ANZSRS
Australian and New Zealand Society of Respiratory Science Ltd
Leading Respiratory Science in Australasia
ACN 147 665 763

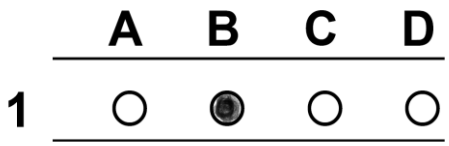
CRFS EXAMINATION 2026 -Exam Exemplar

IMPORTANT POINTS TO REMEMBER

- Unless otherwise stated, laboratory values are reported at sea level with barometric pressure (P_B) equal to 101.3 kPa (760 mmHg).
- The term "ATS/ERS recommendations" used in some questions refers to information on respiratory function testing as presented in current position papers published by the American Thoracic Society (ATS) and European Respiratory Society (ERS). The respiratory terms and symbols used in the examination are from the American College of Chest Physicians (ACCP) and ATS recommendations on pulmonary nomenclature.
- An ATPS to BTPS conversion table is provided on the next page.

GENERAL INSTRUCTIONS

- You will be given **2 hours to complete the examination**, which consists of 100 multiple-choice questions.
- Your mark is based on the number of questions you answer correctly. YOU ARE ASKED TO INDICATE YOUR ANSWERS TO ALL QUESTIONS ON THE SEPARATE ANSWER SHEET PROVIDED. Although you may make preliminary notes or calculations in the examination book, no credit will be given for anything written in the examination book. The answer spaces are lettered to correspond with the letters of the suggested answers to the questions in this book. After you have decided which of the suggested answers is correct, blacken the corresponding space on the answer sheet. **Give only one answer to each question**. If you change an answer, be sure that the previous mark is **erased completely**. **USE ONLY A BLACK LEAD PENCIL, PREFERABLY 2B, AND BE SURE THAT EACH MARK IS BLACK AND COMPLETELY FILLS THE ANSWER SPACE.**

Enter last name and first initial and Candidate ID number as in space provided	
Example Answer	
Which of the following is the capital of New Zealand?	
A Auckland B Wellington C Christchurch D Dunedin	

- Four suggested answers or completions follow each of the questions or incomplete statements - select the answer that is best in each case.
- The exam content table is provided below outlining the general study guide topic covered by each question.

	Topic	Questions
Topic 1	ANATOMY	1 - 16
Topic 2	PHYSIOLOGY / PATHOPHYSIOLOGY	17 - 38
Topic 3	KINETIC THOERY OF GASES	39 - 50
Topic 4	INSTRUMENTATION	51 - 65
Topic 5	PHARMACOLOGY	66 - 74
Topic 6	DIAGNOSTIC PROCEDURES	75 - 93
Topic 7	INTERPRETATION	94 - 100

DO NOT TURN THE PAGE UNTIL YOU ARE TOLD TO DO SO

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CRFS EXAMINATION

Time: 2 hours

Note: Refer to the ATPS to BTPS Conversion Table below as necessary.

ATPS to BTPS Conversion Table

Temperature (˚C)	Conversion Factor
20	1.102
21	1.096
22	1.091
23	1.085
24	1.080
25	1.075
26	1.068
27	1.063
28	1.057
29	1.051
30	1.045

Constants

Universal Gas Constant (R)	8.314	$J\ K^{-1}\ mol^{-1}$		
Avogadro's number	6.022×10^{23}	mol^{-1}		
Atmospheric Pressure	101.3	kPa	760	mmHg
Saturated water vapour Pressure at 37°C (P_{H_2O})	6.28	kPa	47.1	mmHg

Gas Molar Masses

H_2	–	2.02	$g\ mol^{-1}$
He	–	4.00	$g\ mol^{-1}$
CH_4	–	16.04	$g\ mol^{-1}$
CO	–	28.01	$g\ mol^{-1}$
N_2	–	28.02	$g\ mol^{-1}$
O_2	–	32.00	$g\ mol^{-1}$
CO_2	–	44.01	$g\ mol^{-1}$
SF_6	–	146.06	$g\ mol^{-1}$

1 The motor nerve innervating the diaphragm is the:

A - Phrenic
B - Vestibular
C - Abducent
D - Tympanic

2 What are the membranes that surround each lung called?

A - Peritoneum
B - Pleura
C - Cardiac and visceral membranes
D - Parietal and visceral meninges

3 Which cranial nerve carries information from the carotid bodies to the brain?

A - IX – Glossopharyngeal
B - XII – Hypoglossal
C - X – Vagus
D - XI – Accessory

4 Which of the following is not located within the nasal cavity?

A - Nasal septum
B - Conchae
C - Meatuses
D - Uvula

5 The valve between the right ventricle and the pulmonary artery is the:

A - Mitral valve
B - Tricuspid valve
C - Aortic valve
D - Pulmonary valve

6 What body structure serves as a common pathway for the respiratory and digestive systems?

A - Carina
B - Larynx
C - Trachea
D - Pharynx

7 Which of these structures prevents the movement of swallowed materials into airways?

A - Tongue
B - Uvula
C - Epiglottis
D - Vocal cords

8 What statement is false concerning the alveoli?

A - They allow diffusion of gases
B - They are lined with ciliated epithelium
C - There are approx. 350 million per lung
D - They are moistened with surfactant

9 What is the main function of the erythrocytes?

A - Carry nutrients
B - Responsible for transport of O_2 and CO_2 between tissue and the lungs
C - Secrete pulmonary surfactant
D - To fight infection

10 How is the diaphragm innervated?

A - By the parasympathetic division arising from the sacral region
B - By the phrenic nerves arising from C3 to C5
C - By the phrenic nerves arising from T3 to T5
D - By the spinal nerves arising from T5 to T10

11 The microscopic hairs that prevent foreign materials from entering your lungs are known as:

A - Bronchus
B - Lanugo
C - Cilia
D - Villus

12 Which of the following is a function performed by the “respiratory epithelium”?

A - Secretion of surfactant
B - Transmission of oxygen from the air into subepithelial capillaries
C - Protect and effectively clear the lungs of inhaled irritants and pathogens
D - Maintains structural support of bronchi

13 Alveolar type II cells are:

A - Ciliated cells that move mucous.
B - Cuboidal cells that secrete surfactant.
C - Columnar cells that secrete mucous.
D - Squamous cells involved in gas exchange.

14 Which of the following muscles is NOT primarily involved in inspiration?

A - Diaphragm
B - Sternocleidomastoid
C - External intercostals
D - Rectus abdominis

15 Which of the following muscles is NOT primarily involved in expiration?

A - Rectus abdominis
B - Sternocleidomastoid
C - Internal intercostals
D - Transverse abdominis.

16 The diffusion pathway in the lung is normally about:

A - 0.1 to 0.5 µm
B - 5.0 to 10.0 µm
C - 1.0 to 5.0 µm
D - 0.1 to 5.0 µm

17 Reduction of functional haemoglobin associated with anaemia, methaemoglobinaemia or CO poisoning does not produce hyperpnea because the:

A - Total arterial oxygen content is maintained within normal limits
B - Carotid body chemoreceptors are stimulated
C - Blood flow to the carotid body is decreased
D - PO2 of arterial blood is normal

18 A prolonged increase in pulmonary vascular resistance may result in:

A - Right ventricular failure
B - Increased venous return
C - Increased pulmonary capillary blood volume
D - Left heart failure

19 The type of breathing pattern characterised by deep, rapid breathing with progressively increasing and decreasing tidal volumes followed by an apnoeic episode is called:

A - Kussmaul's respiration
B - Biot's respiration
C - Hyperventilation
D - Cheyne-Stokes respiration

20 The following maximal respiratory pressure results are obtained in a patient complaining of dyspnoea and fatigue: MIP 33 cmH2O (49% pred), MEP 54 cmH2O (63% pred), SNIP 42 cmH2O (52% pred). These results are most consistent with:

A - MND
B - Asthma
C - Pulmonary fibrosis
D - COPD

21 During normal breathing inspired air is humidified primarily by:

A - Alveoli
B - the larynx
C - Cilia
D - Nasal structures

22 A patient has a productive cough with expectoration of yellow sputum. What does this indicate about the patient's secretions?

1 - It contains old blood.
2 - A viral infection is likely.
3 - White blood cells are present in the sputum.
4 - The sputum is purulent.

A - 3 and 4 only
B - 1 only
C - 1, 3 and 4 only
D - 2 and 3 only

23 After an upright normal subject takes a vital capacity breath of pure O_2, the N_2 concentration at the apex exceeds that at the base of the lung because:

A - Airway resistance of lower zones is high
B - The ventilation-perfusion ratio is high at the apex
C - The apical alveoli expand less than those at the base
D - Airway closure at the base delays filling of that region

24 Alveolar ventilation will increase in response to stimulation of:

A - The medullary chemoreceptors by increased H^+ ion concentration in the cerebrospinal fluid
B - The carotid chemoreceptors by decreased CO_2 concentration in the blood
C - The medullary chemoreceptors by increased O_2 concentration of the cerebrospinal fluid
D - The carotid chemoreceptors by increased pH of arterial blood

25 When the transmural capillary pressure exceeds the transmural colloidal osmotic pressure.

A - Pulmonary emboli may occur
B - Compliance is increased
C - Pulmonary oedema may result
D - Pulmonary vascular disease occurs

26 Which of the following are true concerning a patient with emphysema?

1 - The maximal pressure to distend the lungs is reduced
2 - Lung compliance is decreased
3 - The maximum expiratory flow curve will have a lower than normal flow at 50% of vital capacity
4 - The equal pressure point (EPP) occurs at a lower than normal lung volume

A - 1, 3 and 4
B - 1 and 3
C - 2 and 4
D - 1, 2 and 3

27 Alveolar ventilation will increase in response to decreased blood levels of:

A - H^+
B - O_2
C - CO_2
D - All of the above

28 Which of the following arterial pH values would be most likely in a patient with a compensated respiratory acidosis?

A - 7.36
B - 7.15
C - 7.44
D - 7.55

29 Lung surfactant:

A - Decreases the likelihood of alveolar collapse during expiration
B - Facilitates CO_2 diffusion through alveolar membranes
C - Increases surface tension of the alveolar membrane
D - Facilitates O_2 diffusion through alveolar membranes

30 A 45 year old has the following arterial blood gas values, these results are indicative of:

pH - 7.37
P_{aCO_2} - 62 mmHg
P_{aO_2} - 55 mmHg
HCO_3^- - 35 mEq L-1

A - Normal acid-base status, moderate hypoxaemia
B - Compensated metabolic alkalosis, moderate hypoxaemia
C - Compensated respiratory acidosis with moderate hypoxaemia
D - Uncompensated respiratory acidosis with mild hypoxaemia

31 A patient complains he has difficulty breathing while lying down. This condition is called:

A - Bradypnea
B - Eupnoea
C - Dyspnoea
D - Orthopnoea

32 Dynamic collapse of airways occurs:

A - Mostly in the respiratory bronchioles where walls are thin
B - During vigorous inspiration
C - In major bronchi during forced expiration because these airways have lower internal pressure than do smaller airways further upstream (nearer the alveoli)
D - Only in unusual disease conditions

33 In emphysema, there is an increased tendency for the bronchioles to collapse during a forced expiration. This is due to:

A - Excessive tone in the bronchiolar smooth muscle
B - A decrease in the elasticity of the lungs
C - An increased resistance to airflow during inspiration
D - A loss of cartilaginous tissue from the lungs

34 An individual who has a BMI of 45 will;

A - Have reduced RV and normal FRC and TLC with an increased work of breathing at rest.
B - Have reduced RV and FRC with a relatively preserved TLC with an increased work of breathing at rest.
C - Have reduced RV, FRC, TLC in proportion to each other with increased work of breathing at rest.
D - Have reduced RV and FRC with a relatively preserved TLC with an increased work of breathing only during exercise.

35 Which of the following indicates adequacy of alveolar ventilation?

A - Arterial carbon dioxide tension
B - Ventilation-perfusion ratio
C - Diffusing capacity of carbon monoxide
D - Arterial oxygen tension

36 Functional residual capacity is the lung volume at which?

A - Chest wall and lung recoil forces are equal and opposite
B - The chest wall tends neither to contract or expand
C - The diaphragm reaches its maximum downward excursion
D - The elastic recoil of the lungs vanishes

37 Which of the following would be expected to produce an increased slope of Phase III in a single breath N_2 washout test?

A - Pulmonary fibrosis
B - Moderate COPD
C - Moderate pulmonary vascular disease
D - left ventricular failure

38 Which of the following statements concerning small airways is/are true?

A - Airflow in small airways is usually laminar
B - The total resistance to airflow decreases with successive generations of airways because there are increasing numbers of units arranged in parallel.
C - The linear velocity of airflow decreases as the airways decrease in size because their total cross-sectional area increases.
D - All of the above.

39 Which of the following equations best represents Gay-Lussac's law relating to pressure and temperature of an ideal gas?

A - $P \times T = k$
B - $\frac{P}{T} = k$
C - $\frac{T}{P^2} = k$
D - $\frac{P^2}{T} = k$

40 Gas exchange in the lung depends on:

A - The passive diffusion of all gas molecules
B - Active transport of CO2 across the lung membranes
C - A forcing of gas into the blood stream by a pressure greater than atmospheric in the alveoli
D - Active transport of O2 across the lung membranes

41 What are the units for the universal gas constant R?

A – J $K^{-1}mol^{-1}$
B – Pa $K^{-1}mol^{-1}$
C – K $Pa^{-1}mol^{-1}$
D – K $J^{-1}mol^{-1}$

42 The following equation, which represents Ficks law of diffusion, what does "dc" represent?

$$\frac{dn}{dt} = -DA\frac{dc}{dx}$$

A - The rate of gas diffusion
B - The diffusion coefficient
C - The concentration gradient
D - Membrane thickness

43 If the atmospheric pressure is 106.8 kPa fractional concentration of O_2 is 0.10 and the water vapour pressure is 6.8 kPa what is the partial pressure of O_2?

A - 10.0 kPa
B - 21.4 kPa
C - 21.0 kPa
D - 10.7 kPa

44 According to Ficks law of diffusion for a gas diffusing across a membrane, if the thickness of a membrane is halved;

A - The rate of diffusion is increased 4 fold
B - The rate of diffusion is increased 8 fold
C - The rate of diffusion is doubled.
D - The rate of diffusion halved

45 The temperature of 100 L of Helium in a highly compliant balloon is increased from 250°K to 300°K what will the CHANGE in volume be?

A - Increase volume by 20 L
B - Increase volume by 5 L
C - Increase volume by 25 L
D - Increase volume by 10 L

46 Which of the following symbols is used to denote density?

A - ρ
B - φ
C - λ
D - γ

47 Which of the following best describes Boyle's law?

A - The volume of a fixed amount of a gas at fixed pressure is directly proportional to its temperature.
B - The volume occupied by an ideal gas is proportional to the number of moles at fixed temperature and pressure.
C - The pressure of a fixed amount of a gas at fixed temperature the pressure of a gas is inversely proportional to its volume.
D - The pressure of a fixed amount of a gas at fixed volume is directly proportional to the gas' absolute temperature.

48 A pressurised commercial aircraft has a cabin pressure of 80 kPa what would the inspired partial pressure of oxygen be?

A - 15.5 kPa
B - 16.3 kPa
C - 16.8 kPa
D - 14.5 kPa

49 Which of the following represents Henry's law with respect to concentration (C) of a dissolved gas?

A - $C = kP$
B - $C = k \times \frac{1}{Mr}$
C - $C = k \times \frac{1}{P}$
D - $C = k \times \frac{1}{T}$

50 What are the units for Boltzmann's constant?

A – J Pa^{-1}
B – J K^{-1}
C – J mol^{-1}
D – J m^{-1}

51 The following series of FVCs are obtained on a volume displacement spirometer: 4.5, 3.8 and 2.5 L. Possible causes of the lack of repeatability in these results include which of the following?

1 - inconsistent patient effort
2 - leaks in the system
3 - equipment out of calibration
4 - inappropriate patient instruction

A - 2, 3 and 4
B - 1, 2 and 4
C - 1 and 3
D - 2 and 4

52 Which of the following studies would produce the most accurate determination of TLC in a patient with severe emphysema?

A - Nitrogen washout
B - Single breath oxygen
C - Whole body plethysmography
D - Helium dilution

53 All of the following are good practices when handling gas cylinders EXCEPT:

A - Storing cylinders horizontally
B - Using a trolley to move the cylinder
C - Storing cylinders upright
D - Adhering cylinders to a wall

54 The inability to calibrate a wire mesh pneumotachograph, which consistently underestimates flow, may be caused by which of the following?

A - The pneumotachograph has a hole in the screen
B - Turbulent flow has developed on the upstream side
C - There is moisture accumulation in the mesh
D - The flow source provides too high a flow

55 A spirometer is tested by injecting a 3L volume from a calibration syringe several times; the mean results are as follows:

Trial	1	2	3
	2.82 L	2.83 L	2.83 L

Which of the following descriptions are true?

1 - the spirometer calibration is in error
2 - the spirometer is precise
3 - the spirometer is accurate within 3%
4 - the spirometer meets ATS/ERS (2019) recommendations

A - 2, 3 and 4
B - 1, 2, 3 and 4
C - 3 and 4 only
D - 1 and 2 only

56 The most appropriate procedure to ensure linearity and accuracy of the flow determination of a differential pressure pneumotachometer is to:

A - Apply a known constant flow approximating the maximum expected
B - Apply a series of known volumes covering the clinical range expected
C - Inject a known volume approximating the expected maximum volume
D - Apply a series of known constant flows covering the clinical range expected

57 Which of the following devices has the highest frequency response?

A - Turbine peak flow meter
B - Differential pressure pneumotachograph
C - Wedge spirometer
D - Water-seal spirometer

58 Why should one wait 10-15 minutes after a helium dilution test before repeating it on a patient?

A - The patient must return to normal O_2 consumption
B - A build-up of He in the lungs could be toxic
C - All the He must be cleared from the patient's lungs
D - All He must be cleared from the spirometer and the meter

59 Chemiluminescence is most commonly used in the respiratory laboratory to measure:

A - Oxygen
B - Nitric Oxide
C - Carbon dioxide
D - Helium

60 Which of the following equations is used to calculate airway resistance with a body plethysmograph?

A - Alveolar pressure/flow
B - Alveolar pressure/box pressure
C - Alveolar pressure/mouth pressure
D - Box pressure/flow

61 Which type of gas analyser uses a vacuum pump to allow ionisation of gas to occur?

A - Thermal conductivity
B - Gas chromatograph
C - Infrared absorption
D - Emission spectroscopy

62 A jar filled with which of the following will serve best as an isothermal lung model to validate the volume measuring ability of a body plethysmograph?

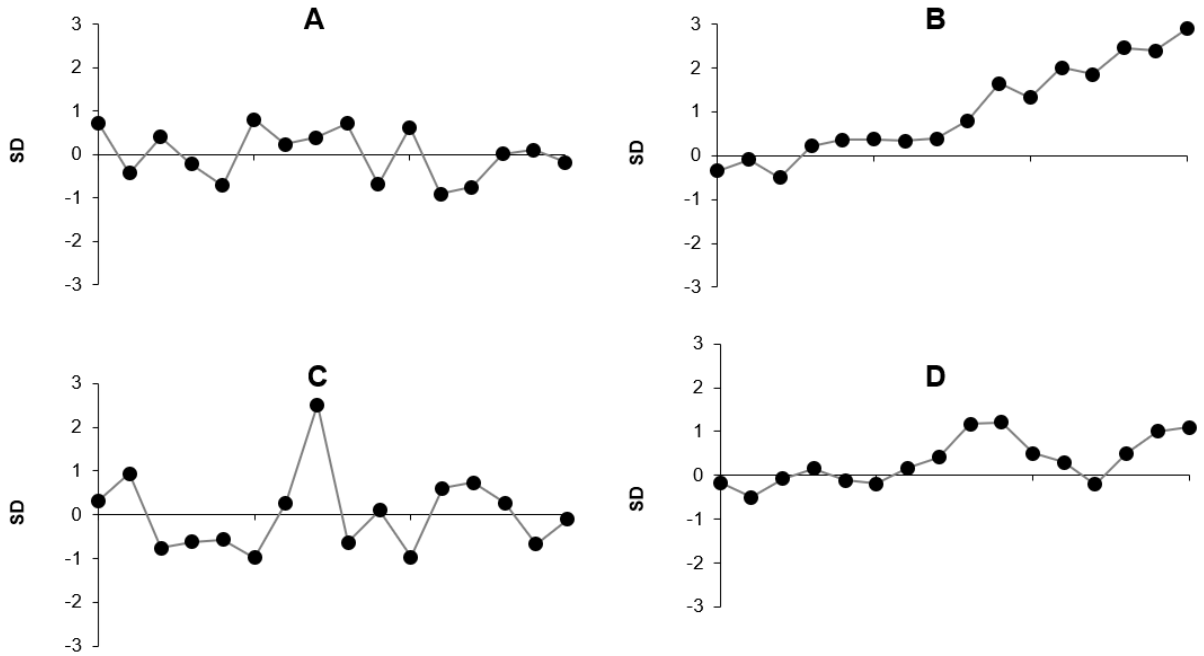
A - 37°C water
B - Copper wool
C - Degassed water
D - Room air

63 Which of the following are true when measuring FRC using the conservation of mass techniques (He dilution and N_2 washout)?

1 - the open-circuit method uses O_2
2 - the closed-circuit method is influenced by the volume of trapped gas
3 - the closed-circuit method requires rebreathing
4 - the open-circuit method requires a CH_4 analyser

A - 1, 2 & 3
B - 2 and 4
C - 2, 3, and 4
D - 1 and 3

64 'In control' is illustrated by plot:



65 Which of the following is an advantage of a pneumotachograph in measuring airflow?

A - Unaffected by gas composition
B - High frequency response
C - Elimination of laminar flow
D - Freedom from drift during integration

66 Corticosteroids and the treatment of asthma:

A - Corticosteroids inhibit the inflammatory response
B - Corticosteroids relax smooth muscle
C - In acute asthma, corticosteroids increase airway obstruction; therefore corticosteroids should only be used for chronic treatment
D - Corticosteroids reduce patient responsiveness to β-agonists

67 A patient taking metoprolol (a β1 adrenoreceptor blocker) for hypertension, is referred for bronchoprovocation studies. During the study, the FEV_1 falls by 30%. Which of the following medications would be the most appropriate to be given to hasten recovery?

A - Salbutamol
B - Ipratropium bromide (Atrovent)
C - Cromoglicic acid (Intal)
D - Flixotide (fluticasone propionate)

68 A baffle is used on a nebuliser to:

A - Heat the gas above room temperature
B - Entrain room air
C - Break the aerosol into smaller particles
D - To return oversized aerosol particles to reservoir

69 Which of the following instructions is appropriate for administering a metered dose bronchodilator to a patient who is unable to co-ordinate motor function normally?

A - Inhale maximally before activating the inhaler
B - Use multiple activations during each inspiration
C - Place a reservoir (spacer) between the inhaler and the mouth
D - Exhale immediately after inhalation

70 If Intal (sodium cromoglycate – a mast cell stabilizer) is given during an acute attack of asthma, you should expect:

A - Medication side effects
B - Patient response within 30 min
C - No significant change in symptoms
D - Rapid bronchodilation to occur with relief in dyspnoea within 15 min

71 Concerning the deposition of aerosols in the lung: which of the following is true?

A - Deposition is reduced on exercise
B - Small particles, less than 1 μm in diameter, are unable to penetrate to the alveoli
C - Large airways are the favoured site for sedimentation
D - The optimal size range for bronchodilator aerosols is 1 to 5 μm

72 Ipratropium bromide (atrovent):

A - Stimulates the bronchial cholinergic receptors
B - Is a non-selective antagonist of M1, M2, and M3 muscarinic receptors
C - Has the same mechanism of action as salbutamol
D - Is tasteless

73 β2 adrenergic agents such as salbutamol may cause:

A - Premature labour
B - Muscle tremor
C - Blurred vision
D - Urinary retention

74 A physician asks the respiratory function lab to evaluate the reversibility of airway obstruction for a patient who has a history of congestive heart failure and arrhythmias. The most appropriate bronchodilator to use is:

A - Salbutamol (Ventolin)
B - Isoprenaline (Medihaler Iso)
C - Ipratropium Bromide (Atrovent)
D - Fenoterol (Berotec)

75 A patient has spirometry repeated before and after inhaled bronchodilators. The following data are obtained:
Bases on ATS/ERS recommendations which of the following statements best describes these findings?

	Pred	Pre-Rx	Post-Rx
FVC (L)	5.20	4.90	5.10
FEV_1 (L)	4.50	3.10	3.50
PEF ($L\ s^{-1}$)	9.20	7.77	8.92

A - 10.9% bronchodilator response considered as a significant response.
B - 22.2% bronchodilator response considered as a significant response.
C - 8.9% bronchodilator response not considered as a significant response.
D - 12.9% bronchodilator response considered as a significant response.

76 A screen pneumotach is inadvertently perforated during cleaning. When reinstalled, before recalibration, verification with a 3 L syringe will show:

A - Significantly lower flows and volumes
B - Higher flows and volumes
C - No change in flows but low volumes
D - Higher flows but lower volumes

77 Which of the following is not a relative contraindication for spirometry?

A - Brain surgery within 4 week
B - Eye surgery within 1 week
C - Cigarette smoking <30 min
D - Clinically unstable pulmonary embolism

78 In reviewing an expiratory flow-volume curve, the respiratory scientist should use which of the following to evaluate the degree of patient effort?

A - $FEF_{200-1200}$
B - FEF_{25}
C - FEF_{50}
D - PEF

79 A pre-bronchodilator expiratory flow-volume curve is attempted by a patient who cannot control his cough. An approximation of the curve may be obtained by instructing the patient to do which of the following?

A - Take a full breath, then expel the air forcefully despite coughing
B - Do a forced inspiration first, then a normal expiration
C - Blow out forcefully, through pressed lips
D - Breathe in partially, then blow out slowly.

80 Which of the following may precipitate an acute asthma attack?

A - Pollen exposure
B - Exercise
C - Aspirin
D - All of the above

81 For a single breath $T_{L_{CO}}$ test, the patient should be told to maintain full inspiration during the breath-holding period by doing which of the following?

A - Contracting the abdominal muscles.
B - Closing the glottis
C - Relaxing against the closed valve
D - Continuing to contract the inspiratory muscles

82 A 22 year old patient performs three acceptable spirometry trials:

	Trial 1	Trial 2	Trial 3
FVC (L)	4.44	4.21	4.65
FEV_1 (L)	3.92	3.88	3.91

The respiratory scientist should do which of the following?

A - Perform at least one more trial
B - Report the values from Trial 3
C - Average the data from trials 1 and 3
D - Report the values from the trial with the largest sum of FVC and FEV_1

83 Which of the following are required to perform a single breath $T_{L_{CO}}$ test using the traditional technique?

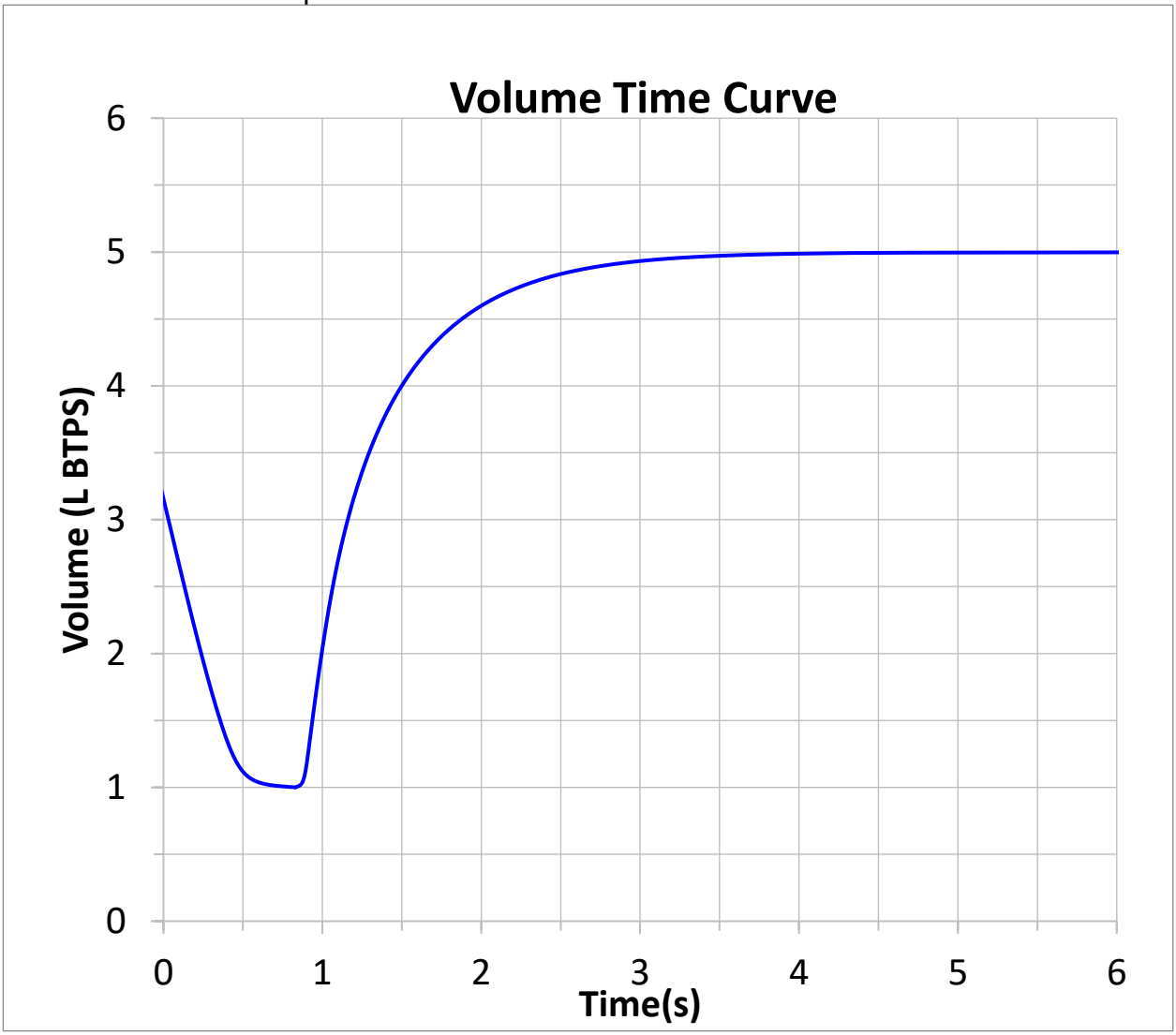
1 - spirometer
2 - 1 L sample bag
3 - 0.3% CO, 10% He, balance N_2
4 - 0.3% CO, 10% He, balance air

A - 1 and 3
B - 1, 2 and 3
C - 1, 2 and 4
D - 2 and 4

84 Which of the following statements about Salbutamol is correct?

A - Treatment's effects begin in about 10-15 minutes and peak effect is usually within 30 minutes
B - Treatment's effects begin in about 50-60 minutes and peak effect is usually within 2 hours
C - Treatment's effects begin in about 25-30 minutes and peak effect is usually within 60 minutes
D - Treatment's effects begin in about 2 hours minutes and peak effect is usually within 4 hours

85 The correct value to report for FEV_1 is:



A - FEV_1 = 3.50 L
B - FEV_1 = 3.85 L
C - FEV_1 = 4.00 L
D - FEV_1 = 4.50 L

86 A whole body plethysmograph is exhibiting a highly variable leak time during a leak test. The most likely reason for this is:

A - There is excessive airflow around the box due to air conditioner.
B - The door seal is damaged or contaminated.
C - The pressure sensor is faulty.
D - The leak valve needs to be adjusted.

87 The results of a patient's lung volume study are below: Which of the following observed results should be recalculated?

	Predicted	Observed
VC (L)	3.00	3.27
FRC (L)	2.55	2.00
IC (L)	1.82	2.42
ERV (L)	1.18	0.85
RV (L)	1.37	1.15
TLC (L)	4.37	5.43
RV/TLC (%)	31	21

A - TLC and RV/TLC
B - TLC only
C - RV, TLC AND RV/TLC
D - None

88 Which time period best describes the duration of action for a short acting β2 agonist?

A - 1-2 hours
B - 6-8 hours
C - 10-12 hours
D - 4-6 hours

89 Assuming the FRC of a patient is constant during a multiple breath N_2 washout test, the distribution of inspired gas would be most affected by which of the following?

A - Fatigue
B - Tidal volume
C - $P_{a_{O_2}}$
D - Diffusion rate

90 During a $T_{L_{CO}}$ test the CO and CH_4 measured concentrations of the inhaled gas mixtures far exceed the concentrations of the test gas. What is a possible explanation for this?

A - The patient is likely to be a heavy smoker.
B - During calibration there was a leak in the sample line allowing for air to mix with the gas being used to calibrate.
C - The patient is likely to have ketoacidosis due to uncontrolled diabetes.
D - The pressure in the test gas cylinder is too low.

91 While breathing CO in 40% oxygen compared to breathing CO in 21% oxygen, the calculated carbon monoxide diffusing capacity will:

A - Fall
B - Remain unchanged
C - $T_{L_{CO}}$ cannot be measured at O_2 concentrations greater than 21%
D - Rise

92 Based on ATS/ERS guidelines, the minimal acceptable inspired volume of the test gas to obtain an A Grade result during a single breath $T_{L_{CO}}$ in a patient with a 4.0 L VC is:

A - 2.8 L
B - 3.6 L
C - 3.2 L
D - 2.0 L

93 When an FVC manoeuvre is being performed, the respiratory physiologist should emphasise the importance of a smooth continuous exhalation and which of the following?

1 - maximal effort
2 - unhesitating start
3 - avoid leaning forward

A - 1 and 2
B - 1 and 3
C - 2 and 3
D - 1, 2 and 3

94 In a patient with severe obstructive lung disease the TLC measured using multiple breath nitrogen washout is;

A - Less than the TLC measured by plethysmography
B - Greater than the TLC measured by plethysmography
C - The same as the TLC measured by He equilibration
D - The same TLC measured by plethysmography.

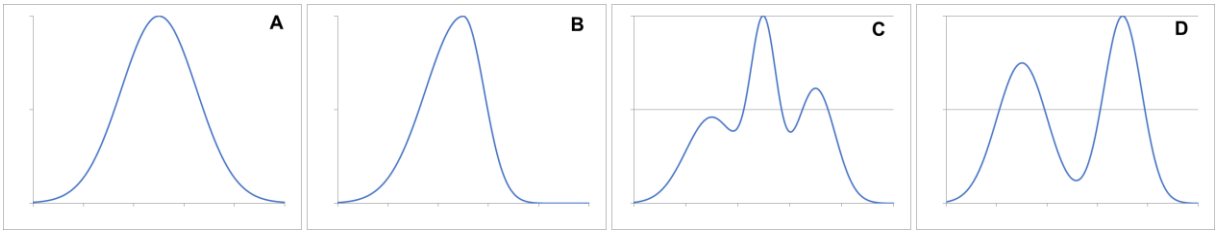
95 Which of the following could be used to verify the presence of airway narrowing in a patient who seems to be uncooperative and perhaps a malingerer?

A - FIF_{50}/FEF_{50}
B - SG_{aw}
C - FEV_1/FVC
D - C_{dyn}

96 A patient records an FEV_1 of 4L. Compared to the population mean and standard deviation of 3 L and 0.5 L respectively, the FEV_1 Z-score is:

A - 1
B - -1
C - 2
D - 1.5

97 Which figure represents a skewed distribution?



98 Which of the following is the least affected by outliers?

A - Range
B - Standard deviation
C - Mean
D - Median

99 A 22 year old pre-operative patient with no history of obstructive lung disease has a vital capacity of 4.6 L and FVC of 3.2 L. The most probable cause for the difference in these data is:

A - Lung consolidation
B - Restrictive lung disease
C - Poor patient effort on the FVC
D - Hyperventilation before surgery

100 Correct conclusions about a 180cm, 40 years old male subject who has an FEV1/FVC ratio of 65% include which of the following?

1 - his FEV1/FVC ratio is below normal
2 - he has obstructive lung disease
3 - he has restrictive lung disease
4 - he has a diffusion impairment

A - 1 only
B - 1 and 2
C - 3 only
D - 1, 2 and 4

End of Exam