

Principles of writing good MCQs

41	A 47 year old female patient has a single episode of chest pain. Her ECG shows prolongation of the PR interval. In which one of the following is the damage likely to be?	
A.	Bundle of His	<input checked="" type="checkbox"/>
B.	The left bundle	<input type="checkbox"/>
C.	The right bundle	<input type="checkbox"/>
D.	The SA node	<input type="checkbox"/>
E.	Vagus nerve	<input type="checkbox"/>



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- Basic rules
- Examples
- Write MCQs
- QA of new MCQs

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Purpose to measure applied knowledge and above

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Evaluation Judgement

Synthesis Putting things together
Creative thinking

Analysis Breaking things down
Critical thinking

Application Using knowledge
in new situations

Comprehension Understanding

Knowledge Recall

Knowledge Retention
Foundation for
higher order thinking

Taxonomy of Educational Objectives: The Classification of Educational Goals, pp. 201-207; B. S. Bloom (Ed.) Susan Fauer Company, Inc. 1956

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Two types:

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- True/false – No longer used
- Best of five / single best answer

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Best of five / single best answer

1. A 55 year old woman presents with recurrent episodes of feeling faint. On examination her pulse of the wrist is 40 beats per minute. The ECG shows normal P waves at a rate of 85 per minute, but a slow ventricular rate. What is the most likely diagnosis?

A.	Atrial fibrillation	
B.	Atrioventricular block	B
C.	Bundle branch block	
D.	Sino-atrial block	
E.	Ventricular fibrillation	

1. A 55 year old woman presents with recurrent episodes of feeling faint. On examination her pulse of the wrist is 40 beats per minute. The ECG shows normal P waves at a rate of 85 per minute, but a slow ventricular rate. What is the most likely diagnosis?

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5 answer options
- one correct answer
- 4 distractors

Basic Rules

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- Question should focus on a key concept or principle that is essential for all candidates to understand.
- Question should assess **application of knowledge**, not recall of an isolated fact.

e.g.

Recall stem:

What area is supplied with blood by the posterior inferior cerebellar artery?

Application stem:

A 62 year old man develops left-sided limb ataxia, Horner's syndrome, nystagmus and loss of appreciation of facial pain and temperature sensations. What artery is most likely to be occluded?

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Stem

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- Focus on realistic scenarios
- Stem should be long relative to the options
- Includes all the pertinent information

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Stem

- Patient vignettes should include some or all of the following components:

Age, gender (e.g. A 46 year old woman...)

Site of care (e.g. ...comes to the emergency department....)

Presenting complaint (e.g.because of a headache)

Duration (e.g.that has continued for two days)

Patient history

Physical findings

+/- Results of diagnostic studies

+/- Initial treatment, subsequent findings etc.

Why clinical vignettes?

- add face validity
- more likely to select important knowledge rather than trivial knowledge
- identifies students who've memorised but do not understand

Stem



Non-Vignette

The most likely renal abnormality in children with nephrotic syndrome and normal renal function is

- A. acute poststreptococcal glomerulonephritis
- B. hemolytic-uremic syndrome
- *C. minimal change nephrotic syndrome
- D. nephrotic syndrome due to focal and segmental glomerulosclerosis
- E. Schönlein-Henoch purpura with nephritis

	A	B	C	D	E
Hi	1	0	99	0	0
Lo	8	1	90	1	0

Short Vignette

A 2-year-old boy has a 1-week history of edema. His blood pressure is 100/60 mm Hg, and there is a generalized edema and ascites. Serum concentrations are: creatinine 0.4 mg/dL, albumin 1.4 g/dL, and cholesterol 569 mg/dL. Urinalysis shows 4+ protein and no blood. The most likely diagnosis is (same option list followed).

	A	B	C	D	E
Hi	0	0	98	2	0
Lo	5	2	82	8	1

Case SM, Swanson DB. Constructing written test questions for the basic and clinical sciences (3rd edn). Philadelphia, PA: National Board of Medical Examiners, 2001.



Stem



Long Vignette

A 2-year-old black child developed swelling of his eyes and ankles over the past week. Blood pressure is 100/60 mm Hg, pulse 110/min, and respirations 28/min. In addition to swelling of his eyes and 2+ pitting edema of his ankles, he has abdominal distention with a positive fluid wave. Serum concentrations are: creatinine 0.4 mg/dL, albumin 1.4 g/dL, and cholesterol 569 mg/dL. Urinalysis shows 4+ protein and no blood. (Same lead-in and option list followed).

	A	B	C	D	E
Hi	0	1	98	1	0
Lo	10	9	66	10	5

Case SM, Swanson DB. Constructing written test questions for the basic and clinical sciences (3rd edn). Philadelphia, PA: National Board of Medical Examiners, 2001.



Stem

- Includes a description rather than a summary

e.g. ...presents to their GP with anaemia. X
....presents to their GP complaining of tiredness..... A blood count shows a haemoglobin concentration of 8.9g/dL. ✓

Lead-in question

- Lead-in should pose a clear question
e.g. diagnosis, treatment.
- It should be possible to arrive at an answer without looking at the options (Cover up test).
- Should not be answerable without reference to scenario.

Lead-in question

- Usually includes 'most likely', 'most appropriate'
- Avoid using 'NOT' and double negatives

Options

- All distractors (i.e. incorrect options) should be homogeneous and plausible.
 - fall into same category as the correct answer
 - be independent and not overlap
 - similar length
 - grammatically consistent
 - alphabetical order

Options

- Include common misconceptions and common mistakes to make plausible distractors more effective.
- Avoid
 - 'None of the above'
 - repeating the words between the stem and the correct response
 - Cueing i.e. providing a hint to the answer in another question.

Terms to avoid

- Never
- Always
- Sometime
- Generally
- Commonly
- Usually
- Same as
- Can be
- May be
- Can appear

Options

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A 58 year old man with a history of heavy alcohol use and previous psychiatric hospitalisation is confused and agitated. He speaks of experiencing the world as unreal.

What is the name of the symptom described in this patient?

- A. Depersonalisation
- B. Derailment
- C. Derealisation
- D. Focal memory deficit
- E. Signal anxiety

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Options

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An otherwise healthy 28 year old woman presents with a two day history of a cough, fever and shortness of breath. A chest radiograph is taken and is shown below.

What is the most likely diagnosis?

- A. Blastocystosis
- B. Community-acquired streptococcal pneumonia
- C. Tuberculosis
- D. Varicella pneumonia

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Options

What would typically cause the **pressure–volume curve** of the left ventricle to be shifted to the left?

- A. Aortic regurgitation
- B. Aortic stenosis
- C. Mitral regurgitation
- D. Mitral stenosis
- E. Tricuspid stenosis

Tips

- Be clear about what you want to assess – avoid the temptation to test many things in one question.
- Apply MCQ writing guidelines
- Ask a colleague to evaluate the MCQ using the QA checklist