



Clinical Simulation Examination Detailed Content Outline

*Each section of each problem is classified to a minor content heading (e.g., I.A, II.B)
described below.*

I. PATIENT DATA EVALUATION AND RECOMMENDATIONS

A. Evaluate Data in the Patient Record

1. Patient history, for example,
 - admission data
 - orders
 - medications
 - progress notes
 - DNR status / advance directives
 - social history
2. Physical examination relative to the cardiopulmonary system
3. Drainage and access devices, for example,
 - chest tube
 - artificial airway
4. Laboratory results, for example,
 - CBC
 - electrolytes
 - coagulation studies
 - culture and sensitivities
 - sputum Gram stain
 - cardiac enzymes
5. Blood gas analysis results
6. Pulmonary function testing results
7. 6-minute walk test results
8. Cardiopulmonary stress testing results
9. Imaging study results, for example,
 - chest radiograph
 - CT
 - ultrasonography
 - MRI
 - PET
 - ventilation / perfusion scan
10. Maternal and perinatal / neonatal history, for example,
 - Apgar scores
 - gestational age
 - L / S ratio
 - social history
11. Metabolic study results, for example,
 - O₂ consumption / CO₂ production
 - respiratory quotient
 - energy expenditure
12. Sleep study results
13. Trends in monitoring results
 - a. fluid balance
 - b. vital signs
 - c. intracranial pressure
 - d. weaning parameters
 - e. pulmonary compliance, airways resistance, work of breathing
 - f. noninvasive, for example,
 - pulse oximetry
 - capnography
 - transcutaneous O₂ / CO₂
14. Trends in cardiac monitoring results
 - a. ECG
 - b. hemodynamic parameters
 - c. cardiac catheterization
 - d. echocardiography

B. Gather Clinical Information



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1. Interviewing a patient to assess
 - a. level of consciousness and orientation, emotional state, and ability to cooperate
 - b. level of pain
 - c. presence of dyspnea, sputum production, and exercise tolerance
 - d. smoking history
 - e. environmental exposures
 - f. activities of daily living
 - g. learning needs, for example,
 - literacy
 - culture
 - preferred learning style
 2. Performing inspection to assess
 - a. general appearance
 - b. characteristics of the airway, for example,
 - patency
 - c. cough, sputum amount and character
 - d. status of a neonate, for example,
 - Apgar score
 - gestational age
 3. Palpating to assess
 - a. pulse, rhythm, force
 - b. accessory muscle activity
 - c. asymmetrical chest movements, tactile fremitus, crepitus, tenderness, secretions in the airway, and tracheal deviation
 4. Performing diagnostic chest percussion
 5. Auscultating to assess
 - a. breath sounds
 - b. heart sounds and rhythm
 - c. blood pressure
 6. Reviewing lateral neck radiographs
 7. Reviewing a chest radiograph to assess
 - a. quality of imaging, for example,
 - patient positioning
 - penetration
 - b. presence and position of tubes and catheters
 - c. presence of foreign bodies
 - d. heart size and position
 - e. presence of, or change in
 - (i) cardiopulmonary abnormalities, for example,
 - pneumothorax
 - pleural effusion
 - consolidation
 - pulmonary edema
 - (ii) hemidiaphragms, mediastinum, or trachea
- C. Perform Procedures to Gather Clinical Information
1. 12-lead ECG
 2. Noninvasive monitoring, for example,
 - pulse oximetry
 - transcutaneous
 - capnography



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3. Peak flow
 4. Tidal volume, minute volume, and vital capacity
 5. Screening spirometry
 6. Blood gas sample collection
 7. Blood gas analysis / hemoximetry
 8. 6-minute walk test
 9. Oxygen titration with exercise
 10. Cardiopulmonary calculations, for example,
 - $P(A-a)O_2$
 - P / F
 - V_D / V_T
 - oxygenation index
 11. Hemodynamic monitoring
 12. Pulmonary compliance and airways resistance
 13. Maximum inspiratory and expiratory pressures
 14. Plateau pressure
 15. Auto-PEEP determination
 16. Spontaneous breathing trial
 17. Apnea monitoring
 18. Overnight pulse oximetry
 19. CPAP / NPPV titration during sleep
 20. Tracheal tube cuff pressure and / or volume
 21. Sputum induction
 22. Cardiopulmonary stress testing
 23. Pulmonary function testing
- D. Evaluate Procedure Results
1. 12-lead ECG
 2. Noninvasive monitoring, for example,
 - pulse oximetry
 - transcutaneous
 - capnography
 3. Peak flow
 4. Tidal volume, minute volume, and vital capacity
 5. Screening spirometry
 6. Blood gas analysis / hemoximetry
 7. 6-minute walk test
 8. Oxygen titration with exercise
 9. Cardiopulmonary calculations, for example,
 - $P(A-a)O_2$
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 17. Overnight pulse oximetry



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18. CPAP / NPPV titration during sleep
19. Tracheal tube cuff pressure and / or volume
20. Sputum induction
21. Cardiopulmonary stress testing
22. Pulmonary function testing

E. Recommend Diagnostic Procedures

1. Skin testing, for example,
 - TB
 - allergy
2. Blood tests, for example,
 - electrolytes
 - CBC
3. Imaging studies
4. Bronchoscopy
5. Bronchoalveolar lavage (BAL)
6. Sputum Gram stain, culture and sensitivities
7. Pulmonary function testing
8. Noninvasive monitoring, for example,
 - pulse oximetry
 - transcutaneous
 - capnography
9. Blood gas analysis
10. ECG
11. Exhaled gas analysis, for example,
 - CO₂
 - NO (F_ENO)
 - CO
12. Hemodynamic monitoring
13. Sleep studies
14. Thoracentesis

II. TROUBLESHOOTING AND QUALITY CONTROL OF EQUIPMENT, AND INFECTION CONTROL

A. Assemble and Troubleshoot Equipment

1. Oxygen administration devices
2. CPAP devices
3. Humidifiers
4. Nebulizers
5. Metered-dose inhalers (MDI), spacers, and valved holding chambers
6. Dry powder inhalers
7. Resuscitation devices
8. Mechanical ventilators
9. Intubation equipment
10. Artificial airways
11. Suctioning equipment, for example,
 - regulator
 - tubing
 - canister
 - catheter
12. Gas delivery, metering, and clinical analyzing devices, for example,



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- concentrator
- liquid system
- flowmeter
- regulator
- 13. Blood analyzers, for example,
 - hemoximetry
 - point-of-care
 - blood gas
- 14. Patient breathing circuits
- 15. Incentive breathing devices
- 16. Airway clearance devices, for example,
 - high-frequency chest wall oscillation
 - vibratory PEP
 - intrapulmonary percussive ventilation
 - insufflation/exsufflation device
- 17. Heliox delivery device
- 18. Nitric oxide (NO) delivery device
- 19. Spirometers – hand-held and screening
- 20. Pleural drainage devices
- 21. Noninvasive monitoring devices, for example,
 - pulse oximeter
 - capnometer
 - transcutaneous
- 22. Gas analyzers
- 23. Bronchoscopes and light sources
- 24. Hemodynamic monitoring devices
 - a. pressure transducers
 - b. catheters, for example,
 - arterial
 - pulmonary artery
- B. Ensure Infection Control
 1. Using high-level disinfection techniques
 2. Selection of appropriate agent and technique for surface disinfection
 3. Monitoring effectiveness of sterilization procedures
 4. Proper handling of biohazardous materials
 5. Adhering to infection control policies and procedures, for example,
 - Standard Precautions
 - isolation
- C. Perform Quality Control Procedures
 1. Gas analyzers
 2. Blood gas analyzers and hemoximeters
 3. Point-of-care analyzers
 4. Pulmonary function equipment
 5. Mechanical ventilators
 6. Gas metering devices, for example,
 - flowmeter
 7. Noninvasive monitors, for example,
 - transcutaneous



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III. INITIATION AND MODIFICATION OF INTERVENTIONS

- A. Maintain a Patent Airway Including the Care of Artificial Airways
 1. Proper positioning of a patient
 2. Recognition of a difficult airway
 3. Establishing and managing a patient's airway
 - a. nasopharyngeal airway
 - b. oropharyngeal airway
 - c. laryngeal mask airway
 - d. esophageal-tracheal tubes / supraglottic airways, for example,
 - Combitube®
 - King®
 - e. endotracheal tube
 - f. tracheostomy tube
 - g. laryngectomy tube
 - h. speaking valves
 4. Performing tracheostomy care
 5. Exchanging artificial airways
 6. Maintaining adequate humidification
 7. Initiating protocols to prevent ventilator associated pneumonia (VAP)
 8. Performing extubation
- B. Perform Airway Clearance and Lung Expansion Techniques
 1. Postural drainage, percussion, or vibration
 2. Suctioning, for example,
 - nasotracheal
 - oropharyngeal
 3. Mechanical devices, for example,
 - high-frequency chest wall oscillation
 - vibratory PEP
 - intrapulmonary percussive ventilation
 - insufflation / exsufflation device
 4. Assisted cough, for example,
 - huff
 - quad
 5. Hyperinflation, for example,
 - incentive spirometry
 - IPPB
 6. Inspiratory muscle training techniques
- C. Support Oxygenation and Ventilation
 1. Initiating and adjusting oxygen therapy, for example,
 - low-flow
 - high-flow
 2. Minimizing hypoxemia, for example,
 - patient positioning
 - suctioning
 3. Initiating and adjusting mask or nasal CPAP
 4. Initiating and adjusting mechanical ventilation settings
 - a. continuous mechanical ventilation
 - b. noninvasive ventilation
 - c. high-frequency ventilation
 - d. alarms
 5. Correcting patient-ventilator dyssynchrony



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6. Utilizing ventilator graphics, for example,
 - waveforms
 - scales
 7. Performing lung recruitment maneuvers
 8. Liberating patient from mechanical ventilation (weaning)
- D. Administer Medications and Specialty Gases
1. Aerosolized preparations, for example,
 - MDI
 - SVN
 2. Dry powder preparations
 3. Endotracheal instillation
 4. Specialty gases, for example,
 - heliox
 - NO
- E. Ensure Modifications are Made to the Respiratory Care Plan
1. Treatment termination, for example,
 - life-threatening adverse event
 2. Recommendations
 - a. starting treatment based on patient response
 - b. treatment of pneumothorax
 - c. adjustment of fluid balance
 - d. adjustment of electrolyte therapy
 - e. insertion or change of artificial airway
 - f. liberating from mechanical ventilation
 - g. extubation
 - h. discontinuing treatment based on patient response
 3. Recommendations for changes
 - a. patient position
 - b. oxygen therapy
 - c. humidification
 - d. airway clearance
 - e. hyperinflation
 - f. mechanical ventilation parameters and settings
 4. Recommendations for pharmacologic interventions
 - a. pulmonary vasodilators, for example,
 - sildenafil
 - inhaled NO
 - prostacyclin
 - b. bronchodilators
 - c. antiinflammatory drugs
 - d. mucolytics and proteolytics
 - e. cardiovascular drugs
 - f. antimicrobials
 - g. sedatives and hypnotics
 - h. analgesics
 - i. neuromuscular blocking agents
 - j. diuretics
 - k. surfactants



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- l. vaccines
 - m. changes to drug, dosage, or concentration
 - F. Utilize Evidence-Based Medicine Principles
 - 1. Determination of a patient's pathophysiological state
 - 2. Recommendations for changes in a therapeutic plan when indicated
 - 3. Application of evidence-based or clinical practice guidelines, for example,
 - ARDSNet
 - NAEPP
 - G. Provide Respiratory Care Techniques in High-Risk Situations
 - 1. Emergency
 - a. cardiopulmonary emergencies, for example,
 - cardiac arrest
 - obstructed / lost airway
 - tension pneumothorax
 - b. disaster management
 - c. medical emergency team (MET) / rapid response team
 - 2. Patient transport
 - a. land / air between hospitals
 - b. within a hospital
 - H. Assist a Physician / Provider in Performing Procedures
 - 1. Intubation
 - 2. Bronchoscopy
 - 3. Thoracentesis
 - 4. Tracheostomy
 - 5. Chest tube insertion
 - 6. Insertion of arterial or venous catheters
 - 7. Moderate (conscious) sedation
 - 8. Cardioversion
 - 9. Cardiopulmonary exercise testing
 - 10. Withdrawal of life support
 - I. Initiate and Conduct Patient and Family Education
 - 1. Safety and infection control
 - 2. Home care and equipment
 - 3. Smoking cessation
 - 4. Pulmonary rehabilitation
 - 5. Disease management
 - a. asthma
 - b. COPD
 - c. sleep disorders

Specifications for Each Test Form

The type of each problem is coded. Problems are assembled according to these specifications.

Problem Type	Specifications
A1. COPD conservative management	2
A2. COPD critical care management	2
B. Adult trauma	3
C. Adult cardiovascular	3
D. Adult neurological or neuromuscular	2
E. Pediatric	2
F. Neonatal	2
G. Adult medical or surgical	4
Total	20

Clinical Simulation Examination Admission Requirements

Please ensure you meet the following requirements before applying for the CSE Examination:

1. 1. Be a CRT and have successfully completed the Therapist Written Examination (WRRT) or the Therapist Multiple-Choice Examination (TMC) at the high cut score.
and
2. 2. Be a graduate of and have a minimum of an associate degree from an advanced level respiratory therapy education program supported or accredited by the Commission on Accreditation for Respiratory Care (CoARC).
or
3. 3. Be a CRT for at least four years prior to applying for the examinations associated with the RRT credential. In addition, the applicant shall have at least 62 semester hours of college credit from a college or university accredited by its regional association or its equivalent. The 62 semester hours of college credit must include the following courses: anatomy and physiology, chemistry, microbiology, and mathematics.
or
4. 4. Be a CRT for at least two years prior to applying for the examinations associated with the RRT credential. In addition, the applicant shall have earned a minimum of an associate degree from an accredited entry-level respiratory care education program.
or
5. 5. Be a CRT for at least two years prior to applying for the examinations associated with the RRT credential. In addition, the applicant shall have earned a baccalaureate degree in an area other than respiratory care and shall have at least 62 semester hours of college credit from a college or university accredited by its regional association or equivalent. The 62 semester hours of college credit must include the following courses: anatomy and physiology, chemistry, microbiology, and mathematics.
or
6. 6. Hold the Canadian Society of Respiratory Therapists (CSRT) RRT credential.

Eligibility Three-Year Time Limit

Effective January 1, 2005, new graduates of accredited advanced-level education programs will have three years after graduation to earn the RRT credential. Individuals who do not earn the RRT credential within this time limit will be required to retake and pass the Therapist Multiple-Choice Examination at the CRT cut score to regain eligibility, and any previous passing performance to earn the RRT credential shall be nullified. Following regaining eligibility by taking and passing the Therapist Multiple-Choice Examination at the CRT cut score, the candidate will have another three years to earn the RRT credential. The individual must apply as a new candidate and pay all applicable fees to take the Therapist Multiple-Choice and Clinical Simulation Examinations.

NBRC's mission is to evaluate the competency of respiratory therapists and to support the profession of respiratory care. It's a role that we take very seriously. As the provider of the RRT, the credential that is considered the "standard of excellence" in respiratory care, it is our responsibility to ensure that graduates of advanced-level education programs have the opportunity to earn the RRT credential. During a time when there is a shortage of qualified respiratory therapists to provide the excellent care that patients expect, advanced-level graduates who earn the RRT credential are in high demand nationwide and can help to fill this shortage.

Clinical Simulation Examination Examination Fees

New Applicant	Repeat Applicant
\$200	\$200