

From Fluff to Tough

Creating High Quality Exam Items

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With Content Provided by
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Testing vs Practice?

How different is it really?

In the following questions consider

- ▶ Difficulty level
 - For student
 - In item creation
- ▶ What the item is asking
- ▶ How the item asks the question

Name: 1-2-30

Exam: Test 2

Content:

A 62 year old male tells you he has been experiencing headaches when he wakes up in the morning. He called you because he woke up today with left arm weakness. He says he bit his tongue while sleeping. You suspect a

stroke due to an intracerebral bleed.

seizure due to a brain tumor.

seizure due to a stroke.

stroke due to ischemia.

Name: 1-1-1

Exam: Test 1

Content:

A 26 year old male complains of increased breathing difficulty over the past two days. He tells you he has been coughing frequently. His vital signs are B/P 124/88, P 108, R 18. His SpO2 is 91% on room air. You suspect his SpO2 reading is low because he has

inadequate tidal volume.

many collapsed alveoli in his lungs.

lower airway constriction.

bacteria in his lungs.

Name: 1-1-4

Exam: Test 1

Content:

A 25 year old male complains of shortness of breath over the past four hours after playing soccer. His chest expansion is normal and he has no chest wall pain. You hear diminished breath sounds over his right upper thorax. Vital signs are B/P 126/84, P 106, R 18. His SpO2 is 92% on room air. You should suspect

pulmonary embolism.

spontaneous pneumothorax.

costochondritis.

pleuritis.

Rationale:



size: 341 KB

Name: 1-1-8

Exam: Test 1

Content:

A 32 year old male has been treated for pneumonia for the past week. His family has urged him to go to the hospital but he has refused. He is now hot to touch. His vital signs are B/P 96/78, P 104, R 24. His SpO2 is 88% on room air. You should

administer oxygen and transport rapidly.

administer aspirin for fever and oxygen for hypoxia.

assist his ventilations until his SpO2 improves.

lay him flat, warm him and treat for shock.

Rationale:



size: 377 KB

Name: 2-1-97

Exam: Test 1

Content:

A 78 year old man was struck by a car crossing the street. When you arrive he is lying in the roadway, has a scalp laceration and angulation of the right radius and femur. His pelvis is unstable. As you begin to package him, he become unconscious and apneic. You should first

open his airway.

check for a pulse.

begin chest compressions.

apply the AED.

Rationale:



size: 267 KB

Main Problems with Tests

- ▶ Do not focus on what is important
- ▶ Test at recall or basic knowledge level
- ▶ Too little feedback is provided
 - Student
 - Instructor
 - Competency
- ▶ Items are ambiguous or unclear
- ▶ Too short to adequately sample content

Main Problems with Tests

- ▶ Instructor fails to communicate purpose of tests
- ▶ Lack of enough exams to provide sample of knowledge attained
- ▶ Poorly constructed exam allows underprepared students who are “good” test takers to potentially perform satisfactorily

Multiple choice items can be designed to measure reasoning, comprehension, application, and other complex thinking processes.

A 45 year old male is complaining of substernal chest pain. He has a history of a previous MI that resulted in an angioplasty and stent. Your partner applies a nonrebreather mask at 15 lpm, the cardiac monitor and the pulse oximeter. As your partner begins to initiate an intravenous line, the patient suddenly becomes unresponsive and displays a very short episode of seizure-like activity. The carotid pulse is absent. The monitor shows ventricular tachycardia. What is your immediate treatment of choice?

- ▶ Defibrillate asynchronously
- ▶ Administer 150 mg of Amiodarone IV push
- ▶ Administer 1.0 mg of epinephrine IV push
- ▶ Deliver a synchronous cardioversion

A 45 year old male is complaining of substernal chest pain. He has a history of a previous MI that resulted in an angioplasty and stent. Your partner applies a nonrebreather mask at 15 lpm, the cardiac monitor and the pulse oximeter. As your partner begins to initiate an intravenous line, the patient suddenly becomes unresponsive and displays a very short episode of seizure-like activity. The carotid pulse is absent. The monitor shows ventricular tachycardia. What is your immediate treatment of choice?

This item appears to be difficult and require a higher level of thinking
– but does it?

A patient suddenly becomes unresponsive and displays a very short episode of seizure-like activity. The carotid pulse is absent and the monitor shows ventricular tachycardia. You should:

- ▶ Defibrillate asynchronously at 360 joules or the biphasic equivalent
- ▶ Administer 150 mg of amiodarone IV push
- ▶ Administer 1.0 mg of epinephrine IV push
- ▶ Deliver a synchronous cardioversion at 50 joules

A patient suddenly becomes unresponsive and displays a very short episode of seizure-like activity. The carotid pulse is absent and the monitor shows ventricular tachycardia. What is the immediate treatment of choice?

- ▶ Defibrillate **asynchronously** at 360 joules or the biphasic equivalent
- ▶ Administer **150 mg** of **amiodarone** IV push
- ▶ Administer **1.0 mg** of **epinephrine** IV push
- ▶ Deliver an **asynchronous** cardioversion at **50 joules**

Each Item Is Written to Specific Content

- ▶ Write each item so that it has a specific purpose on the exam
- ▶ If there is no clear purpose to the item, don't put it on the exam
- ▶ Base purpose on test specification or test-blueprint
 - Topic outline
 - List of major topics
 - Objectives

Each Item is Written to Specific Type of Mental Behavior

- ▶ What type of mental behavior do you want to evaluate by the item?
 - Recall
 - Understanding
 - Critical thinking
 - Problem solving

Make Each Multiple Choice Item Independent

- ▶ Each multiple choice item should be independent
 - The examinee should not have to answer the above item correctly to get the next item correct
 - Previous item often provides a clue or answer to succeeding item(s)
- ▶ Be careful in scenario driven items

Make Each Multiple Choice Item Independent

87. As you continue to manage the patient, the contractions become more severe and intense; however, the patient is still not crowning. Which drug should be administered?

- A. nitroglycerin
- B. adenosine
- C. amiodarone
- D. terbutaline

88. When used in this situation, the above drug is classified as a:

- A. bronchodilator
- B. tocolytic
- C. vasopressor
- D. antioxytocinogen

Avoid Items That Are Too Specific

- ▶ Overly specific items often test trivial knowledge

How many carbon atoms comprise each pyruvic acid molecule that is produced during glycolysis?

- A. 2
- B. 3
- C. 5
- D. 6

Avoid Items That Are Too General

- ▶ Often the generality is not true or many exceptions exist
- ▶ No answer is usually satisfactory for all examinees.

What is the most serious condition an EMT will encounter in the field?

- A. Stroke
- B. Heart attack
- C. Head injury
- D. Chest injury

Each Item Should Test a Single Behavior

- ▶ A chain of behaviors should not be required to attain the correct answer
- ▶ If answered incorrectly, the instructor can't identify the step not learned
- ▶ Complex multistage thinking can be measured in a battery of testing

How much epinephrine should be administered to a six year old experiencing an anaphylactic reaction?

- A. 0.02 mg
- B. 0.2 mg**
- C. 0.06 mg
- D. 0.5 mg

Avoid Opinion-Based or Controversial Items

- ▶ The item should be based on
 - Facts, concepts, principles, procedures
- ▶ Controversial or opinion-based items should state the authority in the stem
 - According to my lecture
 - According to Dr. Walt Stoy
 - According to the Diver's Alert Network
 - According to the AHA ECC 2005 Guidelines

Do Not Use Trick Items

- ▶ Roberts (1993) identified two types
 - Intentional
 - Accidental or unintentional
- ▶ Distrust of test-taker
- ▶ Lack of respect for test process
- ▶ How to avoid trick items – let students challenge test items and provide explanations for the selected choice and interpretations of the stem or choices

Test Item Format Issues

How Do I Select the Best Test Format?

- ▶ Selected-response (objective)
 - Multiple-choice
 - True-false
 - Matching
- ▶ Constructed-response (subjective)
 - Sentence-completion
 - Short answer
 - Essay
 - Writing sample

How Do I Select the Best Test Format?

- ▶ What is to be measured
- ▶ Size of the class
- ▶ Time available to prepare and score the test
- ▶ Test length
- ▶ Item difficulty
- ▶ Type of certification/licensure examination (practice)

Test Length

- ▶ Short-answer requires more time
 - Allow two minutes per short-answer item
- ▶ True/false requires less time than multiple-choice items
 - Allow one-half minute per true/false item
- ▶ Multiple-choice and completion
 - Allow one minute per item
 - 40 to 45 items in a 50 minute period

One Correct Answer Type Multiple Choice Item

- ▶ One response is absolutely correct – does not ask for the best answer
- ▶ Measures knowledge domain
- ▶ Questions that ask who, what, when, and where
- ▶ Less difficult to construct
- ▶ Easier for student

What is the maximum liter per minute flow rate for a nasal cannula?

- ▶ 2 lpm
- ▶ 4 lpm
- ▶ 6 lpm
- ▶ 8 lpm

Only one correct answer

Best Answer Multiple Choice Items

- ▶ Measures learning objectives that require understanding, application, or interpretation of factual material
- ▶ Measures how and why
- ▶ Best answer must be agreed upon by experts
- ▶ More difficult to construct
- ▶ More difficult for students
- ▶ Should be used in EMS education

A 30 year old male has a gunshot wound to the chest. During the general impression you note blood in the mouth, severe cyanosis to the face and neck, and no chest wall movement. You should:

- ▶ Suction the airway and occlude the gunshot wound to the chest.
- ▶ Expose the patient and check for other serious gunshot wounds.
- ▶ Begin BVM ventilation with supplemental oxygen and place your gloved hand over the wound.
- ▶ Occlude the open wound, apply a nonrebreather mask at 15 lpm and begin your initial assessment.

Best Answer

Advantages of Multiple Choice Items

- ▶ Measures knowledge and complex learning objectives
- ▶ Avoids ambiguity and vagueness found in short-answer items
 - Why is epinephrine administered?

Epinephrine is administered for both its vasopressor and bronchodilator effects in what condition?

- Cardiac arrest
- Anaphylaxis
- Pneumonia
- Acute asthma

Advantages of Multiple Choice Items Over True/False Items

- ▶ Student can't get credit for just knowing what is incorrect
- ▶ Student must also know what is correct
- ▶ Greater reliability
 - 4 to 5 in multiple choice item vs 2 in T/F item
- ▶ Can diagnose a problem by looking at plausible distractors

▶ The initial dose of epinephrine for anaphylactic shock is 1.5 mg.

- True
- False

▶ The initial dose of epinephrine for anaphylactic shock is:

- 0.3 to 0.5 mg
- 0.5 to 1.0 mg
- 1.3 to 1.5 mg
- 1.5 to 2.0 mg

But the NREMT exam
is multiple choice...

Other types

- ▶ Other question types can help the educator assess knowledge.
- ▶ Just because their state exam is MC doesn't mean you shouldn't use other item types.
- ▶ Short answer and fill-in questions help you obtain viable distractors for solid MC items in future exams.

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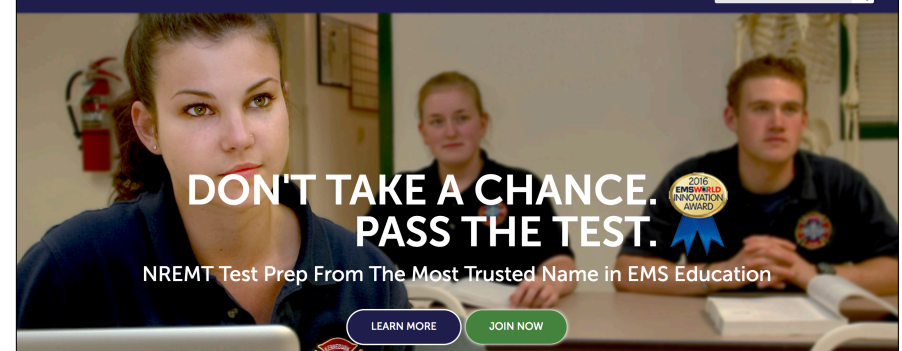
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