




 <p style="text-align: center;"><b>Credential Maintenance Program</b>  <b>Pulmonary Function Technology Assessment</b>  <b>Detailed Content Outline</b></p> <p style="text-align: center;"><i>Multiple-choice items are linked to open cells.</i></p> <p style="text-align: center;">*Test takers will be asked to integrate (apply or analyze) information.</p>	Items		
	Cognitive Level		Total
	Recall	Integration*	
<b>First Quarter of the Calendar</b>			<b>5</b>
<b>I. INSTRUMENTATION / EQUIPMENT</b>	<b>1</b>	<b>4</b>	<b>5</b>
<b>A. Set Up, Maintain, Calibrate</b>	<b>1</b>	<b>2</b>	<b>3</b>
1. Blood gas analyzers			
2. CO-oximeters / hemoximeters			
3. Spirometers (for example, diagnostic, screening, portable)			
4. Peak flow meters			
5. Aerosol delivery devices (for example, bronchodilator / bronchial challenge, dosimeters)			
6. Metered dose or dry powder inhalers			
7. Valves (for example, directional, demand)			
8. Gas analyzers			
a. DLCO (for example, gas chromatograph, infrared)			
b. gas dilution techniques (for example, nitrogen, helium, oxygen)			
c. exercise (for example, CO <sub>2</sub> , O <sub>2</sub> )			
9. Body plethysmographs			
10. Exercise equipment (for example, treadmill, cycle or arm ergometer)			
11. ECG monitors (for example, 3-lead, 12-lead)			
12. Metabolic measurement systems for exercise testing			
13. Gas delivery systems (for example, blenders, flowmeters)			
14. Pressure measuring devices (for example, manometers, transducers, strain gauges)			
15. Gas and water absorbers (for example, Drierite <sup>®</sup> , Permapure <sup>®</sup> tubing)			
16. Emergency management equipment (for example, defibrillator, crash cart)			
17. Flexible bronchoscopes and associated equipment			
18. Arterial / venous blood collection equipment			
19. Information systems equipment (for example, computers, data backup, networks, printers, security)			
20. Quality control devices (for example, calibration syringes, manometers, isothermal lung analog)			
21. Gas exchange validation device or DLCO simulator			


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		Cognitive Level		Total
		Recall	Integration*	
22.	Infection control materials / methods (for example, sterilization devices, gowns, gloves, masks, filters)			
23.	Monitors			
	a. pulse oximeters			
	b. blood pressure (for example, manual cuff, automated)			
<b>B. Troubleshoot</b>		<b>0</b>	<b>1</b>	<b>1</b>
1.	Blood gas analyzers			
2.	CO-oximeters / hemoximeters			
3.	Spirometers (for example, diagnostic, screening, portable)			
4.	Peak flow meters			
5.	Aerosol delivery devices (for example, bronchodilator / bronchial challenge, dosimeters)			
6.	Metered dose or dry powder inhalers			
7.	Valves (for example, directional, demand)			
8.	Gas analyzers			
	a. DLCO (for example, gas chromatograph, infrared)			
	b. gas dilution techniques (for example, nitrogen, helium, oxygen)			
	c. exercise (for example, CO <sub>2</sub> , O <sub>2</sub> )			
9.	Body plethysmographs			
10.	Exercise equipment (for example, treadmill, cycle or arm ergometer)			
11.	ECG monitors (for example, 3-lead, 12-lead)			
12.	Metabolic measurement systems for exercise testing			
13.	Gas delivery systems (for example, blenders, flowmeters)			
14.	Pressure measuring devices (for example, manometers, transducers, strain gauges)			
15.	Gas and water absorbers (for example, Drierite <sup>®</sup> , Permapure <sup>®</sup> tubing)			
16.	Emergency management equipment (for example, defibrillator, crash cart)			
17.	Flexible bronchoscopes and associated equipment			
18.	Arterial / venous blood collection equipment			
19.	Information systems equipment (for example, computers, data backup, networks, printers, security)			
20.	Quality control devices (for example, calibration syringes, manometers, isothermal lung analog)			


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		Cognitive Level		Total
		Recall	Integration*	
21.	Gas exchange validation device or DLCO simulator			
22.	Infection control materials / methods (for example, sterilization devices, gowns, gloves, masks, filters)			
23.	Monitors			
a.	pulse oximeters			
b.	blood pressure (for example, manual cuff, automated)			
<b>C. Perform Quality Control</b>		<b>0</b>	<b>1</b>	<b>1</b>
1.	Blood gas analyzers			
2.	CO-oximeters / hemoximeters			
3.	Spirometers (for example, diagnostic, screening, portable)			
4.	Peak flow meters			
5.	Aerosol delivery devices (for example, bronchodilator / bronchial challenge, dosimeters)			
6.	Metered dose or dry powder inhalers			
7.	Valves (for example, directional, demand)			
8.	Gas analyzers			
a.	DLCO (for example, gas chromatograph, infrared)			
b.	gas dilution techniques (for example, nitrogen, helium, oxygen)			
c.	exercise (for example, CO <sub>2</sub> , O <sub>2</sub> )			
9.	Body plethysmographs			
10.	Exercise equipment (for example, treadmill, cycle or arm ergometer)			
11.	ECG monitors (for example, 3-lead, 12-lead)			
12.	Metabolic measurement systems for exercise testing			
<b>Second Quarter of the Calendar</b>				<b>5</b>
<b>II. PROCEDURES</b>		<b>2</b>	<b>6</b>	<b>8</b>
<b>A. Select Test Protocols and Equipment</b>		<b>1</b>	<b>2</b>	<b>3</b>
1.	Spirometry (for example, VC, FVC, FEV <sub>1</sub> , MVV, flow-volume loop)			
2.	Bronchodilator delivery (for example, MDI, DPI, small volume nebulizers)			
3.	End tidal CO <sub>2</sub>			
4.	Blood sample collection (for example, arterial, capillary)			
5.	Sputum sample collection			

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	Cognitive Level		Total
	Recall	Integration*	
6. Blood gas analysis (for example, pH, PO <sub>2</sub> , PCO <sub>2</sub> )			
7. CO-oximetry / hemoximetry			
8. Static lung volumes			
a. gas dilution methods			
b. body plethysmography			
9. DLCO			
10. Smoking cessation counseling			
11. Patient education (for example, medication delivery, travel, asthma)			
12. Oxygen titration at rest and / or exercise			
13. Exercise (stress) testing			
a. timed walking test (for example, 6MWT, shuttle walk)			
b. monitored (for example, ECG, blood pressure, SpO <sub>2</sub> )			
c. cardiopulmonary exercise test (for example, VO <sub>2max</sub> anaerobic threshold, VO <sub>2</sub> , VCO <sub>2</sub> , V <sub>D</sub> / V <sub>T</sub> )			
d. inspiratory capacity and flow-volume loops during cardiopulmonary exercise testing			
14. 12-lead ECG at rest			
15. Pulse oximetry			
16. Airway responsiveness			
a. bronchodilation studies			
b. bronchial provocation studies (for example, methacholine, exercise, EVH, mannitol)			
17. Airways resistance / conductance measurements by plethysmography			
18. Respiratory muscle strength (for example, MIP, MEP)			
19. Flexible bronchoscopy assistance (for example, patient monitoring, specimen preparation, topical anesthesia)			
20. Patient safety (for example, standard precautions, adverse events / incidents, cross contamination)			
<b>B. Perform the Procedure</b>	<b>1</b>	<b>2</b>	<b>3</b>
1. Spirometry (for example, VC, FVC, FEV <sub>1</sub> , MVV, flow-volume loop)			
2. Bronchodilator delivery (for example, MDI, DPI, small volume nebulizers)			
3. End tidal CO <sub>2</sub>			


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		Cognitive Level		Total
		Recall	Integration*	
4. Blood sample collection (for example, arterial, capillary)				
5. Sputum sample collection				
6. Blood gas analysis (for example, pH, PO <sub>2</sub> , PCO <sub>2</sub> )				
7. CO-oximetry / hemoximetry				
8. Static lung volumes				
a. gas dilution methods				
b. body plethysmography				
9. DLCO				
10. Smoking cessation counseling				
11. Patient education (for example, medication delivery, travel, asthma)				
12. Oxygen titration at rest and / or exercise				
13. Exercise (stress) testing				
a. timed walking test (for example, 6MWT, shuttle walk)				
b. monitored (for example, ECG, blood pressure, SpO <sub>2</sub> )				
c. cardiopulmonary exercise test (for example, VO <sub>2max</sub> , anaerobic threshold, VO <sub>2</sub> , VCO <sub>2</sub> , V <sub>D</sub> / V <sub>T</sub> )				
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14. 12-lead ECG at rest				
15. Pulse oximetry				
16. Airway responsiveness				
a. bronchodilation studies				
b. bronchial provocation studies (for example, methacholine, exercise, EVH, mannitol)				
17. Airways resistance / conductance measurements by plethysmography				
18. Respiratory muscle strength (for example, MIP, MEP)				
<b>Third Quarter of the Calendar</b>			<b>5</b>	
19. Flexible bronchoscopy assistance (for example, patient monitoring, specimen preparation, topical anesthesia)				
20. Patient safety (for example, standard precautions, adverse events / incidents, cross contamination)				


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	Cognitive Level		Total
	Recall	Integration*	
<b>C. Evaluate Validity of Result</b>	<b>0</b>	<b>2</b>	<b>2</b>
1. Spirometry (for example, VC, FVC, FEV <sub>1</sub> , MVV, flow-volume loop)			
2. Bronchodilator delivery (for example, MDI, DPI, small volume nebulizers)			
3. End tidal CO <sub>2</sub>			
4. Blood sample collection (for example, arterial, capillary)			
5. Sputum sample collection			
6. Blood gas analysis (for example, pH, PO <sub>2</sub> , PCO <sub>2</sub> )			
7. CO-oximetry / hemoximetry			
8. Static lung volumes			
a. gas dilution methods			
b. body plethysmography			
9. DLCO			
10. Smoking cessation counseling			
11. Patient education (for example, medication delivery, travel, asthma)			
12. Oxygen titration at rest and / or exercise			
13. Exercise (stress) testing			
a. timed walking test (for example, 6MWT, shuttle walk)			
b. monitored (for example, ECG, blood pressure, SpO <sub>2</sub> )			
c. cardiopulmonary exercise test (for example, VO <sub>2max</sub> , anaerobic threshold, VO <sub>2</sub> , VCO <sub>2</sub> , V <sub>D</sub> / V <sub>T</sub> )			
d. inspiratory capacity and flow-volume loops during cardiopulmonary exercise testing			
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16. Airway responsiveness			
a. bronchodilation studies			
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17. Airways resistance / conductance measurements by plethysmography			
18. Respiratory muscle strength (for example, MIP, MEP)			

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		Cognitive Level		Total
		Recall	Integration*	
19.	Flexible bronchoscopy assistance (for example, patient monitoring, specimen preparation, topical anesthesia)			
20.	Patient safety (for example, standard precautions, adverse events / incidents, cross contamination)			
<b>III. DATA MANAGEMENT</b>		<b>1</b>	<b>6</b>	<b>7</b>
<b>A. Calculate Results, Select Reference Ranges and Data</b>		<b>1</b>	<b>1</b>	<b>2</b>
1.	Blood gas results (for example, pH, PO <sub>2</sub> , PCO <sub>2</sub> )			
2.	CO-oximetry / hemoximetry results (Hb, O <sub>2</sub> Hb, COHb, MetHb)			
3.	Spirometry data (for example, VC, FVC, FEV <sub>1</sub> , MVV, flow-volume loops)			
4.	Static lung volumes			
	a. gas dilution			
	b. body plethysmography			
5.	DLCO			
6.	Home pulmonary function data (for example, spirometry, peak flow)			
7.	Oxygen titration at rest and / or exercise			
8.	Exercise (stress) test			
	a. timed walking test (for example, 6 MWT, shuttle walk)			
	b. monitored (for example, ECG, blood pressure, SpO <sub>2</sub> )			
	c. cardiopulmonary exercise test (for example, VO <sub>2max</sub> anaerobic threshold, VO <sub>2</sub> , VCO <sub>2</sub> , V <sub>D</sub> / V <sub>T</sub> )			
	d. inspiratory capacity and flow-volume loops during cardiopulmonary exercise testing			
9.	Blood pressure monitoring			
10.	ECG analysis (for example, arrhythmia, rate, pattern)			
11.	Pulse oximetry			
12.	Airway responsiveness			
	a. bronchodilation studies			
	b. bronchial provocation studies (for example, methacholine, exercise, EVH, mannitol)			
13.	Airways resistance / conductance measurements by plethysmography			

 <b>Credential Maintenance Program</b> <b>Pulmonary Function Technology Assessment</b> <b>Detailed Content Outline</b> <i>Multiple-choice items are linked to open cells.</i> *Test takers will be asked to integrate (apply or analyze) information.		Items		
		Cognitive Level		Total
		Recall	Integration*	
14.	Respiratory muscle strength (for example, MIP, MEP)			
15.	Safety data (for example, hand hygiene compliance, event management)			
16.	Quality control procedures (for example, mechanical or biologic)			
17.	Serial pulmonary function testing (for example, trending a single patient)			
18.	Clinical history and demographics (for example, age, race, sex, smoking history, medication, clinical indication)			
19.	Laboratory quality management (for example, customer satisfaction, inventory control, standard operating procedures, department records)			
<b>Fourth Quarter of the Calendar</b>				<b>5</b>
<b>B. Evaluate Reliability of Results</b>		<b>0</b>	<b>2</b>	<b>2</b>
1.	Blood gas results (for example, pH, PO <sub>2</sub> , PCO <sub>2</sub> )			
2.	CO-oximetry / hemoximetry results (Hb, O <sub>2</sub> Hb, COHb, MetHb)			
3.	Spirometry data (for example, VC, FVC, FEV <sub>1</sub> , MVV, flow-volume loops)			
4.	Static lung volumes			
	a. gas dilution			
	b. body plethysmography			
5.	DLCO			
6.	Home pulmonary function data (for example, spirometry, peak flow)			
7.	Oxygen titration at rest and / or exercise			
8.	Exercise (stress) test			
	a. timed walking test (for example, 6 MWT, shuttle walk)			
	b. monitored (for example, ECG, blood pressure, SpO <sub>2</sub> )			
	c. cardiopulmonary exercise test (for example, VO <sub>2max</sub> , anaerobic threshold, VO <sub>2</sub> , VCO <sub>2</sub> , V <sub>D</sub> / V <sub>T</sub> )			
	d. inspiratory capacity and flow-volume loops during cardiopulmonary exercise testing			
9.	Blood pressure monitoring			
10.	ECG analysis (for example, arrhythmia, rate, pattern)			
11.	Pulse oximetry			



	Items		Total
	Recall	Integration*	
 <h2 style="text-align: center;">Credential Maintenance Program</h2> <h3 style="text-align: center;">Pulmonary Function Technology Assessment Detailed Content Outline</h3> <p style="text-align: center;"><i>Multiple-choice items are linked to open cells.</i></p> <p style="text-align: center;">*Test takers will be asked to integrate (apply or analyze) information.</p>			
12. Airway responsiveness			
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14. Respiratory muscle strength (for example, MIP, MEP)			
15. Safety data (for example, hand hygiene compliance, event management)			
16. Quality control procedures (for example, mechanical or biologic)			
17. Serial pulmonary function testing (for example, trending a single patient)			
18. Clinical history and demographics (for example, age, race, sex, smoking history, medication, clinical indication)			
19. Laboratory quality management (for example, customer satisfaction, inventory control, standard operating procedures, department records)			
<b>C. Evaluate Clinical Implications</b>	<b>0</b>	<b>3</b>	<b>3</b>
1. Blood gas results (for example, pH, PO <sub>2</sub> , PCO <sub>2</sub> )			
2. CO-oximetry / hemoximetry results (Hb, O <sub>2</sub> Hb, COHb, MetHb)			
3. Spirometry data (for example, VC, FVC, FEV <sub>1</sub> , MVV, flow-volume loops)			
4. Static lung volumes			
a. gas dilution			
b. body plethysmography			
5. DLCO			
6. Home pulmonary function data (for example, spirometry, peak flow)			
7. Oxygen titration at rest and / or exercise			
8. Exercise (stress) test			
a. timed walking test (for example, 6 MWT, shuttle walk)			
b. monitored (for example, ECG, blood pressure, SpO <sub>2</sub> )			
c. cardiopulmonary exercise test (for example, VO <sub>2max</sub> , anaerobic threshold, VO <sub>2</sub> , VCO <sub>2</sub> , V <sub>D</sub> / V <sub>T</sub> )			
d. inspiratory capacity and flow-volume loops during cardiopulmonary exercise testing			

	<b>Credential Maintenance Program</b>		<b>Items</b>		
		<b>Pulmonary Function Technology Assessment Detailed Content Outline</b>		<b>Cognitive Level</b>	<b>Total</b>
		<i>Multiple-choice items are linked to open cells.</i>		<b>Recall</b>	
	<i>*Test takers will be asked to integrate (apply or analyze) information.</i>				
9.	Blood pressure monitoring				
10.	ECG analysis (for example, arrhythmia, rate, pattern)				
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	a. bronchodilation studies				
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14.	Respiratory muscle strength (for example, MIP, MEP)				
15.	Safety data (for example, hand hygiene compliance, event management)				
16.	Quality control procedures (for example, mechanical or biologic)				
17.	Serial pulmonary function testing (for example, trending a single patient)				
18.	Clinical history and demographics (for example, age, race, sex, smoking history, medication, clinical indication)				
19.	Laboratory quality management (for example, customer satisfaction, inventory control, standard operating procedures, department records)				
<b>Totals</b>			<b>4</b>	<b>16</b>	<b>20</b>

#### Specifications by Patient Age

Patient	Maximum items per form
Pediatric	2
General	balance
<b>Total</b>	<b>20</b>