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BRAINWARE UNIVERSITY

Term End Examination 2024-2025
Programme – B.Sc.(CCT)-2021/B.Sc.(CCT)-2022
Course Name – Mechanical Ventilation-Non Invasive and Invasive Mechanism
Course Code - BCCTC502
(Semester V)

Full Marks : 60 **Time : 2:30 Hours**

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A
(Multiple Choice Type Question) 1 x 15=15

1. *Choose the correct alternative from the following :*

(i) Choose the following factors can increase the work of breathing.
   a) Decreased airway resistance b) Increased lung compliance
   c) Decreased chest wall compliance d) Shallow breathing

(ii) Choose the following conditions can lead to increased work of breathing.
   a) Emphysema b) Increased lung compliance
   c) Decreased airway resistance d) Normal tidal volume

(iii) In a healthy individual, choose the part of the respiratory cycle typically requires the most work of breathing.
   a) Inspiration b) Expiration
   c) Tidal volume delivery d) Resting phase

(iv) Identify the term for the work required to stretch the elastic components of the lungs and chest wall during inspiration.
   a) Resistive work b) Elastic work
   c) Expiratory work d) Inspiratory work

(v) Choose the phase of mechanical ventilation is responsible for preventing alveolar collapse and maintaining lung recruitment.
   a) Inspiratory phase b) Expiratory phase
   c) Inspiratory hold d) Expiratory hold

(vi) Flow in a mechanical ventilator can be classified as:
   a) Inspiratory flow and expiratory flow b) Tidal flow and residual flow
   c) Positive pressure flow and negative pressure flow d) Constant flow and variable flow

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(vii) Identify the primary purpose of adjusting tidal volume on a ventilator.

a) To maintain a constant oxygen concentration
b) To prevent lung infections
c) To optimize oxygenation and ventilation
d) To reduce the patient's heart rate

(viii) PEEP indicates:

a) Positive Expiratory End Pressure
b) Positive End-Expiratory Pressure
c) Peak Expiratory Pressure
d) Pressure during Exhalation

(ix) Choose the following is true about PEEP.

a) It increases oxygenation by increasing FiO2.
b) It helps maintain alveolar recruitment during expiration.
c) It is only used during inspiration.
d) It is primarily used to measure lung resistance.

(x) Judge, if Peak Pressure exceeds recommended levels in a ventilated patient.

a) Increase the tidal volume
b) Decrease the respiratory rate
c) Adjust the PEEP settings
d) Assess and address the underlying issue

(xi) Choose the mode of mechanical ventilation provides a set tidal volume and allows for spontaneous breathing between mandatory breaths.

a) Pressure Support Ventilation
b) Assist-Control Ventilation
c) SIMV (Synchronized Intermittent Mandatory Ventilation)
d) Volume Control Ventilation

(xii) Select a low exhaled tidal volume alarm is triggered when:

a) The patient is taking deep breaths
b) The patient's exhaled volume is below the set threshold
c) The patient is coughing
d) The ventilator is too loud

(xiii) Identify the purpose of the expiratory pressure setting in BiPAP therapy.

a) To increase oxygen levels in the bloodstream
b) To prevent airway collapse during inhalation
c) To assist with exhalation and reduce work of breathing
d) To regulate the patient's heart rate

(xiv) Identify the "Apnea" alarm indicate.

a) The patient is experiencing a sudden increase in breathing rate
b) The patient has stopped breathing for a predefined duration
c) The patient is hyperventilating
d) The ventilator is malfunctioning

(xv) Choose the following parameters is a measure of the patient's ability to generate adequate inspiratory pressure.

a) Respiratory rate
b) Tidal volume
c) Maximum inspiratory pressure (MIP)
d) Heart rate

Group-B

(Short Answer Type Questions) 3 x 5=15

2. Write the purpose of high-pressure alarm settings on a ventilator, and when might they be triggered. (3)
3. Explain the primary disadvantage of using a heated humidifier in a mechanical ventilator system. (3)
4. Write the advantages of using an ultrasonic nebulizer over a jet nebulizer for medication delivery. (3)
5. Discuss inspiratory time in mechanical ventilation. (3)
6. Illustrate the concept of "inspiratory positive airway pressure" (IPAP) in BiPAP therapy. (3)

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Explain how should BiPAP settings adjusted and monitored for optimal therapy effectiveness. (3)

Group-C

(Long Answer Type Questions) 5 x 6=30

7. Illustrate the specific role of BiPAP in the management of patients with severe COPD exacerbations. (5)
8. In the context of weaning adult patients from mechanical ventilation, write the roles of various respiratory support techniques, such as pressure support ventilation (PSV), continuous positive airway pressure (CPAP) ? How do healthcare providers decide which mode of ventilation to use during the weaning process. (5)
9. Define "work of breathing" and describe its significance in respiratory physiology. (5)
10. Name the primary muscles involved in breathing and list any accessory muscles that contribute during increased workloads. (5)
11. Justify the adjustment of inspiratory time on a mechanical ventilator impact the patient's respiratory pattern and gas exchange, and under what clinical circumstances might longer inspiratory times be preferred over shorter ones. (5)
12. Write the potential risks associated with using excessive tidal volumes in mechanical ventilation. How can healthcare providers monitor and adjust tidal volume settings to minimize these risks while ensuring adequate ventilation. (5)

OR

Write the significance of tidal volume in mechanical ventilation, and how does it impact patient outcomes? Please describe the relationship between tidal volume and lung protection. (5)

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