

Constructing scenario based Multiple Choice Question





Prof Dr Arun Jamkar

MS, PhD (Surgical oncology)

FICS.FMAS, FIAGES, FAIMER fellow

Ex- Vice Chancellor,

Maharashtra University of Health Sciences,
NASHIK

-
- Consultant , Persistent system pvt ltd
 - Director, Post graduate programme, Research and Development, MIT group of Medical colleges Pune
 - Chair National Bioethics Curriculum implementation UNESCO Chair in bioethics Haifa.
 - Consultant, Palash health care and seed Infotech
 - Chief Medical officer Index Technology USA
 - Brand Ambassador, British association of Physicians of Indian Origin
-

Learning Outcomes

- Learners will
 - Identify the components of a MCQ
 - Explain the strengths and weaknesses inherent in MCQS
 - Justify scenarios as Analytical method
 - Construct sound scenarios based MCQs

Construction

- Quality multiple-choice items are difficult to construct. The more experienced you are, the more you learn how hard it is to create fair and accurate questions.

• McKeachie, 1999

- Education is learning what you didn't even know you didn't know.

- *Daniel J. Boorstin*

Item Components

Stem

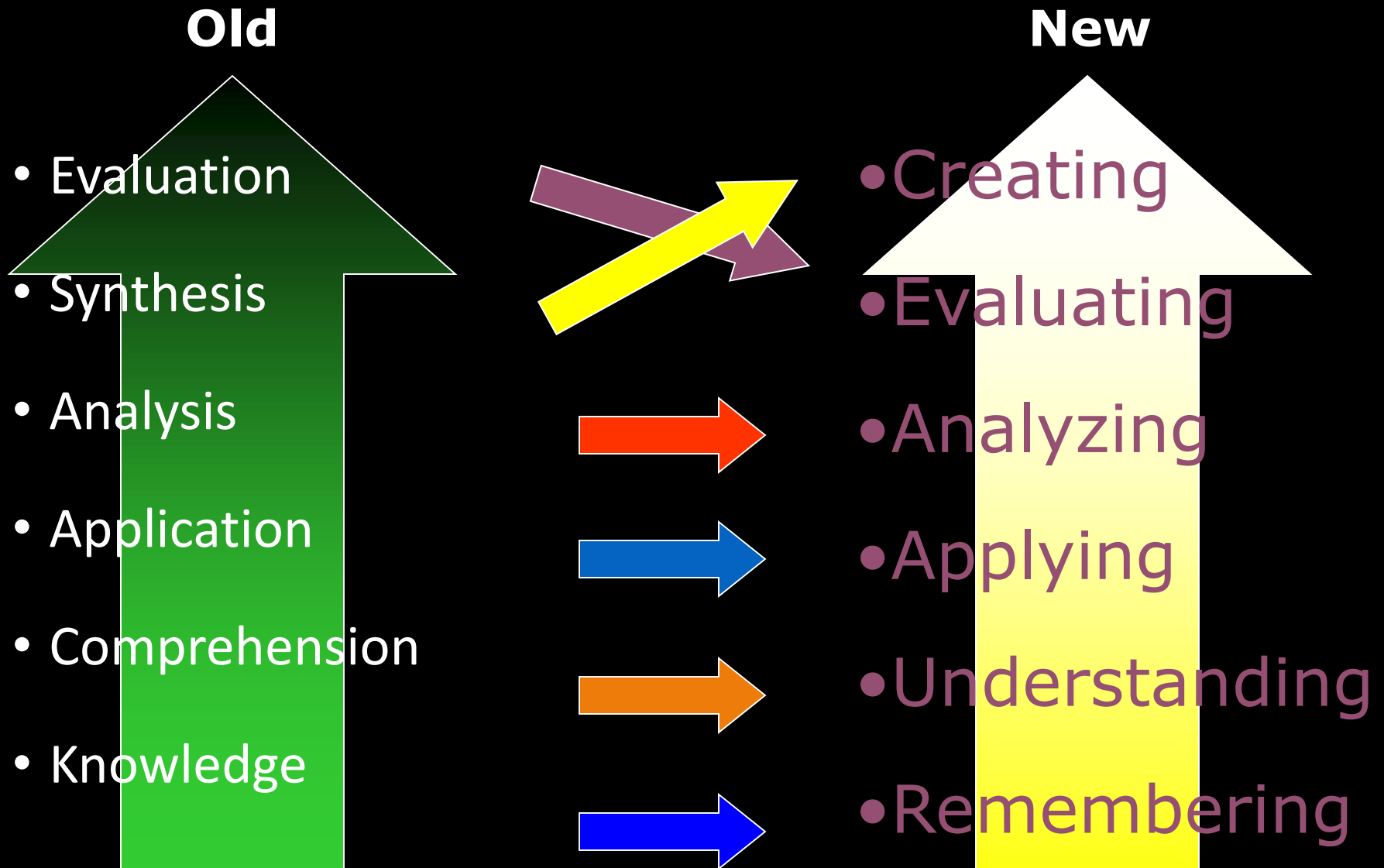
Which of the following question components describes the incorrect responses?

- a) Stem
- b) Correct response
- c) Distracter

Distracters

**Correct
Response**

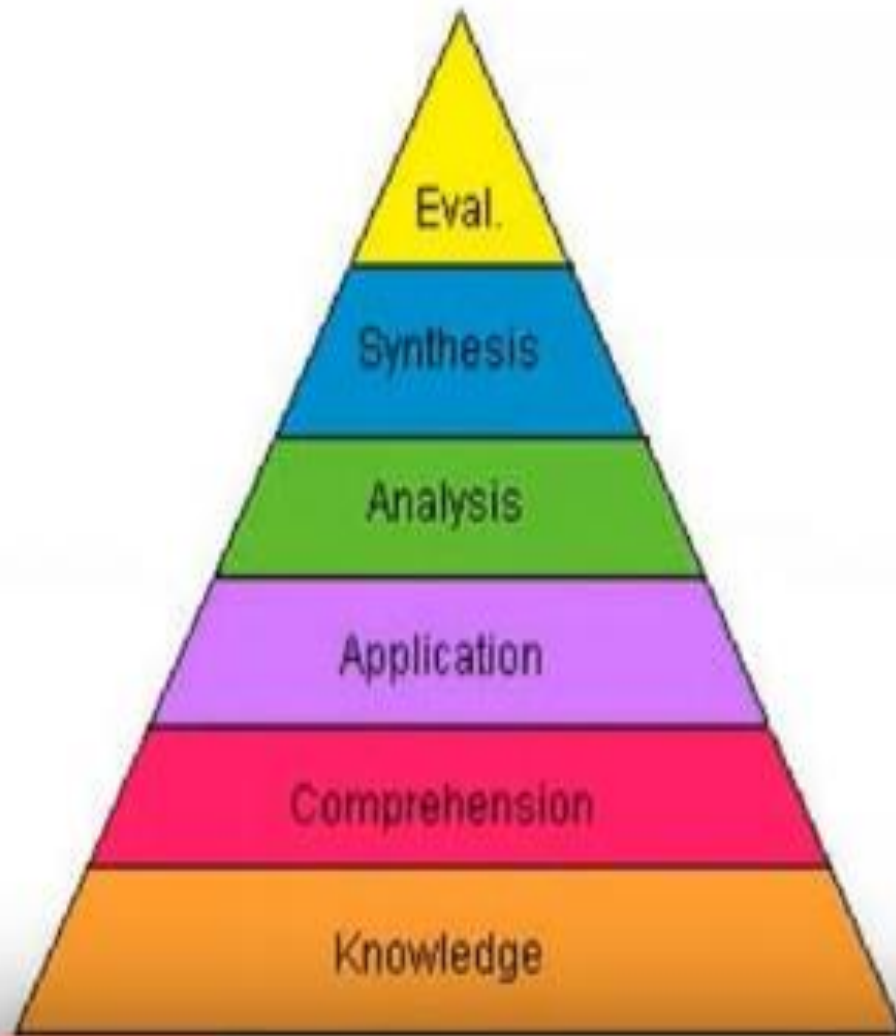
Bloom's Taxonomy



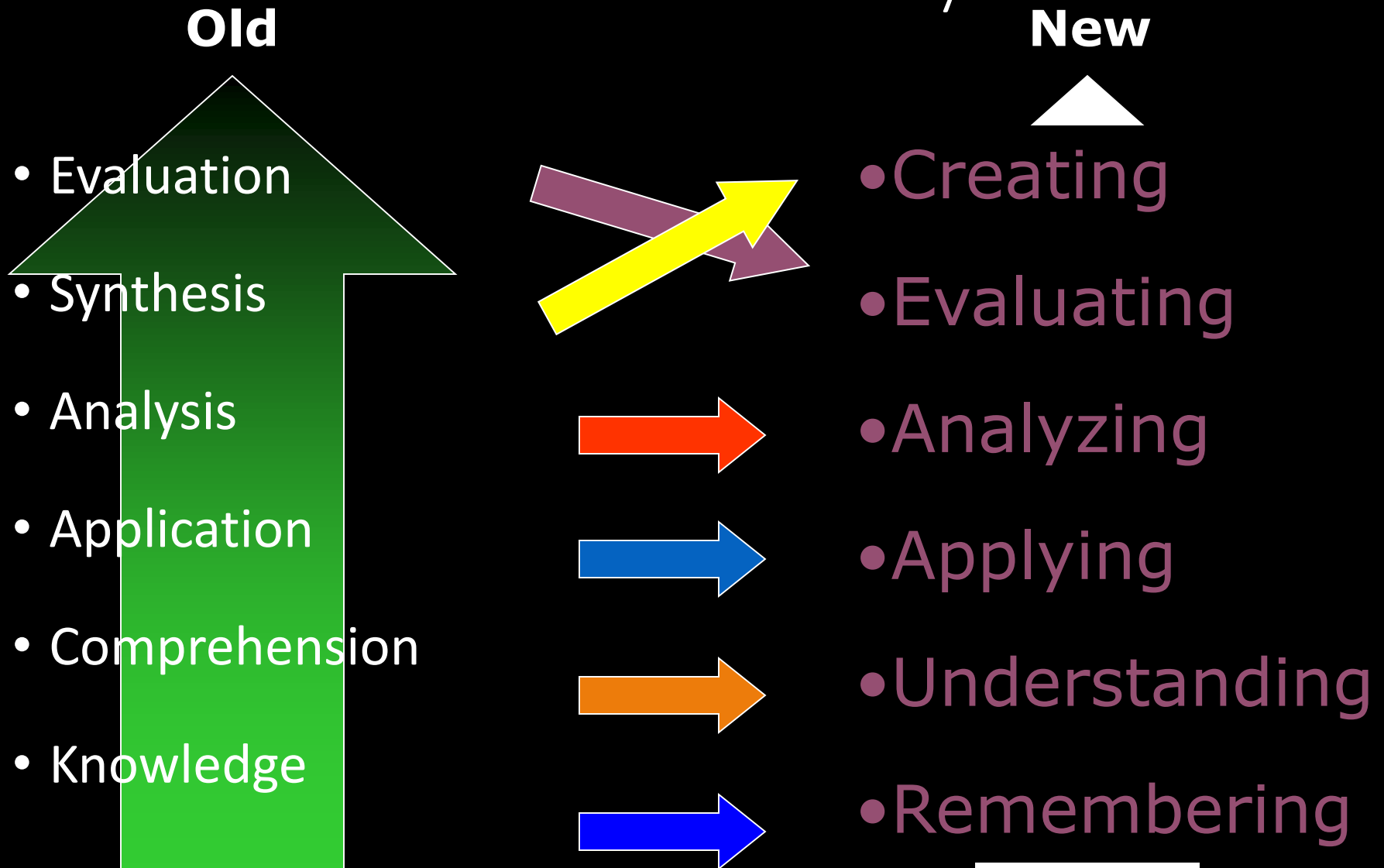
(Based on Pohl, 2000, *Learning to Think, Thinking to Learn*, p. 8)

Revised by Anderson in the 1990's

Nouns to verbs and the top two reversed



Bloom's Taxonomy



(Based on Pohl, 2000, *Learning to Think, Thinking to Learn*, p. 8)

BLOOM'S REVISED TAXONOMY

Higher-order thinking

Creating

Generating new ideas, products, or ways of viewing things
Designing, constructing, planning, producing, inventing.

Evaluating

Justifying a decision or course of action
Checking, hypothesising, critiquing, experimenting, judging

Analysing

Breaking information into parts to explore understandings and relationships
Comparing, organising, deconstructing, interrogating, finding

Applying

Using information in another familiar situation
Implementing, carrying out, using, executing

Understanding

Explaining ideas or concepts
Interpreting, summarising, paraphrasing, classifying, explaining

Remembering

Recalling information
Recognising, listing, describing, retrieving, naming, finding

(Based on Pohl, 2000, *Learning to Think, Thinking to Learn*, p. 8)

APPLICATION OF BLOOM'S TAXONOMY IN DESIGNING MCQS

■ COGNITIVE DOMAIN : LEVEL-I

Recall of acquired knowledge, facts.

Which one of the following types of necrosis is seen in tuberculosis ?

- a) Coagulative
- b) Caseous
- c) Liuefactive
- d) Fibrinoid

Introctory questions help to relax the students. It is desirable to have question ranging from easy to difficult.

Remembering

1. Which of the following persons is the author of the Zone of Proximal Development concept?
 - a) Vygotsky
 - b) Bruner
 - c) Krashen
 - d) Cummins



Understanding

[Insert Story here]

1. What is the main idea of the story?
 - a) The lone wolf is able to succeed
 - b) Trying is as important as succeeding
 - c) Teams are better than individuals



DESIGNING & MANAGING MCQS

- **Level 2: Comprehension**
for ‘understanding’ of this knowledge.

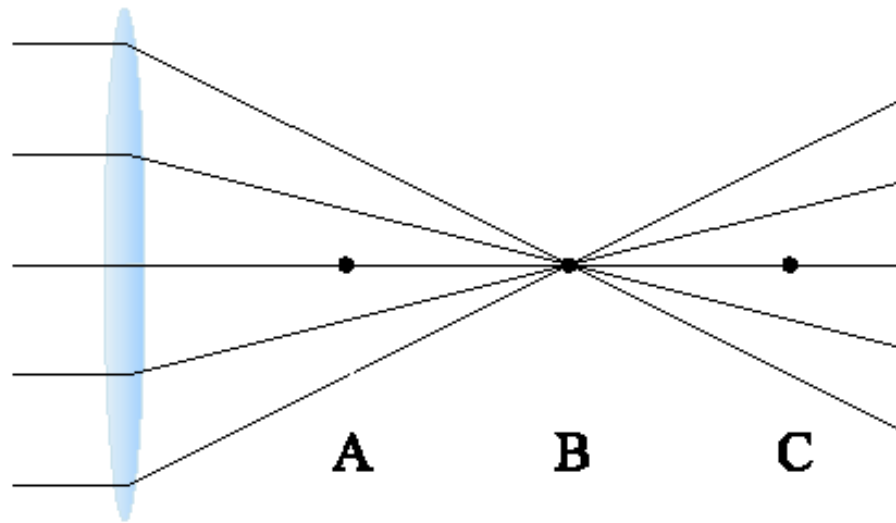
Example

- (a) Decreased T_3 , T_4 , TSH and TRH.
- (b) Decreased T_3 , T_4 , TSH and increased TRH.
- (c) Normal T_3 , T_4 and decreased TSH and TRH.
- (d) **Decreased T_3 , T_4 and increased TSH.**

Applying

Application

Objective: Identifies the correct application of principle (problem solving).



In the diagram above, parallel light rays pass through a convex lens and converge to a focus. They can be made parallel again by placing a:

- a. Concave lens at point B.
- b. Concave lens at point C.
- c. Second convex lens at point A.
- d. Second convex lens at point B.
- e. Second convex lens at point C.

DESIGNING & MANAGING MCQS

- Level 3: Application

Example:

A 40 year old male is admitted for oliguria. Investigations reveal urine creatinine concentration of 1.1 g/L, plasma creatinine concentration of 1.1 mg/dL and urine excretion of 1.0 mL/min. which one of the following is the correct value of creatinine clearance in mL/min?

(a) 90

(b) 100

(c) 110

(d) 120

DESIGNING & MANAGING MCQS

- Level 3: Application

Example:

A 45 year old woman present with a goitre of four years' duration and clinical features suggestive of hypothyroidism. The likely diagnosis include.

- (a) Dyshormonogenesis
- (b) Drug-induced goitre
- (c) Thyroid cancer
- (d) Auto immune Thyroiditis

(a), (c) are false & (b) (d) are true

Analyzing

Objective: Analyzes poetry and identifies patterns and relationships.

[The poem is included here.]

The chief purpose of stanza 9 is to:

- a. Delay the ending to make the poem symmetrical.
- b. Give the reader a realistic picture of the return of the cavalry.
- c. Provide material for extending the simile of the bridge to a final point.
- *d. Return the reader to the scene established in stanza 1.

DESIGNING & MANAGING MCQS

■ Level 4: Analysis

This level requires knowledge, comprehension and its application.

Example:

The above passage illustrates a particular phase of the creative process. Which one is it?

(a) Preparation

(b) Incubation

(c) Orientation

(d) Illumination

(e) Verification

Evaluating

"The creative process is believed to take place in five stages, in the following order: ORIENTATION, when the problem must be identified and defined, PREPARATION, when all the possible information about the problem is collected, INCUBATION, when there is a period where no solution seems in sight and the person is often busy with other tasks, ILLUMINATION, when the person experiences a general idea of how to arrive at a solution to the problem, and finally VERIFICATION, when the person determines whether the solution is the right one for the problem."

How would you judge this student's answer?

- a) EXCELLENT (all stages correct in the right order with clear and correct explanations)
- b) GOOD (all stages correct in the right order, but the explanations are not as clear as they should be).
- c) MEDIOCRE (one or two stages are missing OR the stages are in the wrong order, OR the explanations are not clear OR the explanations are irrelevant)
- d) UNACCEPTABLE (more than two stages are missing AND the order is incorrect AND the explanations are not clear AND/OR they are irrelevant)

DESIGNING & MANAGING MCQS

- Level 6: Evaluation

Example:

A 5 year old girl is admitted in coma. Blood investigations reveal Na^+ 135mEq/L, K^+ 5.3mEq/L, HCO_3^- 10mmol/L, pH 7.10, pCO_2 32mm Hg, pO_2 96mm Hg. Which one of the following acid base disorders is present in the patient?

- (a) Uncompensated metabolic alkalosis
- (b) Compensated metabolic alkalosis
- (c) Uncompensated metabolic acidosis
- (d) Compensated metabolic acidosis

DESIGNING & MANAGING MCQS

■ Level 6: Evaluation

Example:

A 35 year old woman has taken anti-thyroid drugs for six months for thyrotoxicosis. She has a friend who has been successfully treated with radio-iodine. She also frequently forgets to take her drugs and wants to stop them to have radio-iodine treatment. Give your value judgment on each of the following options.

- (a) She should be told that because of her age radio-iodine is best avoided.
 - (b) The problems associated with radio-iodine should be discussed with her.
 - (c) Surgery as a possible alternative should be discussed with her.
 - (d) She should be advised that some form of further treatment is required.
 - (e) You should find out more about her friend's treatment.
- Option (b), (c), (d) are correct & (a), (e) are incorrect.

DESIGNING & MANAGING MCQS

■ Level 5: Synthesis

A new non steroidal anti inflammatory drug (NSAID) is developed for rheumatoid arthritis. In a pilot randomized placebo controlled study, the following were noted:
treatment group-45improved, 18 did not. Placebo group – 34 improved, 26 did not, Choose one of the following from the alternatives given below:

- (a) The results are obviously in favour of the drug having an effect. Therefore, statistical analysis is not needed.
- (b) **Chi square test would be a useful test.**
- (c) Pearson's coefficient of linear regression should be used to calculate significance.
- (d) The numbers are too small for meaningful statistical analysis.

PRINCIPLES INVOLVED IN FORMULATION OF MCQs

- 1) Is the test to be formative or summative?
- 2) What is the intended learning outcome?
- 3) How will students complete the test?
- 4) How will the test be marked?
- 5) How will the test be scored?
- 6) Are students used to the MCQ format?

GUIDELINES FOR WRITING GOOD MCQs

1. Subject knowledge
2. Learning goals
3. Target group

TECHNIQUES FOR WRITING MCQs

1. Do not set it in isolation.
2. It is advisable to break the subject matter into a number of small topics.
3. Arrange topics in order of importance.
4. Decide on the ability/level of knowledge to be tested.
5. Select the type of MCQ depending on the ability/level of knowledge to be tested.
6. Plan the question'
7. Ensure that the question deals with an important aspect of the subject and test knowledge around the central theme in each question
8. Difficulty level

DIRECTION FOR CONSTRUCTION OF MCQs

- Writing stems
- Writing options
- Ongoing item development

MCQ Writing Guidelines

- Content concerns
- Style concerns
- Writing the stem
- Writing the choices

CHECK LIST FOR FORMULATION OF MCQs

Item as a whole

1. Does the MCQ paper cover the learning objectives of the course?
2. Has the marking pattern been defined?
3. Is this the most appropriate type of MCQ to use for the test?
4. Is the language simple and clear?
5. Is each MCQ wholly independent of others?
6. Are all unrelated details eliminated?
7. Does the MCQ test an important learning outcome/important content area?
8. Is it specific?
9. Is the level of difficulty/discrimination appropriate?
10. What is the appropriate time for the item?
11. Are there any verbal clues, which suggest the correct answer?

STEM

1. Is it brief and free of irrelevant material?
2. Does it present a meaningful problem?
3. Is it clear, concise and unambiguous?
4. Does it contain a complete sentence or an idea and not merely a single word?
5. Have ambiguous expressions been avoided?
6. Have all common elements been placed in the stem?
7. Have words like never, always, usually, sometime, etc., been used with caution?
8. Is it stated in positive terms (if possible)? Has negative wording, if used, been given special emphasis (bold, capitalized and underlined).
9. Is the reading time kept to a minimum?

OPTIONS

1. Are the choices grammatically consistent with the stem?
2. Are they logical?
3. Are they plausible and internally consistent?
4. Are numerical options arranged in numerical order, i.e., ascending/descending order?
5. Are all distractors functional?
6. Are the choices similar in length and form?
7. Have 'none of the above' and 'all of the above' been avoided? If used, has care been exercised?
8. Are the choices brief and free of unnecessary words?

KEY

1. Is there only one correct or clearly the best answer?
2. Has the location of the key been evenly distributed in the MCQ paper?
3. Is the key to an MCQ provided by data in another MCQ?
4. Is care taken not to use words in the key which are synonyms or very similar to words in the stem?

Content Concerns

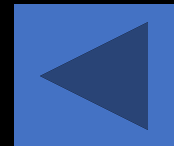
1. Should reflect single content
2. Important non-trivial content
3. Use novel material, paraphrase
4. Keep items independent
5. Avoid opinion-based items
6. Avoid trick items
7. Keep vocabulary simple

Avoid Trick Items

- A trick item is...
 - Trivial content
 - Too difficult discrimination
 - Multiple correct answers
 - High ambiguity
- Ammunition for students who did poorly on a test

Writing the Stem

1. Clear directions
2. Central idea in stem not choices
3. Avoid window dressing
4. Word stem positively



Distractor efficiency

- The distractors are important components of an item, as they show a relationship between the total test score and the distractor chosen by the student.
- Distractor efficiency is a tool that tells whether the item was well constructed or failed to perform its purpose.
- The quality of distractors influences student performance on a test item. Ideally low scoring students who have not mastered the subject should choose the distractors more often whereas high scorers should discard them more frequently while choosing the correct option.
- Any distractor that has been selected by less than 5% of the students is considered to be non-functioning distractor (NF-D)

SPECIFIC DIRECTIONS FOR WRITING STEMS

1. Design on important areas of knowledge-

Example:

Which one of the following clinical pictures is associated with complement abnormalities?

- (a) C1-esterase deficiency and hypersensitivity type 3 reactions.
- (b) C3-nephritic factor and partial lipodystrophy.
- (c) Homozygous C3 deficiency and meningococcal meningitis.
- (d) Homozygous

SPECIFIC DIRECTIONS FOR WRITING STEMS (cont...)

2. Avoid questionable interpretations

There should be complete agreement on the correct response.

Example:

(i) What is the level of Hb (g/dL) which is taken as a 'transfusion trigger' in a patient with acute blood loss?

(a) 5

(b) 6

(c) 7

(d) 8

(ii) How many bronchopulmonary segments are found in the left lung?

(a) 7

(b) 8

(c) 9

(d) 10

Writing the Choices

1. Write as many plausible choices as you can (3 is enough)
2. Only one correct answer
3. Vary the location of correct answer
4. Keep choices independent
5. Homogenous options (grammar and content)
6. Place choices in logical or numerical order
7. Keep choices length equal
8. Avoid **All of the above**
9. Use **None of the above** carefully
10. Avoid giving clues
11. Make all distracters plausible

SPECIFIC DIRECTIONS FOR WRITING STEMS (cont...)

3. Avoid asking two questions at the same time

Example:

Which one of the following occurs in nephrotic syndrome and small cell carcinoma?

- (a) Hyponatremia
- (b) Hypernatremia
- (c) Hypokalemia
- (d) Hyperkalemia

SPECIFIC DIRECTIONS FOR WRITING STEMS (cont...)

4. State the problem clearly, simply and as concretely as possible

Example:

Which one of the following isoenzymes is maximally increase after myocardial infarction?

(a) CK-BB

(b) CK-MB

(c) CK-MM

(d) CK-Mt

SPECIFIC DIRECTIONS FOR WRITING STEMS (cont...)

4. State the problem clearly, simply and as concretely as possible

Example: Polysaccharides

- (a) Are made up of smaller units called monosaccharide
- (b) Are found in proteins.
- (c) Are utilized during photosynthesis.
- (d) Can be described by the chemical formula $(CH_3O)_n$.

SPECIFIC DIRECTIONS FOR WRITING STEMS (cont...)

4. State the problem clearly, simply and as concretely as possible

Improved question:

Which one of the following statements is true regarding polysaccharides?

- (a) They are made up of smaller units called monosaccharide.
- (b) They are found in proteins.
- (c) The process of photosynthesis requires polysaccharides.
- (d) The chemical formula (CH_3O) is used to describe polysaccharides.

SPECIFIC DIRECTIONS FOR WRITING STEMS (cont...)

5. Keep the reading time to a minimum

Example:

Even if a 28 year old female patient is cured of her Hodgkin's disease, she will be at increased risk for certain infectious complications due to her splenectomy. Which one of the following might be a particular problem in this patient of Hodgkin's disease?

- (a) Salmonella osteomyelitis
- (b) Rocky mountain spotted fever
- (c) Pneumococcal septicemia
- (d) nocardiosis

SPECIFIC DIRECTIONS FOR WRITING STEMS (cont...)

5. Keep the reading time to a minimum

Improved question:

The stem can be reframed as ‘Which one of the following complications can arise after splenectomy in a patient of Hodgkin’s disease?’

SPECIFIC DIRECTIONS FOR WRITING STEMS (cont...)

6. Place all common elements in the stem

Example:

(i) Maximum urea clearance in a healthy adult averages about

(a) 65mL /min

(b) 75 mL /min

(c) 85 mL /min

(d) 95 mL /min

Improved question:

In a healthy adult, maximum urea clearance(mL /min) averages about

(a) 65

(b) 75

(c) 85

(d) 95

SPECIFIC DIRECTIONS FOR WRITING STEMS (cont...)

6. Place all common elements in the stem

Example:

Hyperplasia is defined

- (a) As a change resulting from an increase in the number of cells.
- (b) As a change resulting from an increase in the size of cells.
- (c) As change resulting form an increase in the number of mitotic figures.
- (d) As a change resulting from increase in the nuclear-cytoplasmic ration.

SPECIFIC DIRECTIONS FOR WRITING STEMS (cont...)

6. Place all common elements in the stem

Improved question;

Hyperplasia is defined as a change resulting from an increase in the

- (a) number of cells
- (b) size of cells.
- (c) number of mitotic figures.
- (d) nuclear-cytoplasmic ration

SPECIFIC DIRECTIONS FOR WRITING STEMS (cont...)

7. Avoid stereotyped phraseology, as rote responses are usually based on verbal stereotypes

Example:

What is the biological theory of recapitulation?

The correct answer is 'Ontogeny repeats phylogeny'.

SPECIFIC DIRECTIONS FOR WRITING STEMS (cont...)

8. The stem may be written as a direct question or an incomplete statement

Example:

Which one of the following samples will have the highest concentration of glucose?

- (a) Venous whole blood
- (b) Capillary whole blood
- (c) Venous blood plasma
- (d) Capillary blood plasma

SPECIFIC DIRECTIONS FOR WRITING STEMS (cont...)

9. Avoid including nonfunctional words

Example:

There are eight essential amino acids. One of them is

(a) Alanine

(b) Methionine

(c) Tyrosine

(d) Proline

Improved question

Which one of the following is an essential amino acid?

(a) Alanine

(b) Methionine

(c) Tyrosine

(d) Proline

SPECIFIC DIRECTIONS FOR WRITING STEMS (cont...)

10. Avoid unnecessary and irrelevant material

Example:

Hyperparathyroidism which is associated with groans, bones, stones and psychic moans, shows which one of the following serum biochemical profiles?

- (a) High calcium and high phosphate
- (b) High calcium and low phosphate
- (c) Low calcium and low phosphate
- (d) Low calcium and high phosphate

SPECIFIC DIRECTIONS FOR WRITING STEMS (cont...)

Improved question:

Which one of the following serum biochemical profiles is seen in hyperparathyroidism?

- (a) High calcium and high phosphate
- (a) High calcium and low phosphate
- (b) Low calcium and low phosphate
- (c) Low calcium and high phosphate

Designing Scenario Based question Paper

- Age, gender (e.g., 45-year-old man)
- Site of care (e.g., the emergency department)
- Presenting complaint (e.g., headache)
- Duration of complaint (e.g., 2 days)
- Patient history, including past medical history, family history, psychosocial history, and review of systems if important and plausible for the scenario
- Physical findings
- Results of diagnostic studies
- Initial treatment, subsequent findings

Essential clinical details

Make sure the item stems adhere to the following rules:

- Focuses on important concepts rather than trivial facts
- Can be answered without looking at the options
- Includes all relevant facts; no additional data should be provided in the options
- Is not “tricky” or overly complex
- Is not negatively phrased (e.g., avoid using except or not in the lead-in)

Use of Real Patients

- Item writers should be careful when basing vignettes on real patients, particularly for tests aimed at students.
- As a general rule, real patients are complicated, and the elements that are complicated are not always those that are important for assessment.
- It is fine to sometimes include window dressing, such as incidental findings, but item writers should note that real patients often have “red herrings” among their findings.

• A 52-year-old woman comes to the emergency department because of a 1-week history of low-grade fever and increasing abdominal cramps that are exacerbated by bowel movements. She began a course of amoxicillin-clavulanate and metronidazole 2 days ago but has had no relief of her symptoms. She has had intermittent constipation for the past 12 years. She has not had nausea, vomiting, urinary symptoms, or bloody stools. She has a 3-year history of hypertension. She underwent total abdominal hysterectomy and bilateral salpingo-oophorectomy 5 years ago because of leiomyomata uteri. She is 165 cm (5 ft 5 in) tall and weighs 86 kg (190 lb); BMI is 32 kg/m². Her temperature is 38.1°C (100.6°F), pulse is 75/min, and blood pressure is 150/80 mm Hg. The lungs are clear to auscultation. Cardiac examination shows no abnormalities. The abdomen is soft, and there is tenderness to palpation of the left lower quadrant with guarding but no rebound. Bowel sounds are normal. The stool is brown, and test for occult blood is negative. Her hemoglobin concentration is 14.5 g/dL, leukocyte count is 15,000/mm³, and platelet count is 280,000/mm³; serum studies and urinalysis show no abnormalities. Which of the following is the most appropriate next step in diagnosis?

- (A) Examination of the stool for ova and parasites
- (B) Test of the stool for *Clostridium difficile* toxin
- (C) Endoscopic retrograde cholangiopancreatography
- (D) Pelvic ultrasonography
- (E) CT scan of the abdomen with contrast
- (F) Colonoscopy

Example Items: Sequential Questions

- A 35-year-old woman is brought to the emergency department because of worsening pain and swelling of her right knee for the past 2 days. She has been taking acetaminophen for the knee pain during the past 2 days, but the pain is worse today.
- She has not had any trauma to the knee or any previous problems with her joints.
- She is otherwise healthy and she currently takes an oral contraceptive. She is sexually active and has a 10-year-old son who lives with her.
- She is a receptionist at a local hotel and she tells you she must stand often while working.
- She is 160 cm (5 ft 3 in) tall and weighs 52 kg (115 lb); BMI is 20 kg/m². Temperature is 37.9°C (98.9°F).
- The right knee is erythematous, swollen, and tender; there is pain on movement. No other joints are affected.
- X-ray of the knee shows an effusion but no structural abnormalities of the joint. Which of the following is the most appropriate next step in diagnosis?
 - (A) Arthrocentesis of the knee
 - (B) Blood cultures
 - (C) Complete blood count
 - (D) MRI of the knee
 - (E) Urine cultures

Example Items:

Sequential Questions 2

- Arthrocentesis is done. The synovial fluid is cloudy. Gram stain is negative. Analysis of the synovial fluid shows a leukocyte count of 120,000/mm³ and 90% neutrophils. Which of the following is the most appropriate additional test on the synovial fluid?
 - (A) Culture for bacteria
 - (B) Glucose measurement
 - (C) Polarized light microscopy
 - (D) Protein level



Clinical scenarios for basic Sciences

Histology

- *A 42-year-old man was found to have an unexplained abnormality of his liver function tests. He underwent a liver biopsy that was reported as normal.*
 - *What cell type most likely predominated in the specimen? OR (with an image)*
 - *What structure does the arrow most likely indicate? OR*
 - *Which arrow best identifies a Kupffer cell?*

Anatomy and histology

- *A 67-year-old man underwent laparotomy for abdominal pain. He was found to have a gastric tumour eroding through the posterior wall of his stomach.*

What adjacent organ was most likely affected?

- *A 19-year-old man reported numbness over the dorsolateral hand after being stabbed in the lateral aspect of the right upper arm.*

What nerve was most likely affected?

Physiology

- *A 25-year-old woman developed chronic renal failure from glomerulonephritis. The doctor inferred that damage to the kidney's proximal convoluted tubule system had impaired a particular function of the kidney.*
- *What normal function was most likely affected?*

ests suggested that the glomerular filtration rate had fallen by 90% from normal.

What is the best estimate of her filtration rate?

Clinical pharmacology

- *A 67-year-old man was taking a regular medication for congestive heart failure. The doctor identified this drug as a phosphodiesterase inhibitor, which prevents the inactivation of an intracellular second messenger in cardiac myocytes.*
- *What is the most likely identity of this second messenger?*
 - A.adenylyl cyclase*
 - B.creatine kinase*
 - C.cyclic AMP*
 - D.cyclo-oxygenase*
 - E.phospholipase*
- *Answer C – cyclic AMP*

Microbiology

- *A 32-year-old man developed a Plasmodium malariae infection after visiting the Gambia. He had taken appropriate precautions and so asked how the infection could have occurred. The doctor used a diagram of the organism's life cycle to explain this, including the stage of development at the time of transmission by the mosquito.*
 - *What stage in the organism's life cycle did the doctor most likely highlight?*

Question with a 'redundant' scenario.

A 32-year-old man with generalised weakness had a biopsy taken from his quadriceps muscle, which was examined using electron microscopy. The pathologist reported an abnormal appearance of the Golgi apparatus. What is the main role of the Golgi apparatus?

- A controls amino acid breakdown
- B. controls lipid breakdown
- C. controls protein processing
- D. initiates protein assembly
- E. initiates protein breakdown

Answer C – controls protein processing

This is basic science question with a 'redundant' scenario; the candidate needs only to read the lead-in in order to answer the question.

Question with an 'essential' scenario

A 32-year-old man with generalised weakness underwent a muscle biopsy that identified an abnormality of the Golgi apparatus.

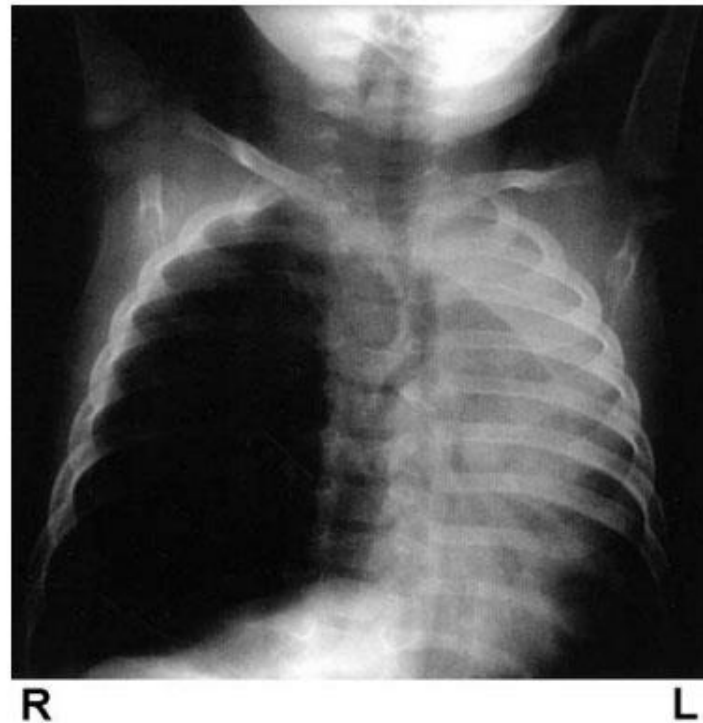
What cellular function was most likely to be abnormal?

- A. amino acid breakdown
- B. lipid breakdown
- C. protein assembly
- D. protein breakdown
- E. protein processing

Answer E – protein processing

This is the same basic science question but now the scenario is 'essential'; the candidate must read the whole question to identify the best answer.

- Image based Scenarios
- Video based scenarios
- Clinical skill Evaluation MCQs



61. A 4-year-old boy with asthma becomes limp during treatment with inhaled albuterol in the emergency department. Ten minutes ago, he received intravenous methylprednisolone for an acute exacerbation, and he was alert and oriented at that time. He received the diagnosis of asthma 2 years ago and has been admitted to the hospital for acute exacerbations eight times since then. Current medications include albuterol and montelukast. He appears pale and gasps and moans as he attempts to breathe. He responds to voice. His temperature is 36°C (96.8°F), pulse is 160/min and thready, respirations are 18/min, and blood pressure is 50/20 mm Hg. The skin is cold to the touch. Pulmonary examination shows poor air movement, especially on the left. No wheezes are heard. The point of maximal impulse is 2 cm to the left of the midclavicular line in the sixth intercostal space. A chest x-ray is shown. Which of the following is the most likely underlying cause of this patient's hypotension?
- (A) Adverse effect of albuterol
 - (B) Adverse effect of methylprednisolone
 - (C) Atelectasis of the left lung
 - (D) Decrease in cardiac output
 - (E) Severe bronchospasm



49. A 56-year-old man has had the painful weeping rash shown for 2 days. He underwent chemotherapy for non-Hodgkin lymphoma 1 year ago. His temperature is 36.7°C (98°F), pulse is 80/min, and blood pressure is 138/76 mm Hg. Examination shows no other abnormalities. Which of the following is the most likely diagnosis?
- (A) Herpes zoster
 - (B) Impetigo
 - (C) Pyoderma gangrenosum
 - (D) Syphilis
 - (E) Systemic lupus erythematosus

Choice of Therapy



84. A 67-year-old woman comes to the physician 1 month after noticing a nontender nodule on the back of her left hand. She initially thought it was an insect bite, but it has grown in size over the past week. It bleeds when she picks at it. She has no history of serious illness. She lives in a retirement community in Florida and frequently plays golf and tennis. Examination of the dorsum of the left hand shows a 2.5-cm lesion. Photographs of the lesion are shown. Which of the following is the most appropriate next step in management?

- (A) Observation
- (B) Topical application of fluorouracil
- (C) Sentinel lymph node biopsy
- (D) Cryosurgery
- (E) Excision of the lesion



Competency based Scenarios for MCQ designs

Competency: Medical Knowledge/Scientific Concepts: Applying
Foundational Science Concepts Content Area: Cardiovascular System

- A 55-year-old man has had crushing substernal chest pain on exertion over the past 6 weeks. He had a myocardial infarction 2 months ago.
- He takes nitro-glycerine as needed and one aspirin daily. He has smoked two packs of cigarettes daily for 30 years.
- Examination shows normal heart sounds and no carotid or femoral bruits.
- Treatment with a β -adrenergic blocking agent is most likely to improve his symptoms due to which of the following mechanisms?
 - (A) Decreasing myocardial contractility
 - (B) Dilating the coronary arteries
 - (C) Peripheral vasodilation
 - (D) Preventing fibrin and platelet plugs

Competency: Patient Care: Management: Pharmacotherapy

Content Area: Hematopoietic and Lymphoreticular System:

Adverse effects of drugs

- A 55-year-old woman with small cell carcinoma of the lung is admitted to the hospital to undergo chemotherapy. Six days after treatment is started, she develops a temperature of 38°C (100.4°F). Physical examination shows no other abnormalities. Laboratory studies show a leukocyte count of 100/mm³ (5% segmented neutrophils and 95% lymphocytes). Which of the following is the most appropriate pharmacotherapy to increase this patient's leukocyte count?
 - (A) Darbepoetin
 - (B) Dexamethasone
 - (C) Filgrastim
 - (D) Interferon alfa
 - (E) Interleukin-2 (IL-2)
 - (F) Leucovorin

Competency: Professionalism Content Area: Social Sciences

- A 45-year-old man comes to the physician for HIV testing. He says that he has been having an extramarital affair with a woman for 6 months, and he hopes this affair will continue because it has made him very happy. He has no plans to tell his wife about the affair. The wife is also a patient of the physician. Physical examination shows no abnormalities, and the result of a serum HIV antibody test is negative. Which of the following is the most appropriate action by the physician?
 - (A) Alert the local public health department to the patient's activities
 - (B) Explain to the patient that one of them must tell the wife about the affair for her own safety
 - (C) Refer the patient for counselling
 - (D) Say nothing about the affair to anyone other than the patient
 - (E) Tell the patient's wife about the affair so she can make an informed decision about possibly being placed at risk in the future

Competency: Patient Care: Management - Clinical Interventions Content Area: Female Reproductive & Breast

- A previously healthy 27-year-old nulligravid woman comes to the emergency department because of a 2-day history of moderate-to-severe pain and swelling of the left labia.
- She is sexually active and uses condoms inconsistently. Her temperature is 37.2°C (99°F), pulse is 92/min, respirations are 18/min, and blood pressure is 115/75 mm Hg.
- Pelvic examination shows a 4 x 3-cm, tender, fluctuant mass medial to the left labium majora compromising the introital opening.
- Which of the following is the most appropriate next step in management?
 - (A) Administration of intravenous metronidazole
 - (B) Administration of intravenous penicillin G
 - (C) Ultrasound-guided needle aspiration of the mass
 - (D) Incision and drainage
 - (E) Vulvectomy

Competency based Scenarios for MCQ designs are applied world over

- USMLE questions
- MRCP questions
- AMC questions