



Clinical Simulation Examination Detailed Content Outline

Each section of each problem is classified to a minor content heading,
for example, I.A, II.B

I. PATIENT DATA

A. Evaluate Data in the Patient Record

1. Patient history, for example,
 - history of present illness (HPI)
 - orders
 - medication reconciliation
 - progress notes
 - DNR status / advance directives
 - social, family, and medical history
2. Physical examination relative to the cardiopulmonary system
3. Lines, drains, and airways, for example,
 - chest tube
 - vascular lines
 - artificial airway
4. Laboratory results, for example,
 - CBC
 - electrolytes
 - coagulation studies
 - sputum culture and sensitivities
 - cardiac biomarkers
5. Blood gas analysis and / or hemoximetry (CO-oximetry) results
6. Pulmonary function testing results, for example
 - spirometry
 - lung volumes
 - DLCO
7. 6-minute walk test results
8. Imaging study results, for example,
 - chest radiograph
 - CT scan
 - ultrasonography and / or echocardiography
 - PET scan
 - ventilation / perfusion scan
9. Maternal and perinatal / neonatal history, for example,
 - Apgar scores
 - gestational age
 - L / S ratio
10. Sleep study results, for example,
 - apnea-hypopnea index (AHI)



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11. Trends in monitoring results
a. fluid balance
b. vital signs
c. intracranial pressure
d. ventilator liberation parameters
e. pulmonary mechanics
f. noninvasive, for example, <ul style="list-style-type: none"> • pulse oximetry • capnography • transcutaneous
g. cardiac evaluation / monitoring results, for example, <ul style="list-style-type: none"> • ECG • hemodynamic parameters
12. Determination of a patient's pathophysiological state
B. Perform Clinical Assessment
1. Interviewing a patient to assess
a. level of consciousness and orientation, emotional state, and ability to cooperate
b. level of pain
c. shortness of breath, sputum production, and exercise tolerance
d. smoking history
e. environmental exposures
f. activities of daily living
g. learning needs, for example, <ul style="list-style-type: none"> • literacy • preferred learning style • social / cultural
2. Performing inspection to assess
a. general appearance
b. characteristics of the airway, for example, <ul style="list-style-type: none"> • patency • Mallampati classification • tracheal shift
c. cough, sputum amount and character
d. status of a neonate, for example, <ul style="list-style-type: none"> • Apgar score • gestational age
e. skin integrity, for example, <ul style="list-style-type: none"> • pressure ulcers • stoma site



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|---|
| 3. Palpating to assess |
| a. pulse, rhythm, intensity |
| b. accessory muscle activity |
| c. asymmetrical chest movements, tactile fremitus, crepitus, tenderness, tactile rhonchi, and / or tracheal deviation |
| 4. Performing diagnostic chest percussion |
| 5. Auscultating to assess |
| a. breath sounds |
| b. heart sounds and rhythm |
| c. blood pressure |
| 6. Reviewing a chest radiograph to assess |
| a. quality of imaging, for example, |
| • patient positioning |
| • penetration |
| • lung inflation |
| b. presence and position of airways, lines, and drains |
| c. presence of foreign bodies |
| d. heart size and position |
| e. presence of, or change in, |
| (i) cardiopulmonary abnormalities, for example, |
| • pneumothorax |
| • consolidation |
| • pleural effusion |
| • pulmonary edema |
| • pulmonary artery size |
| (ii) diaphragm, mediastinum, and / or trachea |

C. Perform Procedures to Gather Clinical Information

- | |
|---|
| 1. 12-lead ECG |
| 2. Noninvasive monitoring, for example, |
| • pulse oximetry |
| • capnography |
| • transcutaneous |
| 3. Peak flow |
| 4. Mechanics of spontaneous ventilation linked to tidal volume, minute volume, maximal inspiratory pressure, and vital capacity |
| 5. Blood gas sample collection |
| 6. Blood gas analysis and / or hemoximetry (CO-oximetry) |
| 7. Oxygen titration with exercise |



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|--------------------------------------|--|
| 8. | Cardiopulmonary calculations, for example, <ul style="list-style-type: none"> • $P(A-a)O_2$ • V_D / V_T • P / F • OI |
| 9. | Hemodynamic monitoring |
| 10. | Pulmonary compliance and airways resistance |
| 11. | Plateau pressure |
| 12. | Auto-PEEP determination |
| 13. | Spontaneous breathing trial (SBT) |
| 14. | Apnea monitoring |
| 15. | Apnea test (brain death determination) |
| 16. | Overnight pulse oximetry |
| 17. | CPAP / NPPV titration during sleep |
| 18. | Cuff management, for example, <ul style="list-style-type: none"> • tracheal • laryngeal |
| 19. | Sputum induction |
| 20. | Cardiopulmonary exercise testing |
| 21. | 6-minute walk test |
| 22. | Spirometry outside or inside a pulmonary function laboratory |
| 23. | DLCO inside a pulmonary function laboratory |
| 24. | Lung volumes inside a pulmonary function laboratory |
| 25. | Tests of respiratory muscle strength - MIP and MEP |
| 26. | Therapeutic bronchoscopy |
| D. Evaluate Procedure Results | |
| 1. | 12-lead ECG |
| 2. | Noninvasive monitoring, for example, <ul style="list-style-type: none"> • pulse oximetry • capnography • transcutaneous |
| 3. | Peak flow |
| 4. | Mechanics of spontaneous ventilation linked to tidal volume, minute volume, maximal inspiratory pressure, and vital capacity |
| 5. | Blood gas analysis and / or hemoximetry (CO-oximetry) |
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7. Cardiopulmonary calculations, for example,
 - $P(A-a)O_2$
 - V_D / V_T
 - P / F
 - OI
8. Hemodynamic monitoring
9. Pulmonary compliance and airways resistance
10. Plateau pressure
11. Auto-PEEP
12. Spontaneous breathing trial (SBT)
13. Apnea monitoring
14. Apnea test (brain death determination)
15. Overnight pulse oximetry
16. CPAP / NPPV titration during sleep
17. Cuff status, for example,
 - laryngeal
 - tracheal
18. Cardiopulmonary exercise testing
19. 6-minute walk test
20. Spirometry outside or inside a pulmonary function laboratory
21. DLCO inside a pulmonary function laboratory
22. Lung volumes inside a pulmonary function laboratory
23. Tests of respiratory muscle strength - MIP and MEP

E. Recommend Diagnostic Procedures

1. Testing for tuberculosis
2. Laboratory tests, for example,
 - CBC
 - electrolytes
 - coagulation studies
 - sputum culture and sensitivities
 - cardiac biomarkers
3. Imaging studies
4. Bronchoscopy
 - a. diagnostic
 - b. therapeutic
5. Bronchoalveolar lavage (BAL)
6. Pulmonary function testing



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7. Noninvasive monitoring, for example,
- pulse oximetry
 - capnography
 - transcutaneous

8. Blood gas and/or hemoximetry (CO-oximetry)

9. ECG

10. Exhaled gas analysis, for example,
- CO₂
 - CO
 - FENO

11. Hemodynamic monitoring

12. Sleep studies

13. Thoracentesis

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

A. Assemble /Troubleshoot Devices

1. Medical gas delivery interfaces, for example,
- mask
 - cannula
 - heated high-flow nasal cannula

2. Long-term oxygen therapy

3. Medical gas delivery, metering, and /or clinical analyzing devices, for example,
- concentrator
 - liquid system
 - flowmeter
 - regulator
 - gas cylinder
 - blender
 - air compressor
 - gas analyzers

4. CPAP / NPPV with patient interfaces

5. Humidifiers

6. Nebulizers

7. Metered-dose inhalers, spacers, and valved holding chambers

8. Dry-powder inhalers (DPI)

9. Resuscitation equipment, for example,
- self-inflating resuscitator
 - flow-inflating resuscitator
 - AED

10. Mechanical ventilators



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11.	Intubation equipment
12.	Artificial airways
13.	Suctioning equipment, for example, <ul style="list-style-type: none"> • regulator • canister • tubing • catheter
14.	Blood analyzers, for example, <ul style="list-style-type: none"> • hemoximetry (CO-oximetry) • point-of-care • blood gas
15.	Patient breathing circuits
16.	Hyperinflation devices
17.	Secretion clearance devices
18.	Heliox delivery device
19.	Portable spirometer
20.	Testing equipment in a pulmonary function laboratory
21.	Pleural drainage
22.	Noninvasive monitoring, for example, <ul style="list-style-type: none"> • pulse oximeter • capnometer • transcutaneous
23.	Bronchoscopes and light sources
24.	Hemodynamic monitoring <ol style="list-style-type: none"> a. pressure transducers b. catheters, for example, <ul style="list-style-type: none"> • arterial • pulmonary artery
B. Ensure Infection Prevention	
1.	Adhering to infection prevention policies and procedures, for example, <ul style="list-style-type: none"> • Standard Precautions • donning/doffing • isolation
2.	Adhering to disinfection policies and procedures
3.	Proper handling of biohazardous materials
C. Perform Quality Control Procedures	
1.	Blood analyzers
2.	Gas analyzers
3.	Pulmonary function equipment for testing <ol style="list-style-type: none"> a. spirometry results



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b. lung volumes

c. diffusing capacity (DLCO)

4. Mechanical ventilators

5. Noninvasive monitors

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. esophagealtracheal tubes / supraglottic airways

d. endotracheal tube

e. tracheostomy tube

f. laryngectomy tube

g. speaking valves

h. devices that assist with intubation, for example,

- endotracheal tube exchanger
- video laryngoscopy

4. Performing tracheostomy care

5. Exchanging artificial airways

6. Maintaining adequate humidification

7. Initiating protocols to prevent ventilator-associated infections

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
- abdominal thrust

5. Hyperinflation therapy

6. Inspiratory muscle training



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C. Support Oxygenation and Ventilation

1. Initiating and adjusting oxygen therapy
2. Minimizing hypoxemia, for example,
 - patient positioning
 - secretion removal
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. Recognizing and correcting patient-ventilator dyssynchrony
6. Utilizing ventilator graphics
7. Performing lung recruitment maneuvers
8. Liberating a patient from mechanical ventilation

D. Administer Medications and Specialty Gases

1. Aerosolized preparations
 - a. antimicrobials
 - b. pulmonary vasodilators
 - c. bronchodilators
 - d. mucolytics / proteolytics
 - e. steroids
2. Endotracheal instillation
3. Specialty gases, for example,
 - heliox
 - inhaled 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
 - i. consultation from a physician specialist



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3.	Recommendations for changes
a.	patient position
b.	oxygen therapy
c.	humidification
d.	airway clearance
e.	hyperinflation
f.	mechanical ventilation
4.	Recommendations for pharmacologic interventions
a.	bronchodilators
b.	anti-inflammatory drugs
c.	mucolytics and proteolytics
d.	aerosolized antibiotics
e.	inhaled pulmonary vasodilators
f.	cardiovascular
g.	antimicrobials
h.	sedatives and hypnotics
i.	analgesics
j.	narcotic antagonists
k.	benzodiazepine antagonists
l.	neuromuscular blocking agents
m.	diuretics
n.	surfactants
o.	changes to drug, dosage, administration frequency, mode, or concentration
F. Utilize Evidence-Based Practice	
1.	Classification of disease severity
2.	Recommendations for changes in a therapeutic plan when indicated
3.	Application of guidelines, for example, <ul style="list-style-type: none"> • ARDSNet • NAEPP • GOLD
G. Provide Respiratory Care Techniques in High-Risk Situations	
1.	Emergency <ul style="list-style-type: none"> a. cardiopulmonary emergencies excluding CPR b. disaster management c. medical emergency team (MET) / rapid response team
2.	Interprofessional communication
3.	Patient transport <ul style="list-style-type: none"> a. land / air between hospitals b. within a hospital



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H. Assist a Physician / Provider in Performing Procedures

1. Intubation
2. Bronchoscopy
3. Specialized bronchoscopy, for example,
 - EBUS
 - navigational bronchoscopy (ENB)
4. Thoracentesis
5. Tracheotomy
6. Chest tube insertion
7. Insertion of arterial or venous catheters
8. Moderate (conscious) sedation
9. Cardioversion
10. Withdrawal of life support

I. Conduct Patient and Family Education

1. Safety and infection control
2. Home care and related equipment
3. Lifestyle changes, for example,
 - smoking cessation
 - exercise
4. Pulmonary rehabilitation
5. Disease / condition management, for example,
 - asthma
 - COPD
 - CF
 - tracheostomy care
 - ventilator dependent

Test Form Assembly Specifications	Problem Count
A. Adult Chronic Airways Disease	7
1. Intubation and mechanical ventilation	2
2. Noninvasive management -for example, medical treatment, noninvasive positive pressure ventilation	2
3. Outpatient management of COPD -for example, medical treatment, discharge planning, rehabilitation	1
4. Outpatient management of asthma -for example, medical treatment, discharge planning, rehabilitation	1
5. Diagnosis -for example emphysema, chronic bronchitis, bronchiectasis, asthma	1
B. Adult Trauma	1
C. Adult Cardiovascular	2
1. Heart failure	1
2. Other -for example, arrhythmia, pulmonary hypertension, myocardial ischemia / infarction, pulmonary embolism	1
D. Adult Neurological or Neuromuscular	1
E. Adult Medical or Surgical	5
1. Cystic fibrosis or non-cystic fibrosis bronchiectasis	1
2. Infectious disease	1
3. Acute respiratory distress syndrome	1
4. Other -for example, immunocompromised, shock, bariatric, psychiatric	2
F. Pediatric	2
1. Asthma	1
2. Other -for example, infectious disease, bronchiolitis, chronic lung disease of prematurity, congenital defect	1
G. Neonatal	2
1. Respiratory distress syndrome	1
2. Resuscitation	1
Total	20