
C. Exothermic reaction D. Endothermic reaction (1)

Q.16 An aqueous solution of a salt turns blue litmus red. The salt could be one obtained by the reaction of:

A. HNO_3 and NaOH B. H_2SO_4 and KOH
C. CH_3COOH and NaOH D. HCl and NH_4OH (1)

Q.17 Consider the following chemical equation:

$p\ Al + q\ H_2O \text{ ----------} \rightarrow r\ Al_2O_3 + s\ H_2$

To balance the chemical equation, the values of 'p', 'q', 'r', 's' must be respectively

A. 3,2,2,1 B. 2,3,3,1
C. 2,3,1,3 D. 3,1,2,2 (1)

Q.18 Which of the given options represents a family of salts

A. NaCl, Na_2SO_4, $CaSO_4$ B. K_2SO_4, Na_2SO_4, $CaSO_4$
C. $NaNO_3$, $CaCO_3$, Na_2CO_3 D. $MgSO_4$, $CuSO_4$, $MgCl_2$ (1)

Q.19 When Copper oxide is dissolved in Hydrochloric acid, the solution turns blue-green due to the formation of:

A. copper(III) chloride B. copper(II) chloride
C. copper(I) chloride D. copper(IV) chloride (1)

Q.20 Which one of the following types of medicines is used for treating indigestion?

A. analgesic B. antiseptic

C. antacid D. antibiotic (1)

Q.21 Two statements, Assertion (A) and Reason (R) are given below. (1)

(A): The acid must always be added slowly to water with constant stirring

(R): If water is added to a concentrated acid, the heat generated may cause the mixture to splash out and cause burns.

Answer the question by 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.

Q.22 a) Why do acids not show acidic behaviour in the absence of water?

b) Plaster of Paris should be stored in a moisture-proof container. Explain why? (2)

Q.23 Write the balanced chemical equation for the following and identify the type of reaction in each case.

a) Potassium bromide(aq) + Barium iodide(aq) → Potassium iodide(aq) + Barium bromide(s)

b) Heating of lead nitrate powder in a boiling tube. (2)

Q.24 a) Write the name and chemical formula of a sodium compound that is sometimes added for faster cooking.

b) This compound is produced from sodium chloride as one of the raw materials. Write the chemical equation for the reaction involved.

c) What will happen if a solution of this substance is heated? Give the equation of the reaction involved. (3)

Q.25 A solution of a substance 'X' is used for whitewashing.

a) Name the substance 'X' and write its formula.

b) Write the reaction of the substance 'X' with water. (3)

Q.26 a) Why should curd and sour substances not be kept in brass and copper vessels?

b) How is the concentration of hydronium ions (H3O+) affected when a solution of an acid is diluted?

c) Under what condition do you think a farmer would treat the soil of his fields with quick lime (calcium oxide)? Why?

d) Show the relationship between the manufacture of bleaching powder and the chlor-alkali process. (1+1+1+2)

Source –based/ Case-based question

Q.27. Have you ever tasted or smelt the fat/oil-containing food materials left for a long time? When fats and oils are oxidised, they become rancid and their smell and taste change. Usually, substances that prevent oxidation (antioxidants) are added to foods containing fats and oils. Keeping food in air-tight containers helps slow down oxidation. Do you know that the manufacturers of chips usually flush bags of chips with gas such as nitrogen to prevent the chips from getting oxidised?

a) Define oxidation.

b) Write an example of a redox reaction.

c) The rusting of iron is a common example of corrosion and oxidation. TRUE/ FALSE

d) How can keeping food in air-tight containers help slow down oxidation? (1+1+1+1)

SECTION C (Physics) **27 marks**

Q.28 The refractive index of water with respect to air is 4/3. The refractive index of air with respect to water will be: [1]

A. 0.75 B. 0.50 C. 0.25 D. 1.75

Q.29 Rainbow is formed due to a combination of: [1]

a) Refraction b) Absorption
c) Dispersion d) Total internal reflection

A. a, c and d B. a, b and d C. a and c D. a, b and c

Q.30. An optician while testing the eyes finds the vision of a patient to be 6/9. By this he means that

A. The person can read letters from 9 m which the normal eye can read from 6 m.

B. The person can read the letters of 6 inches from a distance 9 m
C. The person can read the letters of 9 inches from 6 m
D. The person can read letters from 6 m which the normal eye can read from 9 m [1]

Q.31 **Assertion (A):** Sometimes, the eye may gradually lose its power of accommodation.
Reason (R): The crystalline lens of people at old age becomes milky and cloudy.

A. Both A and R is true and R is the correct explanation of A.
B. Both A and R is true but R is not the correct explanation of A.
C. A is true but R is false.
D. A is false but R is true. [1]

[1]

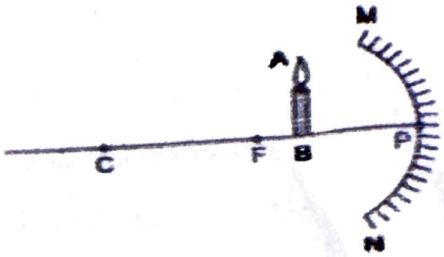
Q.32 The figure given alongside shows the image of a clock as seen in a plane mirror. The correct time is:

A. 9.25 B. 6.45 C. 2.35 D. 2.25

[2]

Q.33 Answer the following on the basis of ray diagram:

a) The figure shows a concave mirror with its pole at P, focus F and centre of curvature C. Draw ray diagram to show the formation of image of object AB and state two characteristics of the image formed.



b) Mention one application of image formed in this case.

Q.34 A student sitting at the back of the classroom cannot read clearly the letters written on the blackboard. What advice will a doctor give to her? Draw the ray diagram for the correction of this defect. [2]

Q.35 Sudha finds out that the sharp image of the window pane of her science laboratory is formed at a distance of 15 cm from the lens. She now tries to focus the building visible of her outside window instead of the window pane without disturbing the lens. [3]

a) In which direction will she move the screen to obtain a sharp image of the building and why?
b) What is the approximate focal length of this lens? Justify.

[3]

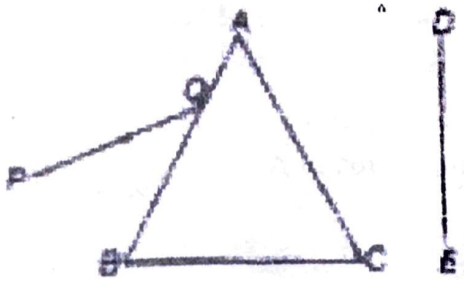
Q.36. Answer the following:

a) What should be the position of the object when a concave mirror is to be used

i. as a shaving mirror and
ii. in torches, producing a parallel beam of light?

b) A man standing in front of a mirror sees his image with a very small head and normal-sized legs. What type of mirrors are used in designing such a mirror? Justify your answer.

Q.37 A narrow beam PQ of white light is passing through a glass prism ABC as shown in the diagram. [3]



Trace it on your answer sheet and show the path of the emergent beam as observed on the screen DE.

a) Write the name and cause of the phenomenon observed.

b) Where else in nature is this phenomenon observed?

c) Based on this observation, state the conclusion that can be drawn about the constituents of white light.

Q.38 Read the following text carefully and answer the questions that follow: [4]

The spreading of light by the air molecules is called the scattering of light. The light having the least wavelength scatters more. The sun appears red at sunrise and sunset; the appearance of the blue sky is due to the scattering of light. The colour of the scattered light depends on the size of the particles. Smaller molecules in the atmosphere scatter smaller wavelengths of light. The amount of scattering of light depends on the wavelength of light. When light from the sun enters the Earth's atmosphere, it gets scattered by the dust particles and air molecules present in the atmosphere. The path of sunlight entering the dark room through a fine hole is seen because of the scattering of the sunlight by the dust particles present in its path inside the room.

a) Does the color of Earth appear different to an astronaut in a spaceship? Justify.

b) Why does the sky appear blue?

c) Why is the red color selected for danger signal lights? [1+1+2]

Q.39 The variation of image distance (v) with object distance (u) for a convex lens is given in the following observation table. [5]

S. No.	Object distance (u) cm	Image distance (v) cm
1	-150	+30
2	-75	+37.5
3	-50	+50
4	-37.5	+75
5	-30	+150
6	-15	+37.5

Analyse it and answer the questions that follow:

a) Without calculation, find the focal length of the convex lens. Justify your answer.

b) Which observation is not correct? Why? Draw ray diagram to find the position of the image formed for this position of the object.

c) Find the value of magnification for u = - 30 cm. (1+2+2)