'समानो मन्त्रः समितिः समानी'

UNIVERSITY OF NORTH BENGAL

B.Sc. Honours 4th Semester Examination, 2022

CC10-PHYSIOLOGY

Time Allotted: 2 Hours | Full Marks: 40

The figures in the margin indicate full marks.

GROUP-A

1. Answer any ***five*** of the following: 1×5 = 5

(a) What is Pleurisy?
(b) What do you mean by the term COPD?
(c) Define the following terms:
(i) ERV and (ii) FRC.
Write down their respective values.
(d) Mention two important functions of the pre-Botzinger Complex.
(e) What is Oxygen toxicity?
(f) What is Pleural Effusion?
(g) State and justify the Boyle's law in relation to cyclic changes in intra-alveolar pressure.
(h) Define Elastic Recoil.
(i) Write down the interpretation of a Spirogram.
(j) What is Nitrogen Narcosis?

GROUP-B

Answer any *three* of the following 5×3 = 15

2. Discuss the physiological conditions leading to abnormalities in arterial P_{CO_2}. What is Hering-Breuer's Reflex? 3+2

3. State some of the non-respiratory functions of the respiratory system. What is Collateral Ventilation? 3+2

4. What do you mean by Transmural Pressure Gradient? Discuss the factors affecting airway resistance. 3+2

5. Discuss, how the law of laplace is applicable in explaining pulmonary surfaction. 5

6. Write short note on alveolar interdependence. What is histotoxic hypoxia? 4+1

7. 'Gas exchange across the systemic capillaries also occurs down the partial-pressure gradients'. — Explain. 5

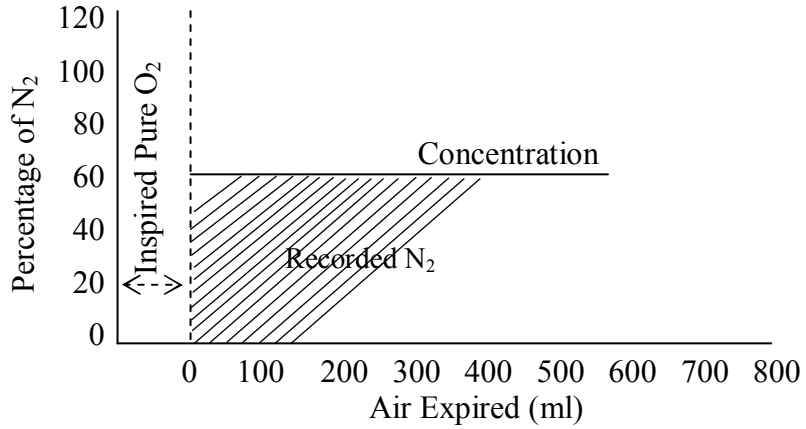
GROUP-C

Answer any *two* of the following 10×2 = 20

8. A Spirogram of a patient shows that the IRV (Inspiratory Reserve Volume) of the patient is 2800 ml. The RV and TV being 900 ml and 300 ml respectively. If the patient reports to be a chain-smoker and the ERV of the patient is 800 ml. Then calculate the vital capacity of the patient. Discuss the effects of different breathing patterns on alveolar ventilation. Discuss the Haldane's Effect. 3+5+2

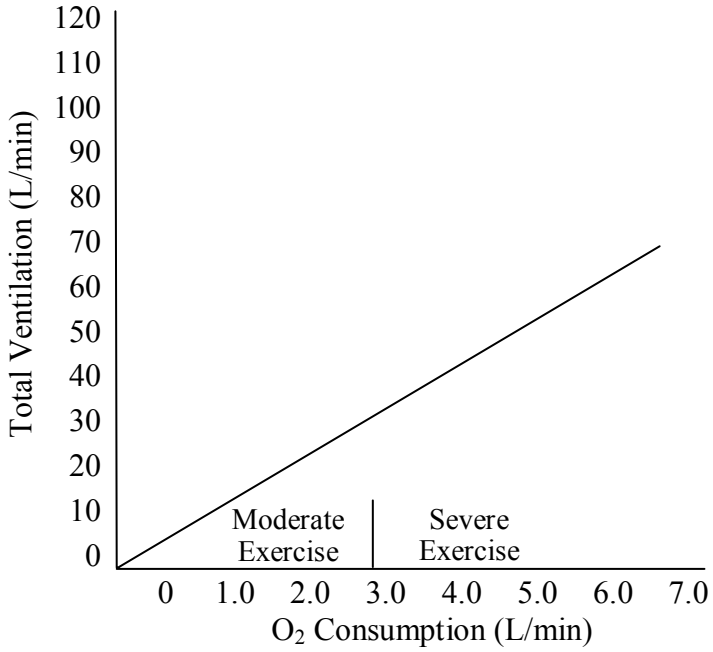
9. Discuss the mechanics of Respiration. State the different situations under which the work of breathing may be increased. Justify the Equation $F = \frac{\Delta P}{R}$. 5+4+1

10. 5+5



The above graph depicts the changes in N_2 concentration in the expired air after a single previous inspiration of pure Oxygen. If the shaded area of the graph measures 30 sq centimeters and the non-shaded area measures 70 sq centimeters and the TV of the expired air is 500 ml. Calculate the dead space (V_D). Discuss the concept of physiologic shunt (when V_A / Q is below normal).

11. 5+5



From the above graphical representation, discuss the effect of exercise on O_2 consumption and ventilation rate with respect to the graph.
Discuss the basic mechanism of Cheyne-Stokes breathing with appropriate graphical representation.

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