

The traditional Freshman Quiz is now a contest for new students

Deadline for entries is Thursday at noon. See page 7 for useful formulae.

Contest rules

Except for the addition of some new questions, this is the text of the freshman quiz exactly as it was last given on Tuesday morning, September 1, 1981, at 10 am in room 26-100. We have included the test instructions for reasons of historical interest; bear in mind that they do not necessarily apply to the contest. Contest rules are as follows:

- Only new undergraduates (that is, freshmen and new transfer students) may enter this contest.
- To enter, write down answers for as many of the questions as you can and submit them with your name to The Tech office in W20-483 (there's a mailbox on the door. Neatness and staples would be appreciated).
- You may use answers learned from reference works and other students, except members of The Tech staff. Each entry must be from one individual; group efforts cannot be considered.
- Correctness and creativity will be rewarded. Specifically, the authors of the two entries judged to have the most correct answers will receive \$25 Coop gift certificates; and the authors of the two entries judged most creative will receive certificates for copies of *Technique* 1985, this year's MIT yearbook, which will appear in the spring.
- Entries will be judged by members of The Tech staff. All decisions will be final. Contest entries become the property of The Tech and cannot be returned.
- Answers, and an announcement of the winners, will appear in Friday's Tech.

Original Rules

- This is a closed book examination. No slide rules or electronic calculators will be allowed. A sheet of formulae — the last page of the test — has been provided. The test will last approximately one hour.
- Smoking (tobacco or otherwise) is not allowed during the examination.
- Write all answers in the answer booklet provided. It is not necessary to begin each answer on a new page. Extra answer booklets will not be available. Do not write on the test itself. Do not separate the pages of the test.
- Answers should be numbered and in proper order. For multiple-choice questions, write only the letter corresponding to the correct answer. (If more than one answer on such a question is correct, write all the letters corresponding to each correct answer.)
- If you are not certain of the answer to any particular question, answer to the best of your knowledge. Partial credit will not be allowed. Illegible answers will receive no credit.
- Do not open this test booklet until you are instructed to do so by the proctor in charge.
- Passing grades on this quiz will be determined by the Freshman Rules Committee. Students may obtain their test scores any time after Wednesday noon from the Freshman Rules Committee Office, (Room 36-009, x3-4665).
- Any student found cheating on this quiz will be expelled from the examination room, and will receive the grade of "GN" on his or her Freshman Rules Committee record.
- This exam is intended to be instructive. Consequently, it is sometimes the case that part of the problem is to figure out what the problem is. (In such cases, the proctors will not be able to assist you in interpreting the question.)
- Good luck!!

The Freshman Quiz

"The true test of intelligence is not how much we know how to do, but how we behave when we don't know what to do."
— John Holt

1. a) Write your MIT ID number.
b) Write your term address.
c) Write your prospective major.

High School Preparation

2. Solve:
 - a) $\int 3x^2 dx$
 - b) $\int x^2 \sin(x) dx$
 - c) $\int_0^{\infty} dx / (1+x)^2$
3. Give the next number in the sequence:
 - a) 11, 13, 17, 25, 32, 37, 47, 58, 71, ...
 - b) 7, 3, 10, 4, ...
4. You are given six buckets in a row. The first three are filled with water and the second three are empty. Moving only one bucket, how do you make them alternate (filled, empty, filled, empty, filled, empty)?
5. a) Draw all the structural isomers of lysergic acid diethylamide.
b) Choose the most stable isomers from those you drew for part a). Explain your reasoning.
c) Given methane, ammonia, and water, describe the steps necessary for the synthesis of lysergic acid diethylamide. Keep in mind ways to minimize unwanted isomers.
6. a) Draw a flowchart describing the generation of prime numbers. Recursive algorithms will be given extra credit.
b) Implement the above in the language of your choice. Be sure to specify the language.
7. A rope over the top of a fence has the same length on each side. It weighs 1/2 lb. per ft. On one end hangs a monkey holding a banana, on the other a weight equal to the weight of the monkey. The banana weighs 2 oz. per inch. This rope is as long as the age of the monkey, and the weight of the monkey (in ounces) is as much as the age of the monkey's mother. The combined ages of monkey and mother are 30 years. 1/2 the weight of the monkey, plus the weight of the banana, is 1/4 as much as the weight of the weight and the weight of the rope. The monkey's mother is 1/2 as old as the monkey will be when it is 3 times as old its mother will be when she is 4 times as old as the monkey was when it was twice as old as its mother was when it was 1/2 as old as the monkey was when it was as old as its mother was when she was 3 times as old as the monkey was when it was 1/4 as old as it is now. How long is the banana?
8. a) Find the integer solutions to the equation $(A^4 + B^4 + C^4) / (A + B + C) = 39$.
b) Translate the following into a limerick:
 - i) $(12 + 144 + 20 + 3\sqrt{4}) / 7 + 5 \times 11 = 9^2 + 30$
 - ii) $\int_{-1}^{1/2} z^2 dz (\cos 3\pi/9) = \ln \sqrt{e}$

Computer Science Questions

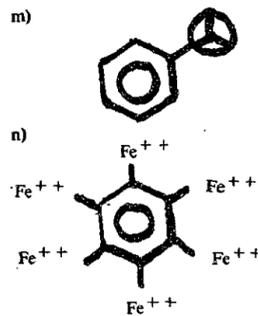
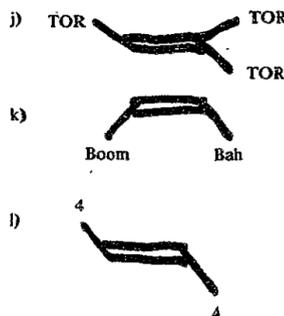
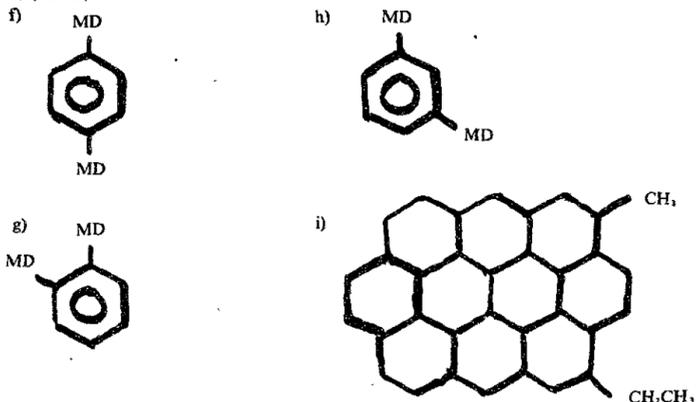
9. Give the byte size for the following machines:
 - a) VAX 11/780
 - b) IBM 370/168
 - c) Big MAC
10. a) What is EBCDIC?
b) Who uses it?
c) Why?
11. a) Describe an implementation of the Rivest public key encryption system.
b) Would you do it in hardware or software?
c) Would the NSA approve?

Physics questions

12. Describe a world in which all forces are repulsive.
13. One hundred bicycles are simultaneously scattered around MIT. In three hours, thirty-six remain. What is the half life of an unlocked bicycle? Speculate on the ultimate disposition of these bicycles given the number of ads for "used" bicycles.
14. For the purposes of this question, you may assume that $c = 10\text{kph}$ (Remember that c is the velocity of light in a vacuum, and that $h = 100\text{g}\cdot\text{m}^2/\text{sec}$ (h is Planck's constant). Describe the effects on everyday life.
 - a) Where would you be now?
 - b) How probable are you?
 - c) How long do you expect to spend at MIT?

Chemistry questions

15. Give the names of the following compounds:
 - a) $\text{WaNACrKrWaNaCrKrWaNaCrKrWaNaCrKrWaNaCrKr}$
 - b) $\text{Be} + \text{Ar}$
 - c) BaAuHIJKLMnO
 - d) HIO_3Ag
 - e) $(\text{BaNa}_2)_n$



16. Match the elements with the appropriate department:

- | | |
|--------------------------------------|---------------|
| A) Chemical Engineering | a) aluminum |
| B) Chemistry | b) boron |
| C) Earth & Planetary Sciences | c) carbon |
| D) EE & CS | d) chromium |
| E) Interdisciplinary Studies | e) adamantium |
| F) Materials Science and Engineering | f) lithium |
| G) Meteorology | g) magnesium |
| H) Philosophy and Linguistics | h) neon |
| I) Ocean Engineering | i) potassium |
| J) Sociology | j) sodium |
| K) Urban Studies and Planning | k) manganese |
17. Where does mercury come from?
a) Ford Motor Company
b) Mount Olympus
c) Laboratory Supplies
d) H.G. Wells

General questions about Boston

18. a) What happened to Beacon Hill?
b) What happened to Bunker Hill?
c) What happened to Benny Hill?
19. Where does summer turn into winter and milk into water?
20. What is the only street in America that crosses itself and why?

MIT questions

21. Name the two buildings in the United States, in order, that have the most (longest) connecting highways.
22. What is the official Alma Mater of MIT?
23. What was the first publication in the Library of Congress with reverse pagination?
24. What two colors have nothing in common?
25. Which buildings at MIT have six-digit room numbers?
26. Which MIT departments do not give undergraduate degrees?
27. Why is the "Harvard Bridge" called the "Harvard Bridge"?
28. By what name was MIT formerly known?
29. What happens when you dial 100 on an MIT telephone?
30. What happens Registration Day night?
31. Where are the Bronze Bunny, the Red Staple, the Great Sail, The Necco Wafer, and the Big Blue Scrap Heap? What are their official names?
32. Where is Ground Zero?
33. From what spot at the Institute can you be seen by an MIT president and two former presidents simultaneously?
34. a) What is Sport Death?
b) What does Sherry Turkle think Sport Death is?
35. a) What color is the Green Building?
b) When does it talk?
c) What does it say?
37. a) What is the latest movie in which you can see a Brass Rat?
b) What is the latest clothing catalog in which you can see a Brass Rat?
38. What does 232-2120 have to do with Dining Service?
39. Where can you see toads?
40. In what *Star Trek* episode can the MIT campus be seen?
41. Why is it significant that cows will go upstairs but not down?
42. According to Karl Taylor Compton, what does every MIT student wear under his raincoat?
43. a) What is the Institute Screw? Give three examples from your recent past experience.
b) What is the Big Screw?
c) Who won it in last year and why?
d) What is UMOG?
e) Who won it in 1979?
f) What is Homecoming Queen?
g) Who was Homecoming Queen in 1979?
44. What is the major cause of death among MIT presidents?
45. Define the following units:
 - a) the Bruno
 - b) the Smoot
 - c) the Matska
 - d) the Sklar
46. a) In what core curriculum courses were lectures given in French?
b) What happened to the lecturer?
47. Who is buried in which MIT dormitory?
48. What became of Instrumentation Lab?
49. According to *Seventeen* magazine, what is proper dress for an MIT fraternity brother?
50. What do you find in Room 7-414?
51. Match the name of the building with its number:

a) Solar House	A) W7
b) Joyce Chen Small Living Place	B) W20
c) ORK	C) W20-415
d) Moose Crossing	D) W70
e) Stratton House	E) W71
f) Open House	F) W74
g) Next House	G) NW61
52. How many language houses are there at MIT? Name them.
53. Compose, then stand up and sing a new verse for the MIT drinking song.
54. Identify these abbreviations, and give all possible meanings:

a) MRS	b) SCREW	c) NRSA	d) NGL
e) GFI	f) SEG	g) TDM	h) TFM
i) IHTFP	j) RTFM	k) FUBAR	
55. What was the name of Avery Allen Ashdown's dinner club and why?
56. a) What was Incomm?
b) What was the GA?
57. What was the honorary society of MIT called?
58. What was the women's honorary society called?
59. What was the East Campus honorary society called?
60. What was the first dormitory to secede from Dormcon?
61. Who was Maurice B. Hendon '83 and why is he famous?
62. What laboratory equipment immortalizes dead rock stars?
63. What major publications have been edited or published by MIT graduates?
64. What do smoking and bicycles have in common?
65. What MIT graduates have appeared in *Doonesbury* and why?
66. What is 36-099?
 - a) mens' room
 - b) broom closet
 - c) Department of Alchemy
 - d) Dean's Office
 - e) Freshman Rules Committee Office

67. Define "hack." Be maximally specific. Give 66 examples from your recent past experience.
68. Appointment to the Freshman Rules Committee is by invitation only. Indicate whether you wish to be considered for appointment next year, and if so, briefly explain why you feel you should be considered.
 - STOP! If time permits, you may check over your answers. Please be sure to hand in your booklet at the conclusion of the examination. You may keep this copy of the test.
 - Transfers to other institutions may be arranged through the Dean for Student Affairs or the Committee on Academic Performance.
 - For the truly desperate, airline schedules and a complete listing of tariffs are available for inspection: TCA, W20-450.