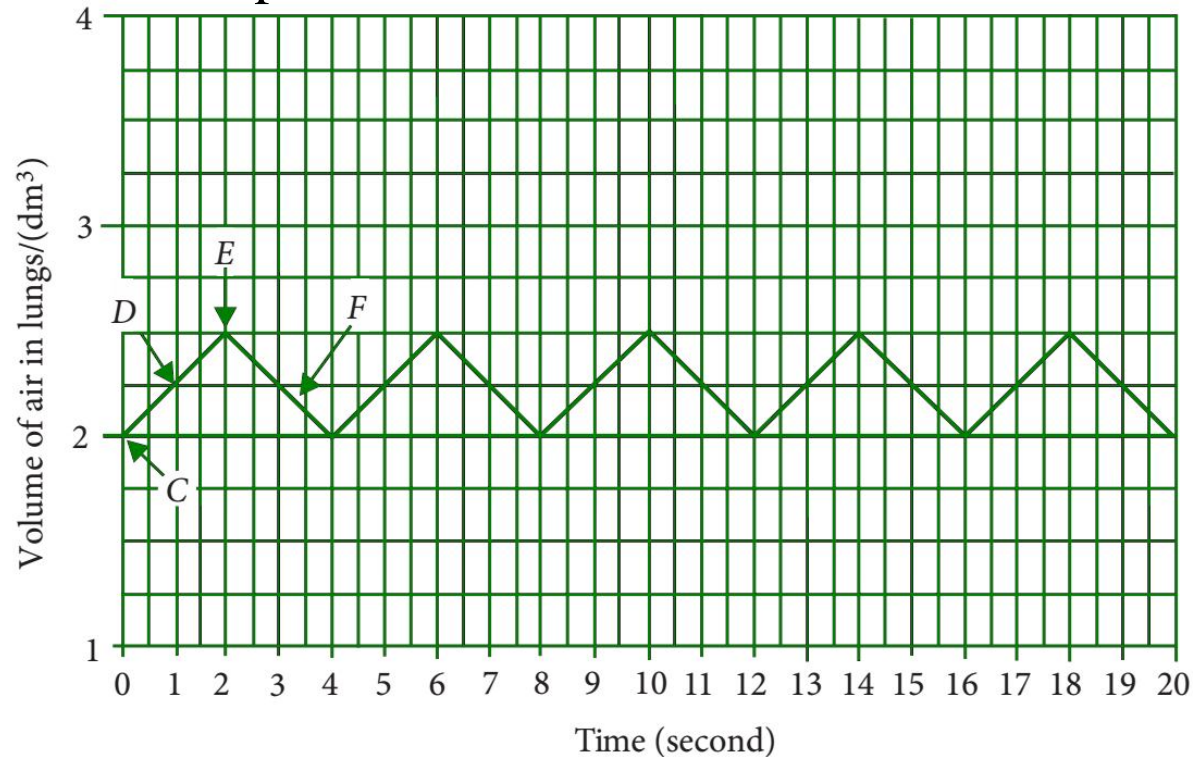


CASE STUDY QUESTION 22

Read the following and answer any four questions from (i) to (v)

During inhalation, the diaphragm is contracted which increases the volume of the lung cavity. During exhalation, the diaphragm is relaxed which decreases the volume of the lung cavity. The given graph is related to the changes in the volume of lungs of a person at a rest over a period of 20 seconds.



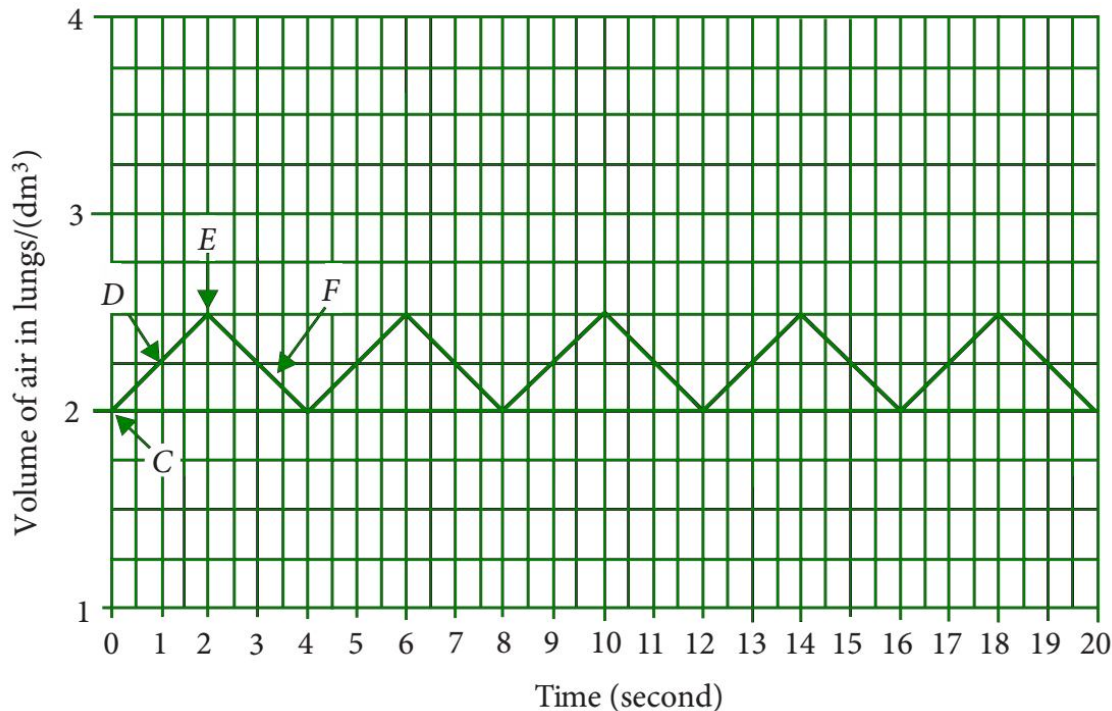
(i) How many breaths per minute is the person taking when at rest?

- (a) 15 (b) 15 (c) 17 (d) 20

It is clear from the given graph that the person is taking 5 breaths per 20 sec, so in 1 minute (60 sec) he will take **15 breaths** ($5/20 \times 60$)

(ii) Which two points in the graph (C, D, E or F), shows inspiration and expiration?

- (a) D, E (b) D, F (c) C, D (d) E, F



Point 'D' shows increase in the volume of lungs, thus at this point, inspiration is taking place while point 'F' shows decrease in the volume of lungs, thus at this point, expiration is taking place.

(iii) Which of the following muscles help during inhalation?

- (a) External intercostal muscles (b) Internal intercostal muscles
(c) Both (a) and (b) (d) None of these

External and internal intercostals muscles are specialised set of muscles that help during inhalation.

Ans: (c) Both (a) and (b)

(iv) During vigorous exercise, the rate of breathing of normal man is

- (a) 20 to 25 times per minute (b) 50 to 90 times per minute
(c) 100 to 150 times per minute (d) 40 to 70 times per minute.

Ans: (a) 20 to 25 times per minute

The rate of breathing increases during vigorous exercise. This is because the body needs more energy which can be released only if greater amounts of oxygen reach the cells. For this purpose, the rate of breathing increases. (This will increase the supply of oxygen to the cells).

(v) Which is the correct sequence of air passage during inhalation?

(a) Nostrils → larynx → pharynx → trachea → lungs

(b) Nasal passage → trachea → pharynx → larynx → alveoli

(c) Larynx → nostrils → pharynx → lungs

(d) Nostrils → pharynx → larynx → trachea → alveoli

Ans: (d) Nostrils → pharynx → larynx → trachea → alveoli