

First year Biology complete notes

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**By: DARAKSHAN SHEIKH
KAMRAN SHAUKAT**

An-AEROBIC

Respiration in which glucose molecule is partially broken in the absence of oxygen. It occurs in cytoplasm

AEROBIC

Respiration in which glucose requires oxygen for its breakdown. This occurs in mitochondria

RESPIRATION IN HYDRA

Through body surface by diffusion

RESPIRATION IN PLANARIA

Through body surface by diffusion

RESPIRATION IN EARTH WORM

Through skin. In earth worm blood is red due to hemoglobin

RESPIRATION IN GRASSHOPPER

Through spiracles, trachea and tracheole

RESPIRATION IN MAN

Through lungs

GASES CHART

GAS	% TAKEN IN	% GIVEN OUT
OXYGEN	21	16
CO ₂	0.04	4
NITROGEN	78	78
WATER VAPOURS	VARIABLE	SATURATED

RESPIRATORY MEDIA: Source where from organism receives their gases. There are 2 main sources (1) Water (2) Atmosphere.

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RESPIRATORY AREA: Point of body where from exchange of gases takes place. For example in Chlorella whole cell membrane is respiratory area. In Humans, external nostrils are respiratory area.

CUTICLE: An outer covering which in terrestrial plants (may be in some animals also). It is made up of cutin which is a kind of Wax.

STOMATA: Openings in leaves where from water and oxygen come out and carbon di oxide comes in the leaf. Stomata work during day time and remain open as long as light is available. The stomata are formed due to modification of guard cells.

GUARD CELLS: Cells in the epidermal area of leaf. They form stomata when they become turgid.

LENICLES: Small openings in the stem of plants. They remain open all the times and help in exchange of gases.

PHOTORESPIRATION: An un-usual mechanism in which C₃ plants close their stomata and stop their photosynthesis and start releasing carbon di-oxide during day time.

TRACHEAL SYSTEM: A system of respiration in arthropods (cockroach). In this system, oxygen enters from openings of spiracles and than through trachea it diffuses into colorless blood of insect.

SPIRACLES: Small openings on the body of insects. Through these openings, oxygen enters into body of insect. There are 2 pairs of spiracles in thorax region and remaining 8 pairs in abdomen.

GILLS: Respiratory area which fishes use for the exchange of gases.

OPERCULUM: Covering of gills

COUNTER CURRENT FLOW: A mechanism, which fishes use to exchange the gases between water and gills. The water is taken in and run on to gill surface. Beneath the gills, the blood vessels run in opposite direction. This system enables the fishes to take over 80% oxygen from water.

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INCOMPLETE VENTILATION: A kind of respiratory system in which lungs are never completely emptied or refilled by air. E.g. Frog

PULONARY RESPIRATION: Respiration by means of lungs. E.g. Frog

CUTANEOUS RESPIRATION: Respiration by means of surface of skin. E.g. Frog

BUCCO-PHARYNGEAL RESPIRATION: Respiration by means of lining of buccal cavity. E.g. Frog

PARA-BRONCHI: Deep holes in the lungs of birds are called Para bronchi. These are responsible for continuous flow of air in one direction.

AIR SACS: Small bag like structures found in the wings, neck and abdomen of birds. They are filled with air and help the birds to have air inside body all the time. The air sac help in uni-directional (single direction) flow of air. This mechanism helps bird in flying.

DIAPHRAGM: Muscular partition between thoracic cavity and abdominal cavity

EXTERNAL NOSTRIL: Respiratory area of many animals (including human beings) through which air is taken from respiratory media (air or atmosphere).

LARYNX: A common passage for food and air. It is also called sound box.

EPIGLOTTIS: Flap of tissue which is responsible to close and open the food pipe and wing pipe accordingly so that air and food may go into their required pipes.

BRONCHI: Bifurcation of trachea into smaller branches is called bronchi

PLEURAL MEMBRANE: A fluid filled thin membrane which encloses lungs.

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ALVEOLI: These are hallow sac like structures where exchange of respiratory gases takes place between blood and lungs. There are 700 million alveoli in human lungs which are equal to 20 skins of human body.

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SURFACTANT: Fluid containing thin layer of internal area of alveoli

INSPIRATION: Intake of respiratory gas. It is also called inhalation.

EXPIRATION: Removal of respiratory gas. It is also called exhalation.

RESPIRATION: Inspiration and expiration collectively are called respiration.

INVOLUNTARY CONTROL: Organs of body which do not work under human wish. They are controlled autonomous nervous system. Lungs are one of those organs.

VOLUNTARY CONTROL: Organs of body which work under human wish.

AORTIC AND CAROTID BODIES: Chemo-receptors situated in aorta and carotid arteries. These receptors are responsible to measure the concentration of carbon di oxide and hydrogen. If concentration increases, they communicate it to the medulla oblongata. The medulla oblongata will then increase the rate of breathing so that Co₂ is removed from body and oxygen comes in.

LUNG CANCER: A respiratory problem in which cancer is developed in lungs. The main causes are smoking, germs and dust.

EMPHYSEMA: It is a respiratory problem in which gradual degeneration of alveoli occur. The lungs lose their elasticity and become hard. The person infected with this condition can not respire properly.

ASTHMA: It is a respiratory problem in which a person suffers from breathlessness. The main causes are continuous inhalation of nitrogen oxide and sulphur dioxide.

TUBERCULOSIS: A serious respiratory problem caused due to Mycobacterium tuberculosis. Main symptoms are cough, during which blood stained sputum is released.

LUNG CAPACITY: Presence of total air in lung is called lung capacity. Human lungs have 5 liters air

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TIDAL VOLUME: During inspiration and expiration, half liter of air is taken in and given out. Exchange of half liter between lungs and atmosphere is called tidal volume

VITAL CAPACITY: During extra deep breath, maximum 4 liters of air is inspired or expired. That is called vital capacity.

RESIDUAL VOLUME: When four liter air is taken out of lungs, only one liter remains in lungs. That is called residual volume

HEMOGLOBIN: A quaternary proteins found at the cell membrane of RBCs. It helps in picking and transportation of 70% oxygen from lungs to body and 35% carbon dioxide from body cells to lungs. Hemoglobin is also called respiratory pigment and originally has purple blue color. After combining with oxygen it changes to red color. Each Hb molecule can bind with 4 oxygen molecules.

MYOGLOBIN: It is a smaller protein found in muscles. It can also bind with oxygen and gives red color to muscles.

OXYHEMOGLOBIN: When hemoglobin combines with oxygen it is called oxy-hemoglobin

CARBAMINOHEMOGLOBIN: This term is used when hemoglobin combines with carbon di-oxide.

PRACTICE SHEET

TEST-01

1. Which is called rich energy molecule
 - (a) Glucose
 - (b) ADP
 - (c) ATP
 - (d) All

2. A process, in which oxidation reduction of food takes place is called
 - (a) Cellular respiration
 - (b) Carbohydrate metabolism
 - (c) Breathing
 - (d) All

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3. During respiration, one of the following is not a bi-product
 - (a) ATP
 - (b) Water
 - (c) Carbon di oxide
 - (d) ADP

4. If 21 percent of oxygen diffuses into water, it will constitute
 - (a) 5%
 - (b) 10%
 - (c) 16%
 - (d) None

5. One point that make respiration different from Photosynthesis is that respiration
 - (a) Occur day and night
 - (b) Is a catabolic process
 - (c) Is reverse of photosynthesis
 - (d) It is different in all three ways

6. Lower plants can receive oxygen through general body surface, but in higher plants, it is not possible due to
 - (a) Presence of cuticle
 - (b) Secondary growth
 - (c) Rigid cell wall
 - (d) All

7. Stomata are formed by modification of
 - (a) Mesophyll cells
 - (b) Guard cells
 - (c) Turgid cell
 - (d) All

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8. The opening and closing of stomata depends up on
 - (a) Potassium ions
 - (b) Turgidity of guard cells
 - (c) Both a&b
 - (d) None
9. In woody plants, the cuticle is replaced by cork, but plants can still respire through
 - (a) Stomata
 - (b) Cuticle
 - (c) Lenticles
 - (d) None
10. Plants which consume oxygen during mid day and release CO₂ are bio-chemically called
 - (a) C₄ plants
 - (b) C₃ Plants
 - (c) Both a&b
 - (d) None
11. One plant is not capable to perform photorespiration
 - (a) Wheat
 - (b) Rice
 - (c) Sugar cane
 - (d) Neem
12. An un-usual bio-chemical process in plant in which they consume oxygen and release carbon di oxide is
 - (a) Photosynthesis
 - (b) Photorespiration
 - (c) Photophosphorelation
 - (d) None
13. Photorespiration in C₃ plants results into

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- (a) Saving removal of water
- (b) Increasing crop yield
- (c) Growth
- (d) None

14. Photorespiration is different than photosynthesis, because

- (a) ATP are not formed
- (b) It is performed by C3 plants
- (c) In photorespiration Serine is a bi-product
- (d) All

15. During photorespiration, the concentration of oxygen -----in leaf

- (a) Increase
- (b) Decrease
- © Oxygen has no concern
- (d) None

16. When oxygen combines with ribulase bi phosphate, it makes

- (a) PAG and Phosphoglycolate
- (b) Only PAG
- (c) Only Phosphoglycolate
- (d) None

17. Photorespiration is

- (a) a useful process
- (b) A useless process
- (c) It reduced photosynthetic output
- (d) Both b&c

18. Hydra is a

- (a) Triploblastic organism
- (b) Diploblastic organism
- (c) Both a&b
- (d) None

17. Hydra can receive oxygen

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- (b) Externally
 - (c) Internally
 - (d) Both a&b
 - (e) None
18. Earth worm can draw oxygen from moisture with the help of mucous which is produced by
- (a) Spiracles
 - (b) Goblet cells
 - (c) Trachea
 - (d) None
19. In cockroach, the CO₂ to atmosphere through cuticle.
- (a) True
 - (b) False
20. Cockroach and other arthropods
- (a) Do not have hemoglobin
 - (b) Have colorless blood
 - (c) Both a&b
 - (d) None

NUMBER	CORRECT OPTION
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GOOD LUCK

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CLASS TEST

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- (a) Occur day and night
 - (b) Is a catabolic process
 - (c) Is reverse of photosynthesis
 - (d) Is different in all three ways
6. Lower plants can receive oxygen through general body surface, but in higher plants, it is not possible due to
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12. Photorespiration in C₃ plants results into

- (a) Saving removal of water
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13. Photo-respiration is different in that in photorespiration

- (a) ATP are not formed
- (b) It is performed by C₃ plants
- (c) In photorespiration Serine is a bi-product
- (d) All

14. During photorespiration, the concentration of oxygen

- (a) Increase

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(b) Decrease

© Oxygen has no concern

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- (a) Do not have hemoglobin

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- (b) Have colorless blood
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- (d) None

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PRACTICE TEST

Name-----

1. Air passing along the respiratory tract is
 1. filtered
 2. warmed
 3. saturated with water
 4. all of the above

2. During inspiration, the pressure in the lungs increases.
 1. True
 2. False

3. During expiration, _____ pressure in the thoracic cavity causes air to leave the lungs.
 1. increased
 2. decreased
 3. gradually decreasing
 4. no

4. During _____ respiration, the respiratory pigment hemoglobin combines with oxygen in the lungs.
 1. internal
 2. external
 3. anaerobic
 4. vital

5. During internal respiration, hemoglobin gives up carbon dioxide to the cells.
 1. True
 2. False

6. Hemoglobin aids in the transport of carbon dioxide from the tissue to the lungs
 1. True
 2. False

7. Cigarette smoking contributes to _____.

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1. emphysema
 2. lung cancer
 3. both 1 and 2
8. Breathing supplies the body with oxygen needed for _____ cellular respiration.
1. aerobic
 2. anaerobic
 3. stasis
 4. no
9. Respiration includes _____.
1. breathing
 2. external and internal respiration
 3. aerobic cellular respiration
 4. all of the above
10. In the nose, the cilia beat upward, carrying mucus and dust.
1. True
 2. False
11. As air moves out during expiration, it cools and loses its moisture.
1. True
 2. False
12. The nose contains _____ nasal cavities.
1. one
 2. two
 3. three
 4. four
15. The trachea lies behind the esophagus.
1. True
 2. False
16. The esophagus opens when a person breathes.
1. True
 2. False
17. The epiglottis prevents food from entering the larynx.
1. True
 2. False

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18. The _____ is the voice box.

1. larynx
2. bronchus
3. pharynx
4. esophagus

19. The trachea is held open by cartilaginous rings.

1. True
2. False

20. Smoking destroys the cilia in the trachea.

1. True
2. False

21. Inserting a tube by way of an incision made in the trachea is called a tracheotomy.

1. True
2. False

22. The trachea divides into two _____.

1. glotti
2. tracheae
3. bronchi
4. lungs

23. The bronchi lead into the right and left _____.

1. atria
2. lungs
3. pharynges
4. lacrimals

24. The bronchi branch into smaller passages called bronchioles.

1. True
2. False

25. During an asthma attack, the bronchioles dilate.

1. True
2. False

26. Each bronchiole terminates in an elongated space enclosed by a multitude of air pockets called

_____.

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1. the glottis
 2. alveoli
 3. the larynx
 4. the pharynx
27. The right lung has _____ lobes.
1. one
 2. two
 3. three
 4. four
28. Each alveolar sac is surrounded by blood _____.
1. arteries
 2. veins
 3. capillaries
30. The diaphragm forms the floor of the thoracic cavity.
1. True
 2. False
31. The lungs are enclosed by the mucoid membranes.
1. True
 2. False
32. The respiratory center is located in the _____.
1. thorax
 2. alveoli
 3. medulla
33. The primary stimuli of the respiratory center are _____.
1. carbon dioxide
 2. hydrogen ions
 3. both 1 and 2
34. The respiratory center is affected by low oxygen levels.
1. True
 2. False
35. Chemical receptors in carotid bodies respond to _____.

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1. hydrogen ion concentration
 2. levels of carbon dioxide in the blood
 3. levels of oxygen in the blood
 4. all of the above
36. When blood levels of carbon dioxide and hydrogen rise, the rate and depth of breathing _____.
1. increase
2. decrease
3. stay the same
4. decrease only slightly
39. As the thoracic cavity increases in size, the lungs expand and air rushes in.
1. True
2. False
40. Inspiration is the passive phase of breathing.
1. True
2. False
41. During inspiration, the following occurs.
1. The diaphragm and rib muscles contract.
2. Intrapleural pressure decreases.
3. The lungs expand and air comes rushing in.
4. All of the above occur during inspiration.
42. Humans breathe by negative pressure.
1. True
2. False
43. The diaphragm and external intercostal muscles are relaxed when expiration occurs.
1. True
2. False
44. The amount of air moved in and out with each breath is called the tidal _____.
1. amount
2. volume
3. reserve
4. capacity

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45. The maximum volume of air that can be moved in and out during a single breath is called the vital _____.

- 1. amount
- 2. volume
- 3. reserve
- 4. capacity

46. Vital capacity is the sum of tidal, inspiratory reserve, and expiratory reserve volumes.

- 1. True
- 2. False

47. Air remaining in the lungs after very deep breathing is called the residual _____.

- 1. inspiration amount
- 2. volume
- 3. space
- 4. expiration amount

48. Residual volume is useful for gas exchange purposes.

- 1. True
- 2. False

49. Internal respiration refers to the exchange of gases between air in the alveoli and blood in the pulmonary capillaries.

- 1. True
- 2. False

50. Internal _____ refers to the exchange of gases between blood in systemic capillaries and tissue fluid.

- 1. expulsion
- 2. respiration
- 3. digestion
- 4. alveolar activity

51. The exchange of oxygen and carbon dioxide between alveolar air and blood is governed by _____.

- 1. gravity
- 2. blood pressure
- 3. diffusion

52. Blood flowing into lung capillaries has a higher concentration of carbon _____ than atmospheric air.

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1. monoxide
 2. dioxide
 3. oxide
 4. nitrate
53. Carbon dioxide diffuses out of blood into the alveoli.
1. True
 2. False
54. Blood coming into the pulmonary capillaries is oxygenated, and alveolar air is deoxygenated.
1. True
 2. False
56. Hb is called deoxyhemoglobin.
1. True
 2. False
57. Hemoglobin retains oxygen in the lungs but tends to release it in the tissues.
1. True
 2. False
58. Hemoglobin takes up oxygen more readily in the warm temperatures and acidic pH of the lungs.
1. True
 2. False
59. During external respiration in the lungs, _____.
1. carbon dioxide leaves the blood
 2. oxygen enters the blood
 3. both 1 and 2 occur
60. Blood in systemic capillaries is bright red because _____.
1. red cells lack oxyhemoglobin
 2. red cells contain oxyhemoglobin
 3. red cells contain carbon dioxide
61. Oxygen diffuses out of blood into tissues because the oxygen concentration of tissue fluid is too high.
1. True
 2. False

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64. Most of the carbon dioxide combines with _____, forming carbonic acid.

1. enzymes
2. water
3. blood
4. plasma

65. Carbonic acid dissociates into _____.

1. hydrogen ions
2. bicarbonate ions
3. both 1 and 2

71. Acute bronchitis is usually caused by a secondary bacterial infection of the bronchi.

1. True
2. False

72. Chronic bronchitis is caused by _____.

1. a bacterial infection
2. a viral infection
3. constant irritation of the lining of the bronchi

76. Tuberculosis cannot be treated .

1. True
2. False

79. Pneumonia is usually caused by _____.

1. a bacterium
2. a virus
3. both 1 and 2

80. Pneumonia in AIDS patients is caused by a protozoan.

1. True
2. False

84. The events involved in the formation of lung cancer are _____.

1. callusing of cells lining the bronchi
2. loss of cilia
3. formation of cells with atypical nuclei
4. all of the above

87. Women who smoke during pregnancy risk having _____.

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1. a miscarriage
- . a premature baby
3. an underweight baby
4. 1, 2, and 3

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