

MCAT Strategy Workshop:

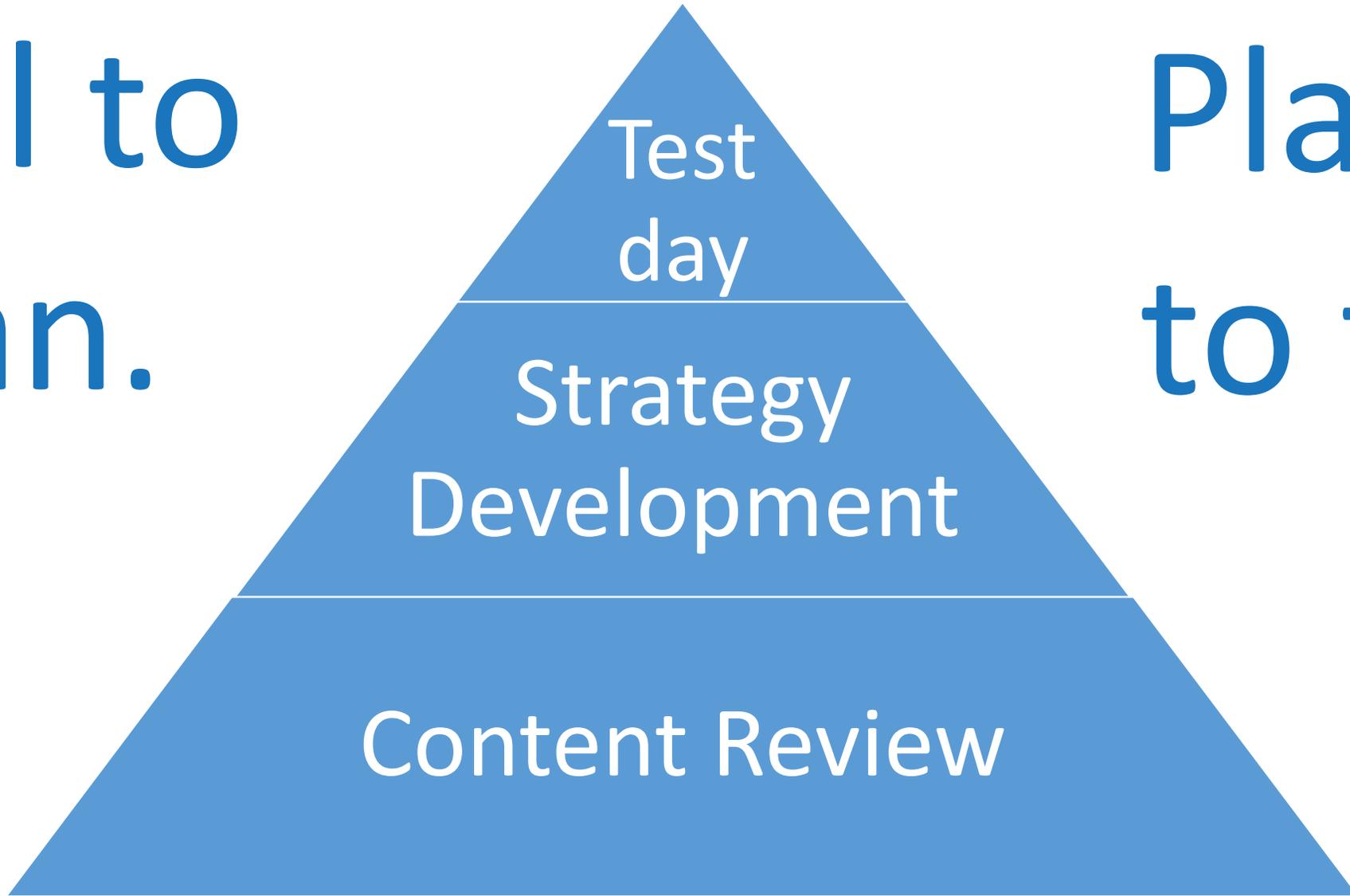
Critical Analysis and Reasoning

Introductions

- Dr. Anthony LaFond, MD-PhD.
- Director of MCAT Content for Next Step
- Worked with thousands of MCAT students over the last 10+ years
- Personally achieved a 42 MCAT



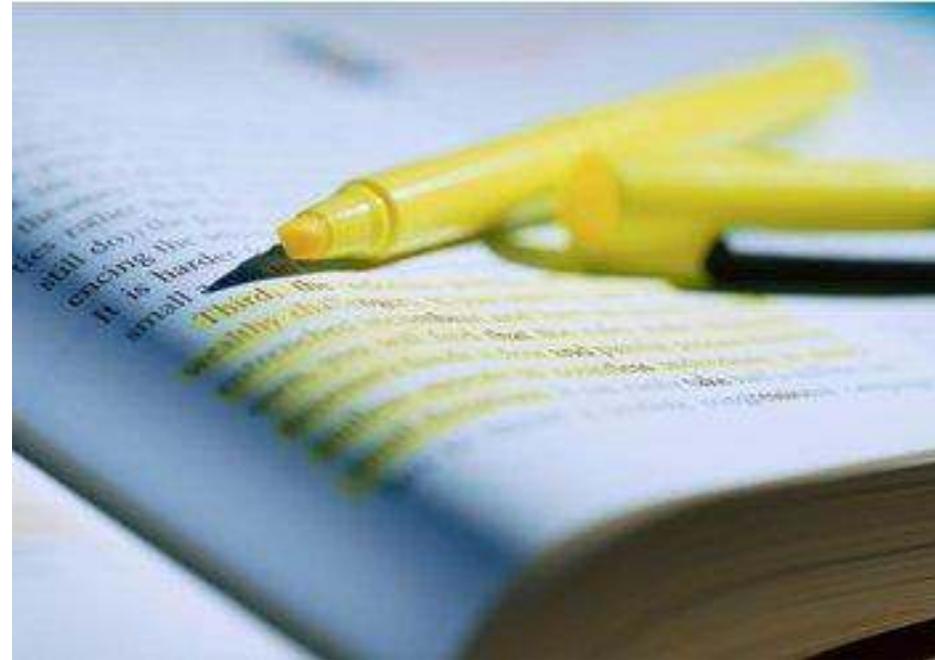
Fail to
plan.



Plan
to fail.

How to highlight

- Read briskly, use highlighter to capture key points!
- What to look for:
 - Opinion
 - Points of contrast
 - Cause and effect!



While the central otherworldly concerns of the Taoist religion have led some commentators to assert that Taoism is a religion “without religious texts”, nothing could be further from the truth. The key texts of Taoism may lack the same coherence and historicity of the Talmud or the Qur’an, but there are nonetheless various works that have profound influence, and no small authority among nearly all Taoist sects.

It goes without saying that the Tao Te Ching is the central work of all Taoist religion. Despite two and a half millennia of debate over its origins, authorship, and date of origin, it remains the foundational work of Taoist philosophy and a central component of Taoist ritual. So important is this work that even commentaries on it (themselves many hundreds of years old) have become important religious texts themselves.

If the Tao Te Ching lays down the foundational ideas of Tao and Te themselves, the practical application of these ideas in life is more fully explored in the Zhuangzi and the I Ching. The Zhuangzi, much like the Tao Te Ching, has an ancient origin (ca. 400 AD) shrouded in no small amount of legend. Supposedly written partly by Zhuangzi himself and later expanded by his disciples, the work eschews the abstract poetry of the Tao Te Ching. Instead, it uses more down-to-earth parables and short dialogues to help readers bring their lives into alignment with the concept of tzu-jan, or naturalness, in their daily lives. It also encourages following the Tao of the elements.

Unlike the Zhuangzi, or any other Taoist text, the I Ching predates the Tao Te Ching by centuries. The system of fortune-telling described in the I Ching dates to somewhere in the 12th century BCE. The I Ching is meant to guide practitioners in choosing right action based on some understanding of the current situation and the future. Early in Taoist development, Taoist scholars adopted the I Ching as their own and advocated it as a central text through which one could meditate on the right way. The cosmological notions at the foundation of the I Ching became so intermingled with Taoist cosmology and Yinyangism over time that by the 16th century there was no meaningful distinction for most practitioners.

Finally, in addition to these three core texts, scholars in the fourth and fifth centuries A.D. attempted to collate all major texts, commentaries, manuscripts, and apologies into a single collection. This work came to be known as the Tao Tsang, typically translated as “Treasury of Tao” or “Taoist Canon”. The Tao Tsang was collected and re-collected many times over the centuries but scholars generally recognize four major Tao Tsangs. The first, compiled circa 400 AD consisted of a bit more than a thousand scrolls and developed the tripartite division that would remain through future efforts. The second and third Tao Tsangs expanded the collection to nearly 5000 separate scrolls and the fourth and final Tao Tsang of 1444 in the Ming Dynasty settled the compilation at just under 5300 works.

The Tao Tsang (all four major compilations) divides its constituent works into three broad categories, typically termed “grottoes” each of which is split into a dozen chapters. The three grottoes are concerned with meditation, rituals, and exorcisms, with meditation always considered the highest and most pure set of writings. When someone is working to be initiated as a Taoist master, the grotto of meditation includes the writings used in the final phase of training.

1. Which of the following best characterizes the author's attitude towards the position the Tao Te Ching holds among Taoist texts?

- A) Assurance of its foremost position
- B) Tentative belief of its status as the least important text
- C) Studied agnosticism about its relative position
- D) Ignorance about how it relates to other texts

2. Suppose archaeologists discover a previously unknown text that discusses Taoist themes and advocates for the practice of Taoist rituals. The author would be *least* likely to believe which of the following about this text?

- A) Such a text would have been incorporated into the Tao Tsang if the compilers had known of it.
- B) The text may have been written at about the same time as the I Ching.
- C) Any discussion of cosmology included in the new text may have significant overlap with important themes of the I Ching and Yinyangism.
- D) It may have been considered an important religious text in its own right if it were an influential commentary on the Tao Te Ching.

3. The author asserts that the major difference between the Tao Te Ching and the Zhuangzi is that the:

- A) Zhuangzi attempts to show how to apply Taoist concepts in daily life by using short, abstract poems.
- B) Tao Te Ching developed after the Zhuangzi as a distillation of the core concepts of Tao and Te expressed in the Zhuangzi.
- C) Zhuangzi attempts to be more practical, both in its subject-matter and in its style.
- D) Tao Te Ching requires its readers to have fully contemplated the works of the meditation grotto for full appreciation.

4. Which of the following would most *weaken* one of the author's central arguments?

A) In several major schools of Taoist teaching, the grotto of meditation is taught as the middle grotto in the progression towards becoming a master, with the final grotto being the grotto of rituals.

B) The parables presented by the Zhuangzi are held as infallible representations of the Tao in action in daily life, and questioning the core truth of these stories is typically punished by banishment from the community.

C) During Taoist ceremonies, the priest's copy of the Tao Te Ching is treated reverently, placed on a special dais between readings, with only the priest being permitted to touch the book.

D) Despite the existence of many works that discuss Taoist themes, the texts themselves are not seen as sacred by most Taoists and the ideas expressed in these works are taken as general guidance that can be disregarded by any local priest or follower of the religion.

5. According to the passage, which of the following can be inferred regarding Taoist religious texts?

I. The Tao Te Ching lacks the historicity of the Qur'an.

II. The authorship and structure of the Zhuangzi, unlike the Tao Te Ching, has been clearly established by historians.

III. The Tao Tsang lacks the coherence of the Talmud.

A) I only

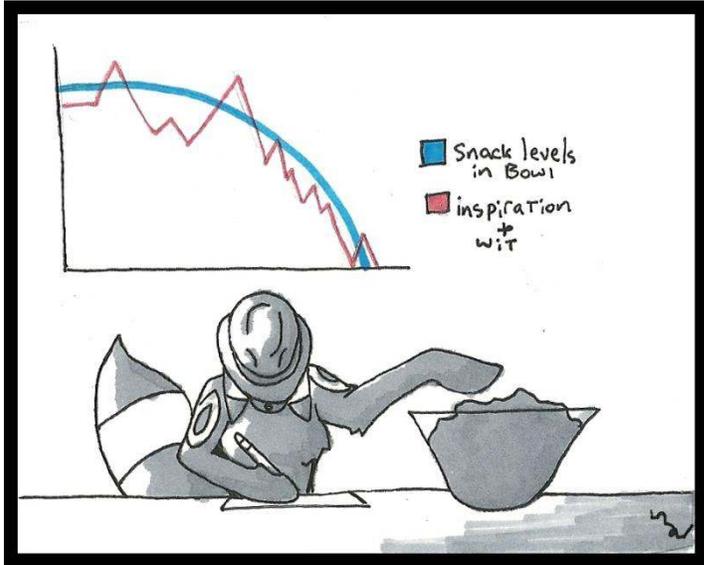
B) II only

C) I and III only

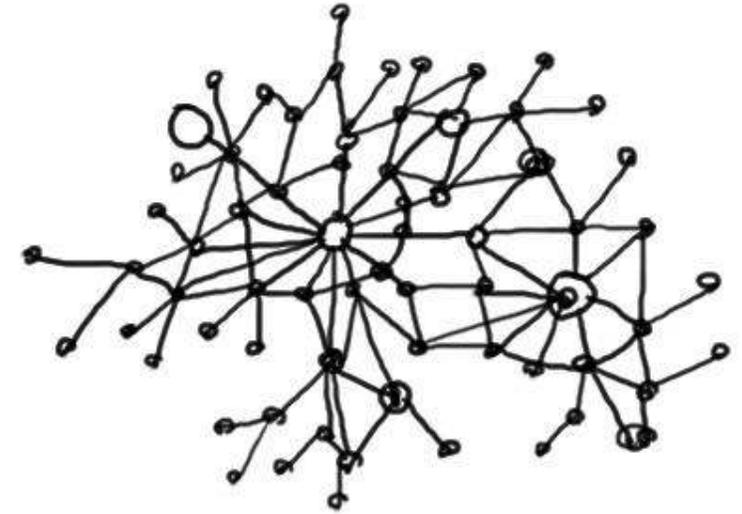
D) I, II and III

When taking notes, focus on:

Correlations



Connections



Cause and Effect

Passage 2

If a drug company could take all of the positive effects of exercise and put them into a pill, they'd be the most successful company in history. It is, in fact, nearly impossible to overstate the positive effects that regular exercise has on nearly every facet of the body's physiological and the mind's psychological state. Exercise has been demonstrated to not just slow the progression of, but to reverse, many of the symptoms of type 2 diabetes, heart disease, high cholesterol, and hypertension. It can delay the onset of dementia, reduce symptoms of anxiety and depression disorders, and aid in smoking cessation programs.

And yet when patients meet with their physicians, the overwhelming majority of primary care doctors fail to discuss the importance of exercise with patients. To the extent that the topic is discussed at all, the doctor will make, at best, passing remarks about the importance of an exercise program. Even more perversely, there is a strong correlation between lower economic class and decreased likelihood of physician-recommended exercise programs, despite the even stronger correlation between lower economic class and many of the diseases that exercise would most directly benefit (most notably obesity and type 2 diabetes). That is to say, those patients who most need regular exercise are the ones least likely to have a doctor that strongly recommends such a program.

Why this connection exists is still somewhat unclear, although research is slowly shedding light on the topic. Fundamentally, public health scientists examine two different facets of the correlation: patient-sided factors and healthcare provider-sided factors. Thus, working and lower class patients may not have access to the kind of doctors that will recommend exercise, or doctors may change how they treat patients based on perceived economic class.

To date, research seems to suggest both of these factors work in concert. In a groundbreaking study at the University of Arizona College of Medicine, experimenters created audio recordings of over 5,000 patient-physician interactions for patients that were classified as obese. The patient population was categorized into three broad categories of economic class based on income. Researchers found that physicians were 22% more likely to discuss exercise regimens with the high-class patient group than the lowest, and that when exercise was discussed, doctors spent a staggering 420% more time in conversation about exercise with the high economic class group than either the middle or low class group. Despite these stark findings, the researchers' failure to control for factors of ethnicity and gender have created large enough concerns about methodological validity to lead some critics to dismiss the study entirely.

More promising are results obtained from examining the patient-sided factors, including frequency of patient-initiated discussions about exercise programs and patient access to high quality primary care. Here, surveys of both patients and healthcare workers have demonstrated a strong correlation between a patient's economic class and their likelihood of initiating a conversation about exercise with their healthcare provider. This correlation seems to exist regardless of the health status of the patient, and any similarities between the patient and provider in terms of demographic categories. The findings suggest, perhaps, that patients from higher economic classes are simply more comfortable initiating conversations with their healthcare professionals.

A final irony was revealed in the most recent major study published on the topic, which found no correlation between a patient's ability to start and stick with an exercise regimen and how frequently such programs were discussed with healthcare professionals.

6. In the study discussed in the fourth paragraph, the researchers created audio recordings of the doctor-patient interactions in order to:

A) prove that physicians unconsciously discriminate against lower class patients by not discussing exercise with them.

B) determine differences in doctor-patient interactions when the doctor and patient are of the same or of different ethnicities.

C) ascertain whether doctors were more likely to discuss exercise regimens with obese male patients than with obese female patients.

D) assess both how often exercise was discussed and for how much time it was discussed.

7. Which of the following studies would provide the best evaluation of the author's speculations at the end of the fifth paragraph?

- A) A study examining how frequently patients ask physicians about medications other than the ones initially recommended by the doctor
- B) A cross-sectional study that correlates ethnicity and gender with frequency of implementation of doctor-recommended exercise plans
- C) A survey asking patients how many members of their immediate family are healthcare workers that specialize in exercise-based fields such as physiatry or physical therapy
- D) A longitudinal study that follows three different groups who are given three different doctor-prescribed exercise regimens to determine whether they are able to stick with the plan and if not, why not

8. For which of the following statements does the passage provide the least explanation or support?

A) A patient with type 2 diabetes who is trying to quit smoking may be able to improve both of these health factors with regular exercise.

B) Patients who discuss exercise plans with their physician are unable to stick with the plan due to how infrequently they are able to get check-ups with their doctor.

C) Even studies that include a very large amount of data may nonetheless lead to questionable conclusions.

D) Patients' own behavior can influence the likelihood that their doctor will discuss exercise plans with them.

9. The passage author would be most likely to agree with which one of the following assertions?

A) Patients in the lowest economic classes are just as likely to be able to stick with a doctor-recommended exercise plan than patients in the highest economic classes.

B) A female doctor is more likely to discuss an exercise regimen with an obese female patient of lower economic class than a male obese patient from a higher economic class.

C) The positive effects of exercise are overwhelming in the scope and profundity of effect on physiological conditions but are very limited on psychological ones.

D) Had the study described in paragraph 4 been conducted at a different institution the researchers would have been more likely to use more robust controls.

10. Which of the following could serve as an appropriate title for the passage?

- I. Physician-Recommended Exercise Plans: When and Why
- II. The Benefits of Exercise in Addiction Recovery
- III. Doctors and Patients Both Fail to Address Exercise

- A) I only
- B) III only
- C) I and II only
- D) I and III only

Questions?

How Can Next Step Help?

Realistic MCAT Testing Platform

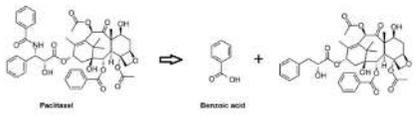
Pause (c) Next Step Pre-Med LLC
Don Johnson FULL LENGTH 1 Remaining Time 01:34:35

Chemical and Physical Foundations of Biological Systems Passage 1 (Questions 1-4)

Pharmaceuticals that disrupt the microtubules of cells during the cell reproduction process can be an important component of treating such medical conditions as Kaposi's sarcoma and ovarian tumors. Paclitaxel is one such example of a pharmaceutical in this category, often known as "mitotic inhibitors."

Research into medicines with bioequivalent properties to paclitaxel could lead to the discovery of ways to achieve similar effects with different molecular substances. One example of such research involved hydrolysis of paclitaxel molecules in an attempt to study the molecule's individual components. A diagram of one of the paclitaxel molecules in question appears below, along with post-hydrolyzed components.

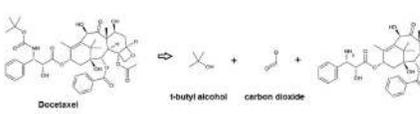
Figure 1 Hydrolyzed products of paclitaxel



Paclitaxel → Benzoic acid + Post-hydrolyzed component

One developed drug that was found to have been roughly bioequivalent to paclitaxel is docetaxel, also in the taxane family. Docetaxel affects the centrosomes of mitotic spindles.

Figure 2 Hydrolyzed products of docetaxel



Docetaxel → t-butyl alcohol + carbon dioxide + Post-hydrolyzed component

Attempts were made to purify a number of the various compounds involved for purposes of further physical and chemical property testing. Further pursuit of the research involved required using a number of chromatography techniques and other separation procedures in order to purify both the precursor chemicals and final products. A precursor step in many of these procedures required the dissolution in water or in ethyl alcohol (ethanol) of pre-separation mixtures. Table 1 shows solubility levels, as well as melting and

Mark

Question 1

Close and Return Don Johnson (c) Next Step Pre-Med LLC

Chemical and Physical Foundations of Biological Systems Passage 1 (Questions 1-4)

Pharmaceuticals that **disrupt the microtubules** of cells during the cell reproduction process can be an important component of treating such medical conditions as **Kaposi's sarcoma** and ovarian **tumors**. **Paclitaxel** is one such example of a pharmaceutical in this category, often known as "**mitotic inhibitors**."

Key terms: Kaposi's sarcoma, Paclitaxel, mitotic inhibitors

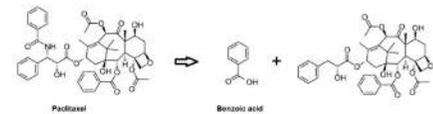
Cause and effect: these drugs inhibit mitosis because they disrupt microtubules

Research into medicines with **bioequivalent** properties to **paclitaxel** could lead to the discovery of ways to achieve **similar effects** with different molecular substances. One example of such research involved hydrolysis of paclitaxel molecules in an attempt to study the molecule's individual components. A diagram of one of the paclitaxel molecules in question appears below, along with **post-hydrolyzed components**.

Key terms: post-hydrolyzed components

Cause and effect: studying the structure can lead to new drugs with equivalent effects

Figure 1 Hydrolyzed products of paclitaxel



Paclitaxel → Benzoic acid + Post-hydrolyzed component

Figure 1 shows us that hydrolysis of paclitaxel yields benzoic acid

Question 1

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Benzoic acid and t-butyl alcohol are both colorless substances at 20°C and at room temperature, as well as at 30°C. Would paper chromatography be an appropriate technique for the separation of benzoic acid from t-butyl alcohol?

A. Yes, because they have different molecular masses and capillary action affects them in different ways.

B. No, because there would not be any visible distinction between the two migrating substances.

C. It depends on whether the chromatography had a thin-layer component.

D. It depends on the pH of the solvent.

40.38% of students answered this question correctly.

Your answer was incorrect

Option	Percentage
A	33.01%
B	40.38%
C	11.64%
D	14.97%

Answer Explanation:

- Difficulty: 2 Medium
- Reasoning Skill: 3 Reasoning About the Design and Execution of Research
- Concept Category: 6C Separations and Purifications

B is correct. Paper chromatography is only effective if there is a visible difference between the substances being separated. Two colorless substances such as benzoic acid and t-butyl alcohol would likely migrate at different speeds, but it would not be possible to identify their positions.

A: The part about having different molecular masses is accurate, and differences in the speed of capillary action can be assumed. However, there would be no way to identify the locations of the substances at the end of the process, since both are colorless. Therefore, paper chromatography would not be helpful in this case.

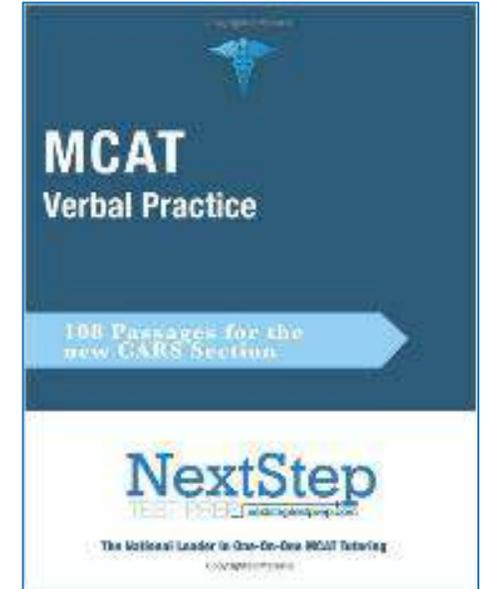
C: The question doesn't state anything about the chromatography including TLC - the question is specifically asking about paper chromatography.

Next Section ▶▶▶ Next ▶ Next Passage ▶▶▶

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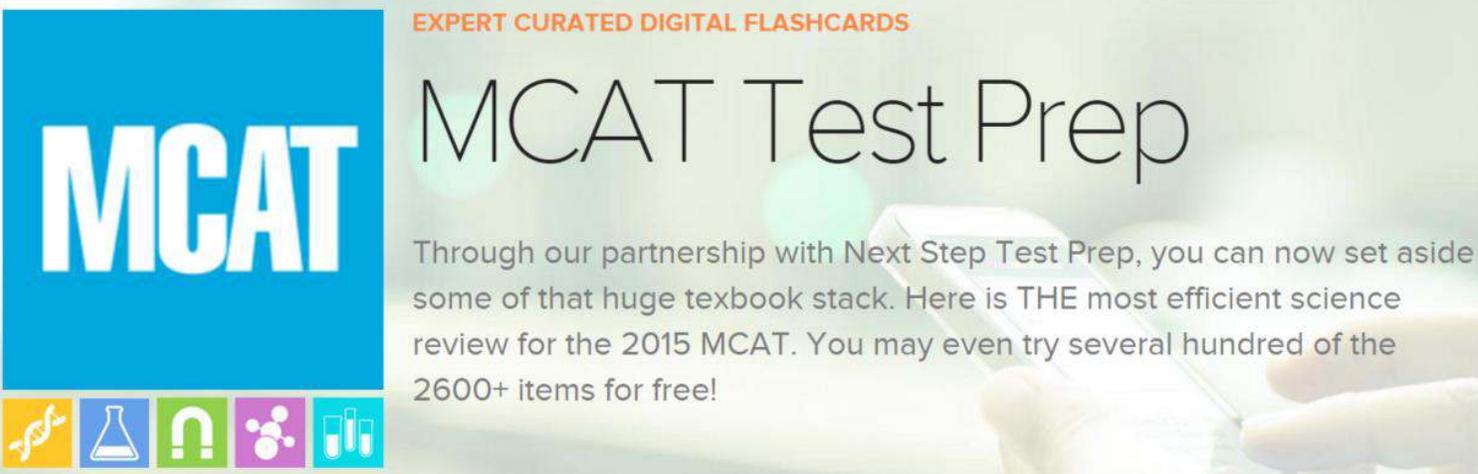
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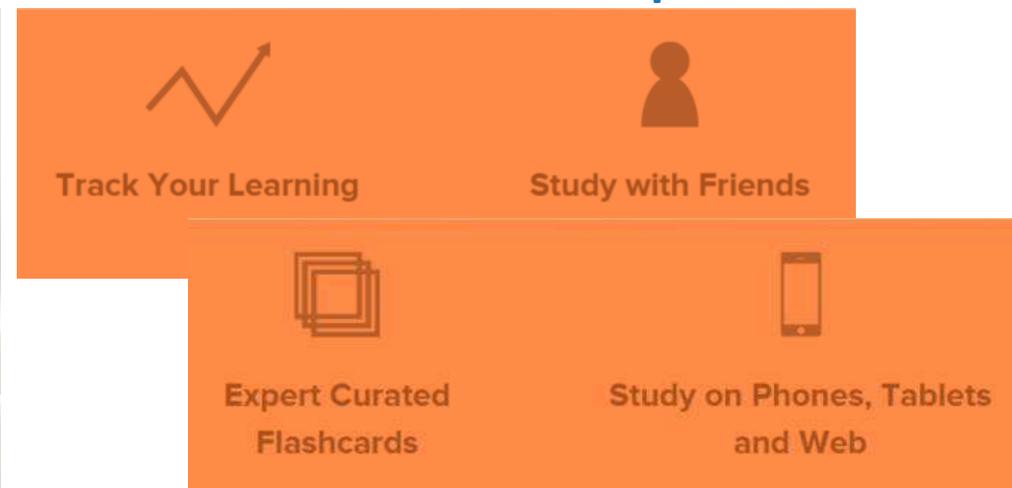


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Icons: DNA, flask, magnifying glass, molecular structure, test tubes.

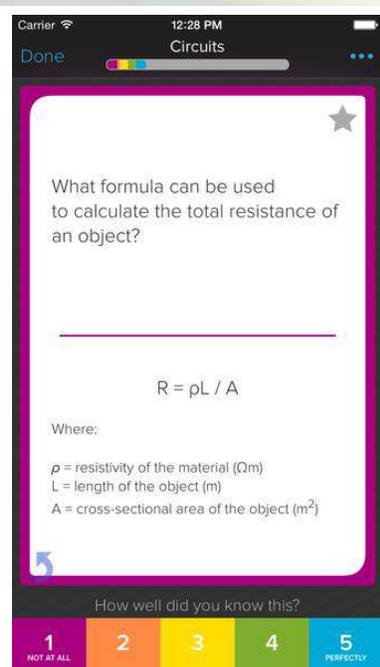


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Kira Thrace
71,036 Cards Studied
1 Day Streak

Subject	Progress
MCAT Biology	63%
MCAT Gen. Chemistry	44%
MCAT Physics	38%
MCAT Org. Chemistry	54%
MCAT Biochemistry	87%



12:28 PM
Circuits

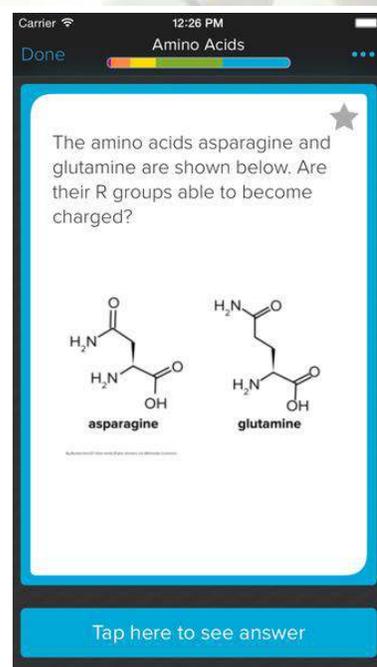
What formula can be used to calculate the total resistance of an object?

$R = \rho L / A$

Where:
 ρ = resistivity of the material (Ωm)
 L = length of the object (m)
 A = cross-sectional area of the object (m^2)

How well did you know this?

1 NOT AT ALL 2 3 4 5 PERFECTLY



12:28 PM
Amino Acids

The amino acids asparagine and glutamine are shown below. Are their R groups able to become charged?

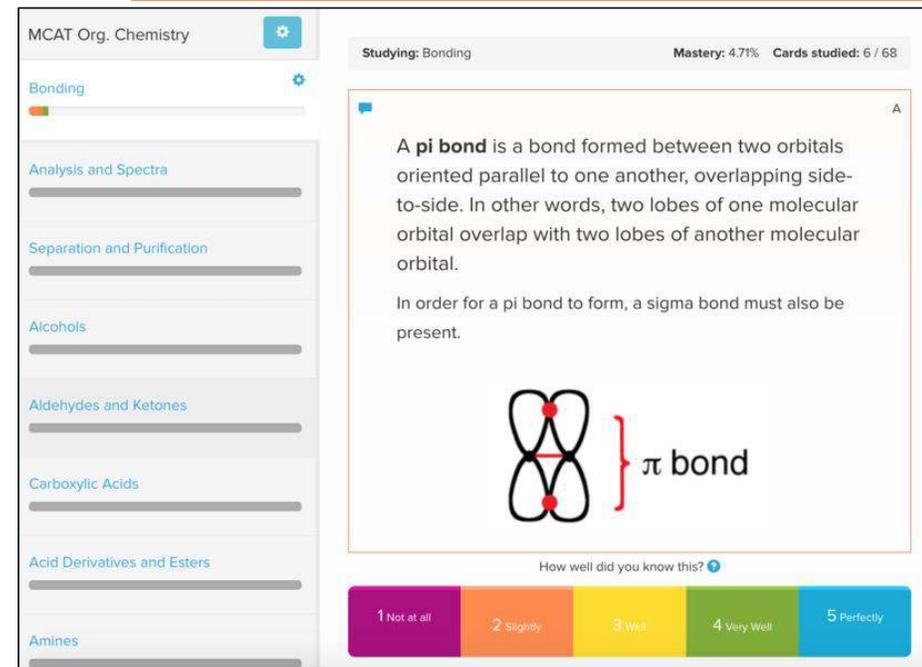
NC(CC(N)=O)C(=O)O

asparagine

NC(CCC(N)=O)C(=O)O

glutamine

Tap here to see answer



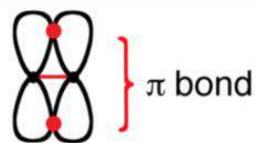
MCAT Org. Chemistry

Studying: Bonding Mastery: 4.71% Cards studied: 6 / 68

Bonding

A **pi bond** is a bond formed between two orbitals oriented parallel to one another, overlapping side-to-side. In other words, two lobes of one molecular orbital overlap with two lobes of another molecular orbital.

In order for a pi bond to form, a sigma bond must also be present.



π bond

How well did you know this?

1 Not at all 2 Slightly 3 Well 4 Very Well 5 Perfectly

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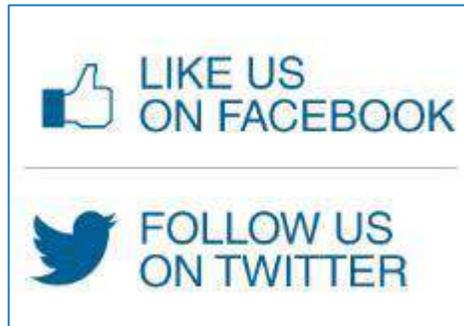


Tu 8/4	Fri 8/5	Sat 8/6
9:30 - 10:30 Keynote breakfast for P&G	9 - 10 Welcome/Speed Dating	9 - Day 2 Recap
10:30 - 3p P&G sessions/appointments, see San Diego.	10 - Break	9:30 - 10:30 Morning Keynote
11:30 - 1p P&G sessions/appointments, see San Diego.	10:30 - 11:45 Session 1—Cyberbullying OR PR Pitches	10:45 - 12p Session 1—Write Brain or MYOB
	11:45 - 1:15p Lunch	12p - 1:30p Lunch
4p - 5p Big Toy Book Party	1:15p - 2:30p Session 2—Double Slot for Writing or Connecting with Brands	1:30p - 2:45p Change the World—Revolution
	2:45p - 4p Session 3—2nd half writing OR Experience OR Expo/rest/recharge	3p - 4:15p Session 3—Own Your Beauty OR Online Community
	4p - 4:45p Afternoon break	4:15p - 5p Afternoon break
6p - 8p Expo	4:45p - 6p VOTY Community Keynote	5p - 8p The Help Screening!
7p - 10p KOYH party?	6p - 8p VOTY Reception	5p - 6p Closing Keynote
8p - 11p People's Party	5:30p - 7:30p Cheap Sally?	
8:30p - 11p Goin' Coconuts Luau	7:30p - 9:30p HWTM Party	
	9p - 12 Sparklecom	8p - 10:30p Social Fiesta
		9p - 11p Aiming Low
		10p - 11:30p Cheeseburger



Thank you for listening!

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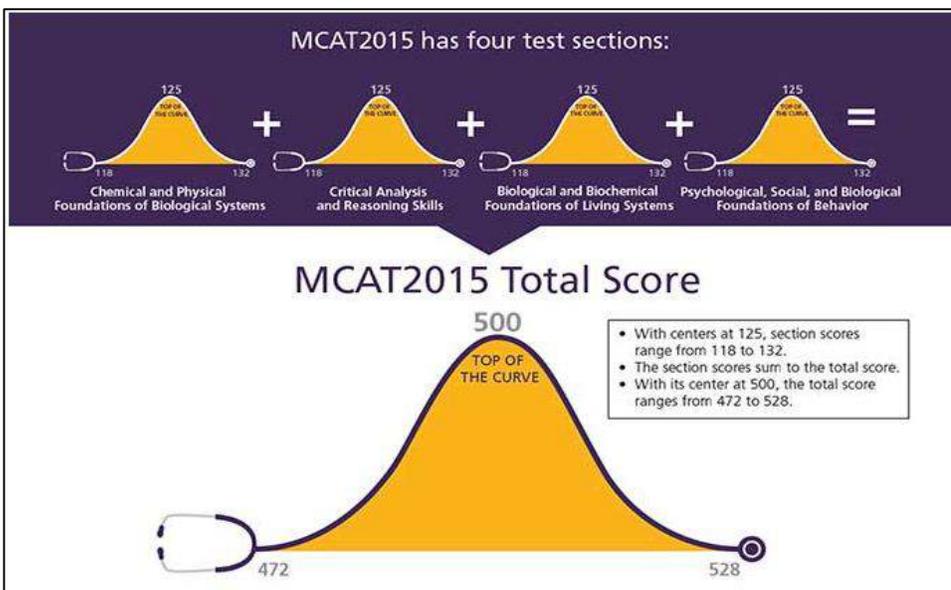
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