

ورشة عمل  
كيفية إعداد بنوك الأسئلة  
وتقييمها

المكان: - المدرج

يوم ٢٥/١١/٢٠٢٠ م

بِسْمِ اللّٰهِ الرَّحْمٰنِ الرَّحِیْمِ

# MCQs: Construction and evaluation

**By**

**Dr/Hoda Makhoulf**

**Professor of Pulmonology**

**Director of Quality Assurance Unit**

**Vice Director of Education Development Centre**

**Undergraduate Program Assistant Director & Reviewer**

**RUMP Auditor**

**Assiut University**

# Agenda

- ▶ **Purposes of assessments**
- ▶ **Types of assessment**
- ▶ **How to prepare written exam**
- ▶ **Types of questions**
- ▶ **What is the good assessment**
- ▶ **Guidelines for MCQs Exam**
- ▶ **How to calculate the time of examination**

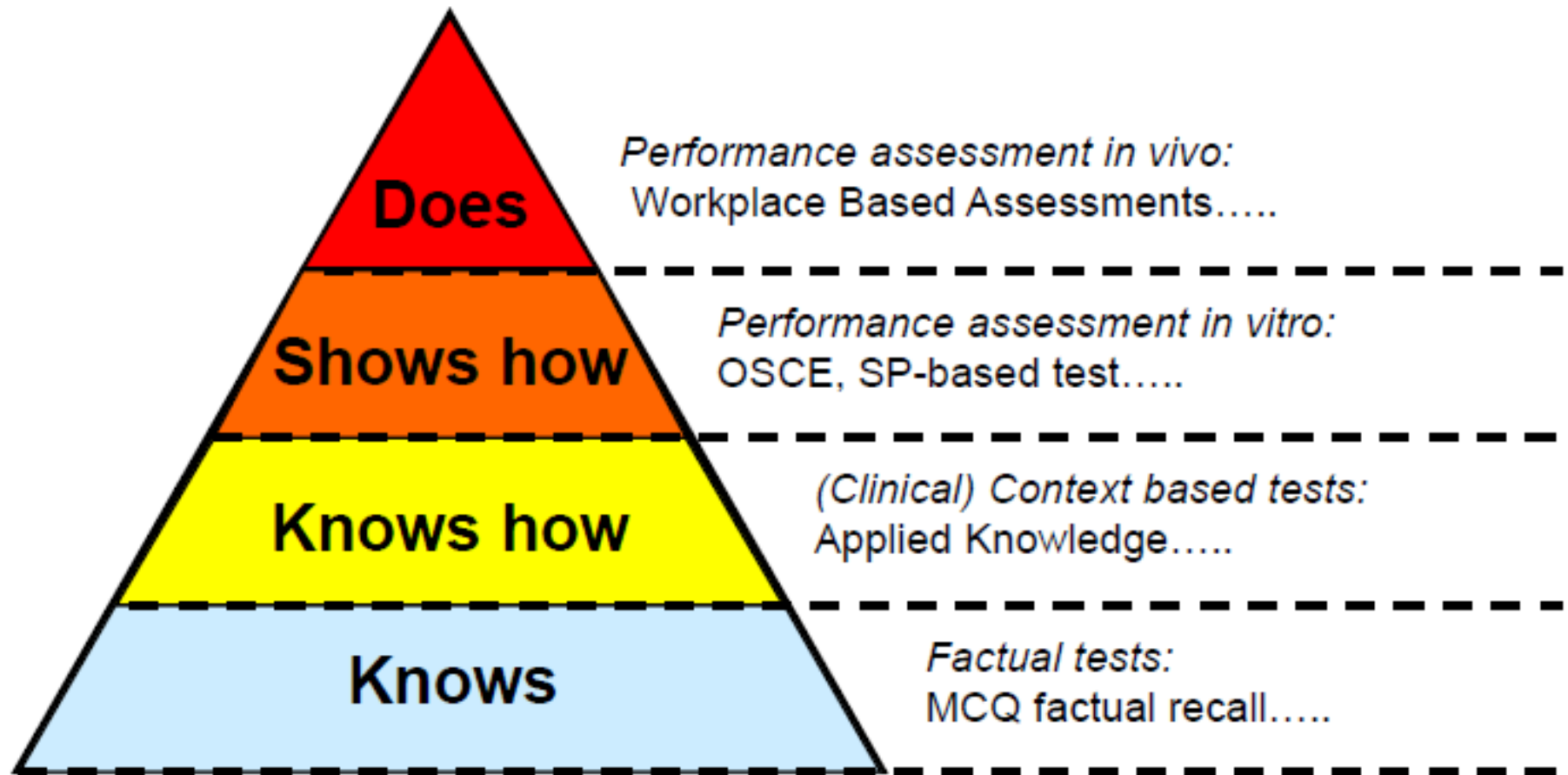
# Purposes of Assessments

- **to pass or fail a candidate**
- **to grade or rank a candidate**
- **to license to proceed**
- **to license to practise**
- **to provide feedback to candidates**
- **to provide feedback to faculty**
- **to evaluate the effectiveness of the curriculum**

# **Types of Assessment**

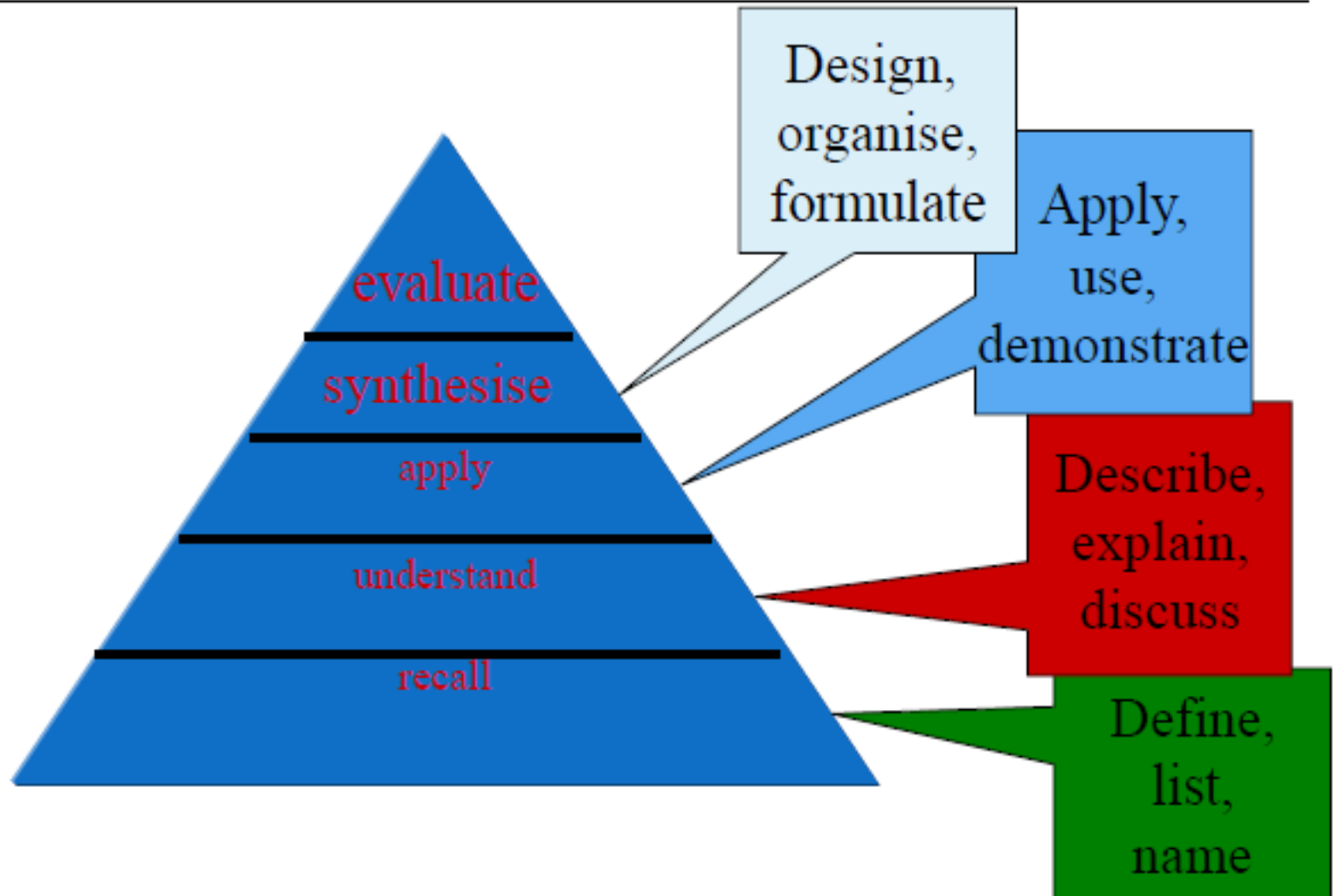
- **Summative assessment**
- **Formative assessment**

## Climbing The Pyramid.....



Miller's Pyramid

# Blooms Taxonomy





# **How to prepare written exam (assessing knowledge and intellectual)**

- **Identify the learning objectives and ILOs to be assessed.**
- **Use simple and clear language in all questions.**
- **Ensure proper sampling.**

# **How to prepare written exam**

- **Use correct grammar.**
- **Ensure that questions reflect conditions stated in the objective.**
- **Discard any question which is in any way controversial.**
- **Questions of moderate difficulty are best.**

# **How to prepare written exam**

- **Do not build a test item upon a previous test item.**
- **Divide long or complicated examinations into several parts.**
- **Provide clear directions for each type of item.**
- **Model answers , Use answer keys or checklists for scoring.**

# Types of questions

- **Multiple-Choice.**
- **Clinical Case studies.**
- **Short-Answer Questions** requiring a short (one to two sentences).

# Types of questions

- **True –False** A statement is determined to be true or false.

- **Extended matching questions (EMQ)**

There are four elements to the structure of a EMQ

- Theme
- Option list
- Lead-in statement
- Items (questions)

## **Types of questions**

- **Short Essay questions** where students are asked to write down what they know about a subject or question.
- **Modified essay questions** are similar to a patient management problem in that they provide a scenario and specific questions that a student must answer.

## What Is A Good Assessment?

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$$\bullet U = R \times V \times E \times C \times A$$

Van der Vleuten

- . *U - Utility*
- . R – Reliability
- . V – Validity
- . E – Educational Impact
- . C – Cost
- . A - Acceptability



## What Is A Good Assessment?

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$$\bullet U = R \times V \times E \times C \times A$$

Van der Vleuten

- . *U - Utility*
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- . C – Cost
- . A - Acceptability

How about an  
MCQ?





## What Is A Good Assessment?

$$U = R \times V \times E \times C \times A$$

Van der Vleuten

- . *U - Utility*
- . R – Reliability (*Good*)
- . V – Validity (*Fair*)
- . E – Educational Impact (*Fair*)
- . C – Cost (*Good*)
- . A – Acceptability (*Reasonable*)

How about an  
MCQ?



# **Guidelines for MCQs Exam**

# MCQs Formats

- **Single best answer ('best of 5')**

**A statement followed by a number of items,  
only ONE of which is correct**

## **Single Best Answer (SBA)**

**The way to a man's heart is-**

- A. Through his aorta**
- B. Down the motorway and off at junction 4**
- C. Through his pulmonary arteries**
- D. Through his pulmonary veins**
- E. Through his stomach**

# **Single Best Answer (SBA)**

**• A well constructed MCQ consists of:**

**➤ a stem**

**➤ a lead-in question**

**➤ a series of response options**

# **Lead-in questions to test factual recall of knowledge**

- **The candidate repeats previously learned material by recalling facts and basic concepts.**
- **Keyword:** (who, what, why, when, where, which, choose, select, how, match).

## **Example:**

**A branch of which cranial nerve supplies the vocal cords?**

**A. Abducens**

**B. Optic**

**C. Trochlear**

**D. Vagus**

**E. Vestibulocochlear**

## **Lead-in questions to test intellectual**

- The candidate **solves problems by applying acquired knowledge, facts, techniques and rules in a clinically relevant situation.**
- **Keyword:** ( apply, choose, make use of, organize, plan, select, solve, utilize, identify).



**Stem/question:** A 65 year old man has difficulty rising from a seated position and straightening his trunk, but he has no difficulty flexing his leg.

**Lead-In:** Which of the following muscles is affected?

- A. Gluteus maximus**
- B. Gluteus minimus**
- C. Hamstrings**
- D. Iliopsoas**
- E. Obturator internus**

## **SBA Writing, The Basic Rules**

- Each item **stems** should **focus on an important concept**, typically a common or potentially catastrophic clinical problem.
- **Don't** waste time with questions assessing **trivia**.
- **Focus on** problems that would be encountered in **real life**.

## **SBA Writing, for Applied Knowledge**

- **Each item stems should assess application of knowledge, not recall of isolated facts.**
- **The item stems may be long (aim for 30-100 words) but the options should be short.**

## **SBA Writing, for Applied Knowledge**

- **Clinical scenarios (vignettes) provide a good basis for a question e.g. describe a patient, their history, physical findings, results of tests, treatment, etc.**
- **Present the information in a systematic order.**

## **SBA Writing, The Basic Rules**

- **The stem of the item must pose a clear question and it should be possible to arrive at an answer with the options covered.**
- **To determine if a question is focused, cover up the options and see if the question is clear.**

# **SBA Writing, The Basic Rules**

- **Re-write the stem and/or options if not!**
- **Each question should have the correct grammar and spelling.**

# SBA Writing, The Basic Rules

- **Avoid** use of **negatively** phrased questions such as:
  - Which is the **least** appropriate?
  - Which is **NOT** an example of?
  - All of the following are false **EXCEPT.**
  - All of the following are true **EXCEPT**

# **SBA Writing, The Basic Rules**

- **Avoid** questions of the form “**which of the following statements is correct?**”

**as these tend to be unfocused**

- **Avoid** Tricky/complicated stems

**Questions.**



# **SBA Writing, The Basic Rules**

**All **distracters** (incorrect options) should be:**

- **Plausible**
- **Grammatically consistent**
- **Logically compatible**
- **Of the same (relative) length as the correct answer**
- **In alphabetical order**

# SBA Writing, The Basic Rules

- All **distracters** (incorrect options) should be **homogenous** that is they should be in the **same category** as the correct answer e.g. all diagnosis, treatments etc.
- Re-write double options to focus on a single point.

# Double Options (Bad)

**Which option has the correct letter?**

**A. b & c**

**B. b & c & d**

**C. b & d & e**

**D. b & c & e**

**E. b**

# **SBA Writing, The Basic Rules**

- **When **numeric options** are used, the options should be listed in **numeric order** and in a **single format** (i.e., as terms or ranges.**

## **SBA Writing, The Basic Rules**

- **Avoid using “All of the above” or “None of the above” as options.**
- **Avoid absolute terms such as “always” and “never” in stems and options.**
- **Avoid repeating words and phrases in the stem and in the options.**

# **Avoid Imprecise Terms**

- **Avoid terms such as frequently, usually in stems and options.**
- **Define terms such as 'in the majority= >50%'etc.**

# Non-vignette

**Which is the SINGLE best test in patients presenting with a pulmonary embolus to give a definitive diagnosis?**

- A. Chest x-ray**
- B. Electrocardiogram (ECG)**
- C. Fibre optic bronchoscopy**
- D. Fine needle aspiration**
- E. Pulmonary CT scan**

## **Short vignette**

**A 55 year old obese, non smoker is admitted to hospital after a long haul flight. He complains of increasing breathlessness, a cough and a pain at his left base on inspiration. There is dullness on percussion but no other findings of note. (43 words).**



## **Short vignette**

**What is the SINGLE best test to give a definitive diagnosis for this patient?**

- A. Chest x-ray**
- B. Electrocardiogram (ECG)**
- C. Fibre optic bronchoscopy**
- D. Fine needle aspiration**
- E. Pulmonary CT scan**

# Long vignette

**A 55 year old obese non smoker is admitted to hospital after a long haul flight. His family have noticed him to be increasingly breathless. He complains of a cough and a pain at his left base on inspiration. On examination there is a dullness on percussion but no other findings of note. His blood pressure is 142/90. His only other relevant history is generalized osteoarthritis. (65 words)**

# Remember....

- **Prune, add, edit**
- **Peer review is a vital part of exercise**

# **After Write, Prune, Add, Edit, Peer Review ....**

- **Content expert group-approve, minor modification or return to sender.**
- **Approved questions are added to item bank.**
- **Test construction using specification blueprint.**

**The way to a man's heart is-**

**A. Through his aorta**

**B. Down the motorway and off at junction 4**

**C. Through his pulmonary arteries**

**D. Through his pulmonary veins**

**E. Through his stomach**



**Which of the following is the best way  
to a man's heart?**

**A. Aorta**

**B. Pulmonary arteries**

**C. Pulmonary veins**

**D. Stomach**



**Xerostomia may be seen in which of the following conditions?**

- A. Diabetes**
- B. Sarcoidosis**
- C. Bulimia**
- D. HIV infection**
- E. All of the above**



**A patient with post-hepatic cirrhosis develops rapid enlargement of the liver associated with deterioration of hepatic function. Serum concentration of which of the following is most likely to be abnormal?**

**A. Alpha-1 antitrypsin**

**B. Alpha-fetoprotein**

**C. Carcinoembryonic antigen**

**D. Chorionic gonadotropin**

**E. Gastrin**





**At a banquet, the menu included fried chicken, home-fried potatoes, peas, chocolate éclairs and coffee. Within 2 hours, most of the diners became violently ill with nausea, vomiting and abdominal pain. Analysis of the contaminated foods is most likely to yield large numbers of which of the following organisms?**

- A. Escherichia coli**
- B. Proteus mirabilis**
- C. Salmonella typhimurium**
- D. Staphylococcus aureus**
- E. Streptococcus faecalis**



**How to calculate the  
time of examination**

- **The following rules are for the students with English mother tongue.**
- **We may double the duration , at least for our students.**

**(Linn & Gronlund , 2000)**

| <b>Item</b>  | <b>Time</b>  |
|--|--|
| <b>True-false test</b><br><b>Correct answer for false questions</b>                    | <b>15 seconds</b><br><b>30-45 seconds</b>                      |
| <b>Seven item matching exercise</b>  | <b>60-90 seconds</b>   |
| <b>Four response MCQ</b><br><b>(knowledge level)</b><br><b>application level</b>       | <b>30 seconds</b><br><b>60 seconds</b>                         |
| <b>Any test item requires solving a problem, analyzing, synthesizing or evaluating</b> | <b>adds 30-60 seconds to a question.</b>                       |
| <b>Short-answer</b>  | <b>30-45 seconds</b>   |
| <b>Essay</b>   | <b>60 seconds for each point to be compared and contrasted</b> |

# Home message

**To perform a good assessment, you should**

- **Identify the purpose?**
- **Have a curriculum**
- **Blueprint**
- **Identify Stakeholders**
- **Use a framework to consider Utility**



**Thank you**

Jim Henson



Assuit University Medical Education  
Development & Training Center

## تسجيل حضور



كلية الطب - جامعة أسيوط  
مركز تطوير التعليم الطبي والتدريب

ورشة عمل كيفية إعداد بنى الاختبار وتصميم ٢٠٢٠/١١/٢٥

| م | الإسم                        | القسم/الجامعة    | البريد الإلكتروني          | رقم التليفون | التوقيع |
|---|------------------------------|------------------|----------------------------|--------------|---------|
|   | د/ نازة أبو بكر عبد الباق    | الشيخ            | Fatma elasilya@yahoo.com   | ٠١٠٠٦٥٦٤     |         |
|   | د/ أميرة عبد الحميد كامل     | الكيمياء الحيوية | amira_kamel222@yahoo.com   | ٠١٠٦٨٣٤٥٨٦١  |         |
|   | صفاء دماصر صويح              | الصيدلانية       | safaa_georg@yahoo.com      | ٠١٠٠٩٨١٠٢٨   |         |
|   | د/ منة محمد خديجة            | الصيدلانية       | efm_kholaf@yahoo.com       | ٠١٠٠٦٩٥٠٠٩   |         |
|   | ماجدة فرح على حري            | الصيدلانية       | mydagebri78@gmail.com      | ٠١٠٦٢٤٢٩٢١٤  |         |
|   | د/ حور الدين محمد عبد السلام | الصيدلانية       | ebthad2@gmail.com          | 01003143075  |         |
|   | د/ أسماء كمال أبو            | الصيدلانية       | lamiazak@gmail.com         | 01663492008  |         |
|   | د/ منة زاهر محمد محمود       | الصيدلانية       | asmaagem3a@yahoo.com       | 01066030235  |         |
|   | د/ أسماء محمد عبد الحميد     | الصيدلانية       | mohamedekr-osman@gmail.com | 0102231360   |         |
|   | د/ أميرة إكرام عبد الوهاب    | الصيدلانية       | argoon@yahoo.com           | 01064559917  |         |











