

# **PRACTICAL BASED QUESTIONS** **TO BE ASKED IN PLACE OF** **PRACTICAL NOTEBOOK AND** **VIVA VOCE**

## **RELEVANT SHORT QUESTIONS**

### **SHORT QUESTIONS TEST # 1**

➤ **Write short answers of the following questions.**

**Q1. What is the purpose of comparing breathing rates at rest and after exercise?**

**Ans:** The purpose is to observe how physical activity influences the respiratory system and breathing rate.

**Q2. How would you measure the breathing rate at rest?**

**Ans:** Measure the number of breaths per minute, by counting the rise and fall of the chest or abdomen while at rest.

**Q3. What factors might influence an individual's baseline or resting breathing rate?**

**Ans:** Factors include age, fitness level, overall health, and environmental conditions.

**Q4. Why is it important to establish a baseline breathing rate before conducting exercise?**

**Ans:** It provides a reference point for comparison, helping to determine the impact of exercise on breathing rate.

**Q5. What physiological changes occur in the body during exercise that may affect the breathing rate?**

**Ans:** Increased oxygen demand, higher carbon dioxide production, and elevated heart rate during exercise can affect the breathing rate.

**Q6. How can you ensure that the exercise activity is consistent and standardized for accurate comparisons?**

**Ans:** Use a standardized exercise routine, such as brisk walking or jogging, and control the duration and intensity of the exercise.

**Q7. What type of exercises are likely to result in a more noticeable increase in breathing rate?**

**Ans:** Aerobic exercises, such as running or cycling, are likely to result in a more noticeable increase in breathing rate.



8. **What role does the respiratory system play in supplying oxygen to the body during exercise?**  
ns: The respiratory system increases the breathing rate to deliver more oxygen to the muscles for energy production during exercise.
9. **How does the body eliminate excess carbon dioxide produced during exercise?**  
ns: Increased breathing rate helps eliminate excess carbon dioxide by facilitating its exhalation from the body.
10. **Explain the concept of oxygen debt and its relationship to the breathing rate after exercise.**  
ns: Oxygen debt is the amount of oxygen needed to restore metabolic processes to their pre-exercise state. The breathing rate remains elevated after exercise to repay this debt.
11. **What impact might an individual's fitness level have on the post-exercise breathing rate?**  
ns: Individuals with higher fitness levels may recover faster, resulting in a quicker return to their resting breathing rate after exercise.
12. **How does the body regulate the breathing rate to meet the changing oxygen demands during exercise?**  
ns: The respiratory center in the brain receives signals from chemoreceptors and adjusts the breathing rate to maintain oxygen homeostasis.
13. **What safety precautions should be considered when conducting an experiment involving exercise and monitoring breathing rates?**  
ns: Ensure participants are healthy and capable of the chosen exercise, monitor for signs of distress, and provide a safe environment.
14. **How might environmental factors, such as altitude, influence the breathing rate during exercise?**  
ns: At higher altitudes, where oxygen levels are lower, the breathing rate may increase to compensate for reduced oxygen availability.
5. **What is the relationship between heart rate and breathing rate during and after exercise?**  
ns: Both heart rate and breathing rate increase during exercise to supply the body with oxygen and nutrients; they gradually decrease during the recovery period.
6. **Explain the role of the diaphragm and intercostal muscles in regulating breathing rate during exercise.**  
ns: These muscles contract more vigorously during exercise to increase lung capacity and facilitate a higher breathing rate.
7. **How might age influence the response of the respiratory system to exercise?**  
ns: Younger individuals may have a more adaptable respiratory system, allowing for quicker adjustments in breathing rate during and after exercise.
8. **What is the significance of measuring the breathing rate at specific time intervals after exercise?**  
ns: It helps track the recovery process, indicating how quickly the respiratory system returns to the resting state.



**Q19. How do different exercise intensities affect the post-exercise breathing rate?**

**Ans:** Higher exercise intensities typically result in a more significant increase in breathing rate and a longer recovery period.

**Q20. What factors might cause variations in breathing rates among individuals during exercise?**

**Ans:** Differences in fitness levels, health conditions, and individual responses to exercise can contribute to variations in breathing rates.

## SHORT QUESTIONS TEST # 2

**Write short answers of the following questions.**

**Q1. What is the stimulus of breathing? (i) carbon dioxide concentration in blood, (ii) carbon dioxide concentration in the alveolar air, (iii) oxygen concentration in blood or (iv) oxygen concentration in the alveolar air?**

**Ans:** The stimulus for breathing is the high concentration of carbon dioxide in the blood.

**Q2. The breathing becomes rapid and deep after exercise. Why?**

**Ans:** During muscular activity i.e. after exercise, more CO<sub>2</sub> is produced and consequently breathing becomes rapid and deep especially to remove CO<sub>2</sub> out and also for the intake of large amount of oxygen.

**Q3. What are the main differences in the composition of the inhaled and exhaled air?**

**Ans:** Following are the main differences between inhaled and exhaled air.

Differences between the inhaled and exhaled air		
Features	Inhaled Air	Exhaled Air
Amount of oxygen	21%	16%
Amount of carbon dioxide	0.04%	4%
Amount of nitrogen	79%	79% (Remains the same)
Amount of water vapours	Variable	Saturated
Amount of dust particles	Variable	Almost none

**Q4. After vigorous exercise, your muscles get fatigued. How it happens?**

**Ans:** Exercise demands energy. Our muscle cells produce instant energy by breaking down ATP. The mitochondria in a living cell can generate a lot of ATP aerobically by breaking down sugars. But oxygen is scarce during exercise. System adopts different strategy to produce energy through anaerobic path called glycolysis in which energy produced is less than the former and hence accumulation of lactic acid occurs which causes muscle fatigue.



**Q5.** What is the normal breathing rate per minute?

**Ans:** It is about 14-16.

**Q6.** What happened after walking in laboratory?

**Ans:** There was slight increase in breathing rate.

**Q7.** What was the change in breathing rate after running up and downstairs?

**Ans:** The breathing rate increased.

**Q8.** What is the controlling region of breathing?

**Ans:** It is the "Breathing centre" located in medulla of brain.

**Q9.** How is  $O_2$  transported from lungs onward to the body parts?

**Ans:** It is carried by haemoglobin of blood which now becomes Oxyhaemoglobin.

**Q10.** What name is given to the artery or vein concerned with lungs?

**Ans:** It is called PULMONARY.

**Q11.** After exercise, why the breathing becomes rapid and deep?

**Ans:** During muscular activity  $CO_2$  is produced and breathing becomes rapid and deep especially to remove  $CO_2$  out, and also for intake of large quantity  $O_2$ .

**Q12.** What are the main differences in the composition of the inhaled and exhaled air?

**Ans:**

Comparison between the inspired and the expired air		
Feature	Inspired Air	Expired Air
Amount of oxygen	21%	16%
Amount of carbon dioxide	0.04%	4%
Amount of nitrogen	79%	79%
Amount of water vapours	Variable	Saturated
Amount of dust particles	Variable	Almost none
Temperature	Variable	Almost equal to body temperature

**Q13.** After vigorous exercise, your muscles get fatigued, How it happens?

**Ans:** Its reason is the deficiency of oxygen and concentration of  $CO_2$  in muscles.

**Q14.** What is the stimulus of breathing? (i) carbon dioxide concentration in blood, (ii) carbon dioxide concentration in the alveolar air, (iii) oxygen concentration in blood or (iv) oxygen concentration in the alveolar air!

**Ans:** (i) Carbon dioxide concentration in blood.

**Q15.** The breathing becomes rapid and deep after exercise. Why?

**Ans:** When we take exercise, the cells of our muscles increase the rate of cellular respiration and due to it the concentration of  $CO_2$  in our blood also increases. To take out this extra  $CO_2$  and to get much oxygen, the respiratory centre sends message to the respiratory system to increase the rate of breathing.



# **PRACTICAL BASED QUESTIONS TO BE ASKED IN PLACE OF PRACTICAL NOTEBOOK AND VIVA VOCE**

## **RELEVANT SHORT QUESTIONS**

### **SHORT QUESTIONS TEST # 1**

**Write short answers of the following questions.**

- What is the purpose of **demonstrating** the exhalation of carbon dioxide during respiration using limewater?
- 5: The purpose is to visually show that carbon dioxide is produced during respiration by observing the change in limewater when exposed to exhaled air.
- Explain the **chemical reaction** between **carbon dioxide** and **limewater**.
- 5: Carbon dioxide reacts with limewater (calcium hydroxide) to form calcium carbonate, causing the limewater to turn milky.
- What **respiratory process** **produces carbon dioxide as a byproduct**?
- 5: Cellular respiration produces carbon dioxide as a byproduct when glucose is oxidized to release energy.
- Describe the **setup of the experiment** to **demonstrate the exhalation of carbon dioxide using limewater**.
- 5: Exhaled air is bubbled through limewater using a straw or tubing, and the change in limewater color is observed.
- What might be the **expected observation in limewater** when **carbon dioxide is bubbled through it**?
- 5: Limewater will turn milky due to the formation of calcium carbonate, indicating the presence of carbon dioxide.
- Why is it **necessary to use fresh limewater in the experiment**?
- 5: Fresh limewater ensures that any change in color is solely due to the reaction with exhaled carbon dioxide, not pre-existing conditions.
- How does the experiment **illustrate the connection between breathing and the production of carbon dioxide in the human body**?
- 5: The experiment visually demonstrates that the act of breathing releases carbon dioxide, which reacts with limewater.



**Q8. What other gases are present in exhaled air, and how might they affect the limewater experiment?**

**Ans:** Exhaled air contains nitrogen, oxygen, and traces of other gases. Only carbon dioxide reacts with limewater, so the focus is on the color change resulting from this reaction.

**Q9. What could be potential sources of error in the experiment, and how can they be minimized?**

**Ans:** Potential sources of error include contamination and incomplete exhalation. Minimize errors by using a clean setup and ensuring complete exhalation into the limewater.

**Q10. Explain why the experiment is a qualitative demonstration rather than a quantitative measurement of carbon dioxide.**

**Ans:** The experiment visually confirms the presence of carbon dioxide but does not quantify the amount produced.

**Q11. How might variations in breathing rates among individuals impact the results of the limewater experiment?**

**Ans:** Individuals with higher breathing rates may produce more carbon dioxide, potentially resulting in a faster and more noticeable change in limewater.

**Q12. What is the importance of having a control in this experiment, and what would be an appropriate control?**

**Ans:** The control is essential to ensure that any change in limewater is due to exhaled air. A control using normal air (without exhalation) serves this purpose.

**Q13. What is the role of the straw or tubing in the experimental setup, and how does it affect the results?**

**Ans:** The straw or tubing allows exhaled air to be directed into the limewater, ensuring efficient exposure and reaction with carbon dioxide.

**Q14. How could the experiment be modified to compare the carbon dioxide production of individuals with different levels of physical activity?**

**Ans:** Compare limewater reactions between individuals before and after engaging in physical activity to observe potential variations in carbon dioxide production.

**Q15. Explain the relevance of this experiment in understanding the environmental impact of human activities.**

**Ans:** The experiment highlights the carbon dioxide produced during respiration, contributing to the understanding of human impact on atmospheric carbon dioxide levels.

**Q16. What precautions should be taken to ensure the safety of participants and observers during the limewater experiment?**

**Ans:** Ensure proper ventilation, use a non-toxic limewater solution, and avoid inhaling limewater directly.

**Q17. How might temperature and humidity levels in the environment influence the limewater experiment results?**

**Ans:** Changes in temperature and humidity can affect the solubility of gases, potentially influencing the rate of reaction between carbon dioxide and limewater.



## SHORT QUESTIONS TEST # 3

**Write short answers of the following questions.**

- Q1. **Explain how the limewater experiment aligns with the principles of the scientific method.**  
Ans: The experiment involves observation, hypothesis formation, testing, and drawing conclusions, adhering to the scientific method.
- Q2. **How might this experiment be extended to investigate the impact of different breathing patterns on carbon dioxide production?**  
Ans: Explore limewater reactions when individuals engage in shallow breathing, deep breathing, or breath-holding to observe variations in carbon dioxide production.
- Q3. **What ethical considerations should be taken into account when involving participants in the limewater experiment?**  
Ans: Obtain informed consent, prioritize participant comfort and safety, and ensure that participants are aware of the experiment's purpose.
- Q4. **What other substances, besides carbon dioxide, might influence the limewater experiment, and how can they be controlled for?**  
Ans: Substances like moisture or impurities in exhaled air might affect the limewater. Control for these by using dry, filtered air for comparison.
- Q5. **How could technology, such as sensors or data loggers, enhance the precision and accuracy of this experiment?**  
Ans: Technology could provide real-time data on changes in limewater color, allowing for more precise measurements and quantitative analysis.



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## **RELEVANT SHORT QUESTIONS**

### **SHORT QUESTIONS TEST # 1**

➤ **Write short answers of the following questions.**

**Q1. What is the purpose of demonstrating the presence of tar in cigarette smoke?**

**Ans:** The purpose is to visually show the harmful components of cigarette smoke, specifically tar, to raise awareness about its impact on health.

**Q2. Explain the composition of tar in cigarette smoke and its potential health effects.**

**Ans:** Tar is a mixture of harmful substances, including carcinogens, that can contribute to respiratory diseases and increase the risk of cancer.

**Q3. Describe the experimental setup to demonstrate the presence of tar in cigarette smoke.**

**Ans:** The setup involves passing cigarette smoke through a filter, where tar particles are trapped and can be observed.

**Q4. What health risks are associated with the inhalation of tar from cigarette smoke?**

**Ans:** Inhaling tar is linked to respiratory issues, lung diseases, and an increased risk of lung cancer and other cancers.

**Q5. Why is it important to compare the lungs of smokers and nonsmokers using charts?**

**Ans:** Comparing lungs visually highlights the potential damage caused by smoking and emphasizes the importance of lung health.

**Q6. What visual differences might be observed in the lungs of smokers compared to nonsmokers on the charts?**

**Ans:** Charts may show darker, discolored lungs with potential lesions or tumors in smokers compared to healthier, pinkish lungs in nonsmokers.



**Q7. Explain how the demonstration of tar in cigarette smoke aligns with public health campaigns against smoking.**

**Ans:** It provides a tangible representation of the harmful substances in cigarettes, supporting efforts to discourage smoking and promote public health.

**Q8. How can the tar demonstration be adapted to include a quantitative aspect?**

**Ans:** Quantify the amount of tar collected on the filter, comparing it between different cigarette brands or quantities, to emphasize the variation in tar levels.

**Q9. What role does mucus and cilia play in the respiratory system, and how does tar affect these structures?**

**Ans:** Mucus and cilia help remove debris from the respiratory system. Tar can impair their function, leading to mucus buildup and respiratory issues.

**Q10. How might the tar demonstration be used as an educational tool to discourage smoking among teenagers?**

**Ans:** The visual impact of the tar demonstration can serve as a powerful deterrent, educating teenagers about the immediate and long-term health risks of smoking.

**Q11. What other substances in cigarette smoke, besides tar, contribute to its harmful effects?**

**Ans:** Nicotine, carbon monoxide, and various carcinogens are among the harmful substances in cigarette smoke.

**Q12. Explain how the charts depicting lungs of smokers and nonsmokers contribute to health education in schools.**

**Ans:** The charts provide a clear visual representation of the consequences of smoking, fostering health awareness among students.

**Q13. What ethical considerations should be taken into account when conducting demonstrations related to smoking and health?**

**Ans:** Ensure informed consent for participants, provide accurate information, and consider the potential emotional impact on the audience.

**Q14. How might the tar demonstration be adapted for an interactive classroom setting to engage students?**

**Ans:** Encourage students to actively participate in the setup, observation, and discussion of the tar demonstration to enhance engagement and learning.

**Q15. Explain the potential impact of smoking on overall respiratory function, beyond the visible effects on the lungs.**

**Ans:** Smoking can lead to chronic obstructive pulmonary disease (COPD), reduced lung function, and increased susceptibility to respiratory infections.

**Q16. What steps can be taken to minimize biases and ensure objectivity when presenting the charts of lungs to students?**

**Ans:** Present factual information, use unbiased language, and rely on scientific evidence to promote an objective understanding of the effects of smoking.

**Q17. How might demographic factors, such as age or gender, influence the visual representation of lung damage in smokers?**

**Ans:** Demographic factors can influence susceptibility to certain health conditions, but the visual impact of smoking on lungs is generally consistent.



**Q18. How could the investigation of height data be extended to explore correlations with other physiological traits or health indicators?**

**Ans:** Analyzing height data alongside other physiological traits or health indicators can reveal potential correlations and relationships.

**Q19. Explain how the study of height variations aligns with the principles of scientific inquiry.**

**Ans:** The study involves making observations, collecting data, analyzing patterns, and drawing conclusions, aligning with the principles of scientific inquiry.

**Q20. What potential impacts could the understanding of height variations have on fields like nutrition, healthcare, or sports science?**

**Ans:** Understanding height variations can inform strategies in nutrition, healthcare, and sports science, tailoring interventions to individual needs.

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## SHORT QUESTIONS TEST # 2

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➤ **Write short answers of the following questions.**

**Q1. List the different continuous variations in plants.**

**Ans:**

- i. Seed colour in wheat grains.
- ii. Seed mass in Gram etc.
- iii. Fruit mass in oranges etc.
- iv. Size of shoot or root.

**Q2. Count the number of "tongue-rollers" and "non-tongue-rollers" in your class and tabulate the data.**

**Ans:** Students should count the number of "tongue-rollers" and "non-tongue-roller" in the class and tabulate the data.

**Q3. Who are tongue rollers?**

**Ans:** People who can roll their tongue into 'U' shape when they extend it out of their mouth are called tongue rollers.

**Q4. Give examples of common discontinuous variations in humans.**

- Ans:**
- i. Tongue-rollers
  - ii. Blood groups in humans
  - iii. Rh factor +ve, -ve
  - iv. male and female sexes
  - v. Free ear lobe or fused ear lobe.

**Q5. What is a histogram?**

**Ans:** The graph representation of frequency distribution of a hereditary trait is called histogram.

**Q6. What is the ultimate source of genetic variation?**

**Ans:** Mutation.

**Q7. Define frequency?**

**Ans:** It is a measure of how often an event takes place.



**What is a variable?**

It is a property or quantity that shows measurable variation e.g. height in man.

**Is variation inheritable?**

No, Variation is heritable due to genes.

**Is human height a continuous or discontinuous trait?**

It is a continuous varying trait

**Is tongue rolling a continuous or discontinuous varying trait?**

It is discontinuous varying trait.

**Give an example of continuous varying trait.**

Human height.

**What do you mean by genetic variation?**

Occurrence of genetic differences between individuals most commonly studied in species population is known as genetic variation.

**Who are tongue rollers?**

Tongue rollers are the persons who can turn their tongue round.

**Give examples of common discontinuous variations in humans.**

Examples of common discontinuous variations in humans are blood groups and tongue rolling.

**List the different continuous variations in plants.**

- (i) Colour of leaves
- (ii) Colour of flowers are continuous variations in plants.

**Count the number of "tongue-rollers" and "non tongue-rollers" in your class and tabulate the data.**

Number of tongue-rollers: 12

Number of non tongue-rollers: 08

**Is human height a continuously or discontinuously varying trait?**

Human height is a continuously varying trait.

**What are continuously varying traits? Give examples in living organisms?**

The characters which have several degrees of continuous variations are called continuously varying traits. For example kernel colour in maize and height, skin colour and intelligence etc. in man.

**What is histogram?**

The graphic representation of frequency distribution of hereditary trait is called histogram.

## SHORT QUESTIONS TEST # 3

**Write short answers of the following questions.**

**Q1. Define frequency.**

It is a measure of how often an event takes place.