WRITE YOUR EXAM ID NUMBER HERE:

Antitrust

Spring 2019
Prof. Eric E. Johnson
University of Oklahoma College of Law

PART 2

FINAL EXAMINATION – ESSAY

GENERAL INSTRUCTIONS:

1. Do not turn the page until instructed.
2. Failure to follow these instructions, including without limitation instructions 3 through 7, as well as matters of allowed materials, device usage, and time limits, are academic misconduct issues, and violations will be treated as such even if inadvertent.
3. All exam materials (including this booklet and your response) must be turned in at the end of the period **with your exam ID number written in the box above in the upper left**. **Do not disassemble this booklet, remove the staple, or tear pages.**
4. You may not waive anonymity. Use only your exam ID number on your response.
5. Copying the exam or any portion thereof is prohibited—including making a rough transcription from personal memory after the exam's administration.
6. During the exam: You may not consult with anyone—necessary communications with the administrators/proctors being the exception. You may not view or attempt to view materials other than your own. Do nothing that would distract other students.
7. After the exam: Communicate nothing about the exam, including even vague impressions or characterizations, to any member of the class who has not yet taken it.
8. You may write anywhere on the examination materials—e.g., for use as scratch paper. But only answers and material recorded in the proper places will be graded.
9. Your goal is to show your mastery of the material presented in the course and your skills in analyzing legal problems. This is what you will be graded on.
10. Unless otherwise provided, assume hypothetical facts take place within the present-day United States, and base your legal analysis on the law, rules, procedures, practices, and cases from the course, plus any hypothetical laws presented in the facts.

Do not turn any page until instructed.

When instructed lift just this top sheet to look at the sheet underneath for additional instructions.

The additional instructions are on the next sheet, not the reverse of this sheet.

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SPECIFICS FOR THE ESSAY PORTION:

11. You have a total of 2 hours, including an initial 30-minute reading-outlining-only period, described below.

12. This portion of the examination is **"open book."** You may use any paper-based notes and books you like. No materials may be shared during the exam. No electronic or interactive resources may be used or referenced. During the EW Period (described below) you may use a computer (including a keyboard-configured tablet) to write your exam, provided it is running the required exam-taking software and is used pursuant to applicable policies. But you may not reference files stored thereon during the examination session. You may wear a regular watch. And you may use a regular calculator that can add, subtract, multiply, divide, square, and calculate a square root; with no more memory capacity than holding a single number in memory; and with the ability to display results in no other format other than a single line of digits with commas and a decimal point. Otherwise, any touching, using, accessing, wearing, viewing or listening to any electronic device is prohibited. No smart watches. No phones.

13. 30-MINUTE RO PERIOD: The first 30 minutes is a reading-outlining period (RO Period). This is your time to carefully read the exam booklet (that is, the facts and the questions), to take notes, to reference your outlines and books, and to outline your response on scratch paper. **During the 30-minute RO Period you may not begin recording the response upon which you will be graded and you may not use any computing device.** That is, if you are taking the exam on computer, you may not type any characters at all into the computer during the RO Period; and if you are taking the exam by handwriting, you may not make any mark in any blue book (that is, an exam-response booklet, sometimes labeled a "green book") during the RO Period.

14. 90-MINUTE EW PERIOD: Next you will have a 90-minute exam-writing period (EW Period) during which you will write your response. For the avoidance of doubt, it is acknowledged that during the EW Period you may also continue to do what was allowed during the RO Period (e.g., refer back to the exam booklet, reference your books and notes—including any notes you created during the RO Period).

15. Organization counts. Read all exam questions before answering any of them — that way you can be sure to put all of your material in the right places.

16. Within the confines of the questions you are asked, note all issues you see. More difficult issues will require more analysis. Spend your time accordingly.

17. Clarity counts. Clearly label each question separately in your answer. Be aware that there are no points to be won or lost for spelling, grammar, or stylistic aspects of writing—so long as I can understand what you are saying. Feel free to use abbreviations, but only if the meaning is entirely clear. Blue books: Make sure your handwriting is legible. I cannot grade what I cannot read. Use a blue or black pen. Skip lines and write on only on one side of the page.

Wait. Do not turn the page until instructed to begin.

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Rainbow Laser Unicorns

"Laser" stands for Light Amplification by Stimulated Emission of Radiation. Other light sources—such as light bulbs or LEDs—take an input of energy and use that to radiate light as a dispersed glow. A laser, by contrast, takes an input of energy and uses that to emit light in a narrow, coherent beam.

Every laser requires, at its core, a lasing medium. An energy source pumps energy into the lasing medium. Then the lasing medium, owing to its chemical/physical properties, emits that energy as coherent light.

Most lasers emit only light of a particular wavelength, which, in the visible spectrum, corresponds to light of a particular color of the rainbow. So, for instance, a laser that emits all of its light at 635 nanometers is a particular hue of red. Engineers have succeeded, however, in creating broad-spectrum lasers. The first kind of broad-spectrum laser was the free-electron laser, which can be tuned to different wavelengths—red, blue, orange, violet, or whatever you like. The downside of a free-electron laser is that it requires a large laboratory facility since the lasing medium is a cloud of free electrons, and creating that requires a particle accelerator, which in turn requires an array of vacuum pumps. Thus, free-electron lasers are wildly expensive, bulky, and prone to mechanical breakdown—not a recipe for commercial success.

Less than a decade ago, however, a new kind of broad-spectrum laser was developed whose lasing medium is a sapphire crystal doped with the rare-earth metal scandium. These scandium-sapphire-crystal lasers—often called "SSC lasers" by scientists or "rainbow lasers" by the press—can be made small enough to fit in a pocket, and yet they can be tuned to emit light in any particular color—or even all of the colors of the rainbow at once to create a form of white light that is similar to visible sunlight. What is more, it is possible for the color of the laser's light to be changed as quickly as a billion times per second.

SSC lasers have found two commercial applications so far: (1) digital-cinema projectors and (2) scientific laboratory equipment that determines the chemical composition of a substance.

The digital cinema market is what most people think of when they think of SSC lasers. The capacity for SSC lasers to emit many millions of visible colors per second has made it the key piece of technology in a new generation of digital cinema projectors with massively increased color range and brightness plus the ability to project images onto larger screens across longer distances.

While less visible to the public, the revolution in analytical laboratory equipment through the use of SSC lasers is no less exciting. Laboratory researchers often need to know the chemical composition of a substance. There are many techniques and kinds of machines for accomplishing this, most of which require destroying a small portion of the sample. SSC lasers have been revolutionary because they've allowed for the development of a new kind of laboratory analyzer known as a "lemdar" analyzer. "Lemdar" stands for Laser Enabled Matrix Desorption-Absorption Resonance. Lemdar analyzers are unique in their ability to almost instantly determine the chemical composition of a substance without destroying or degrading the sample. Science has long understood that different chemicals absorb and reflect light of different wavelengths in different ways. But taking full advantage of that effect in

FIG. 1: Press reports about Applied Atomics and Iridion Instruments—the so-called "rainbow laser unicorns"—are often accompanied by fanciful images such as this one. This does little to help anyone understand the technology, but business journalists are only human.

order to analyze samples non-destructively was not feasible before SSC lasers. The capacity of an SSC laser to quickly cycle through millions of wavelengths of light with pinpoint focus on different parts of a sample means that it can provide billions of data points within seconds. When this is compared to a reference database of known chemical compounds, it provides near-instantaneous results. So even though there are other analytical machines for determining the chemical composition of a substance—such as mass spectrometers and gas chromatographs—virtually all university, government, and private research labs agree that there is no substitute for a lemdar analyzer for a vast swath of laboratory activity.

Unfortunately for movie theaters and scientific research laboratories, there are only two manufacturers of scandium-sapphire-crystal lasers: Applied Atomics and Iridion Instruments. Both firms have enjoyed strong revenue growth thanks to their ability to command prices far in excess of their marginal costs. In fact, both companies have become what investors call "unicorns"—privately held firms valued at over $1 billion.

Applied Atomics and Iridion Instruments each have patents relating to SSC lasers. Applied Atomics has the '111 patent, which covers scandium-sapphire crystals as such—meaning the chemical substance used as the lasing medium. Applied Atomics also has the '777 patent, which covers a cheap and efficient way of manufacturing scandium-sapphire crystals. Iridion Instruments has the '222 patent, which covers a laser that uses a scandium-sapphire crystal as the lasing medium. Iridion Instruments also has the '888 patent, which covers a cheap and efficient way of manufacturing scandium-sapphire crystals—albeit a completely different way of doing so than is disclosed in Applied Atomics' '777 patent.

Some years ago, shortly after Applied Atomics and Iridion Instruments started manufacturing SSC lasers, each sued the other for patent infringement. Specifically, Applied Atomics sued Iridion for infringement of the '111 patent, and Iridion sued Applied Atomics for infringement of the '222 patent. The suits were consolidated and both litigants simultaneously moved for partial summary judgment on the issue of the validity of their own patents. The district court not only denied both of these motions, the court immediately invited both parties to file motions for summary judgment on the issue of the *invalidity* of the other party's patent. When both Applied Atomics and Iridion Instruments declined to file these motions, the court on its own initiative, *sua sponte*, noticed summary judgment motions on the issue of invalidity of

both patents. The day before briefs were due, the parties settled for zero dollars and the simple agreement to jointly dismiss their claims.

Since then, neither Applied Atomics nor Iridion Instruments has sued or threatened to sue anyone over the ‘111 patent or the ‘222 patent. But no one else has tried entering the market for SSC lasers—so the issue hasn’t come up. Meanwhile, Applied Atomics and Iridion are both sticking to their own patented methods of manufacturing scandium-sapphire crystals, so neither has had occasion to complain about the other on the basis of the ‘777 or ‘888 patents.

But that’s not to say everyone is happy. There has been plenty of grumbling from the movie theater industry and from research laboratories.

Movie theaters owners are upset that they can’t buy all the SSC-laser projectors they want—even at sky-high prices. Right now, SSC-laser projectors are approximately 55% of all new projectors being purchased by theaters. But in areas where competition is fierce among theaters, including wealthy suburbs of large metropolitan areas, movie theaters are buying nothing but SSC-laser projectors. Theater owners say anything less than a SSC-laser projector will leave their patrons disappointed and looking for a theater that can provide a better cinematic experience. In fact, there’s a backlog of SSC-laser-projector orders, and high-end theaters everywhere are on waiting lists to buy them as soon as they are made. The 45% of cinema projectors being sold that aren’t SSC-powered are being purchased by theaters in smaller cities, by educational institutions, and by second-tier budget theaters that show movies long past their release date at discount ticket prices.

Meanwhile, scientific laboratories are able to get all the lemdar analyzers they can afford. The problem they face is affording them. High-end gas chromatography machines, for instance, which are similar in size to a refrigerator, can go for $100,000 or more. But lemdar analyzers—despite the fact that they are about the size and

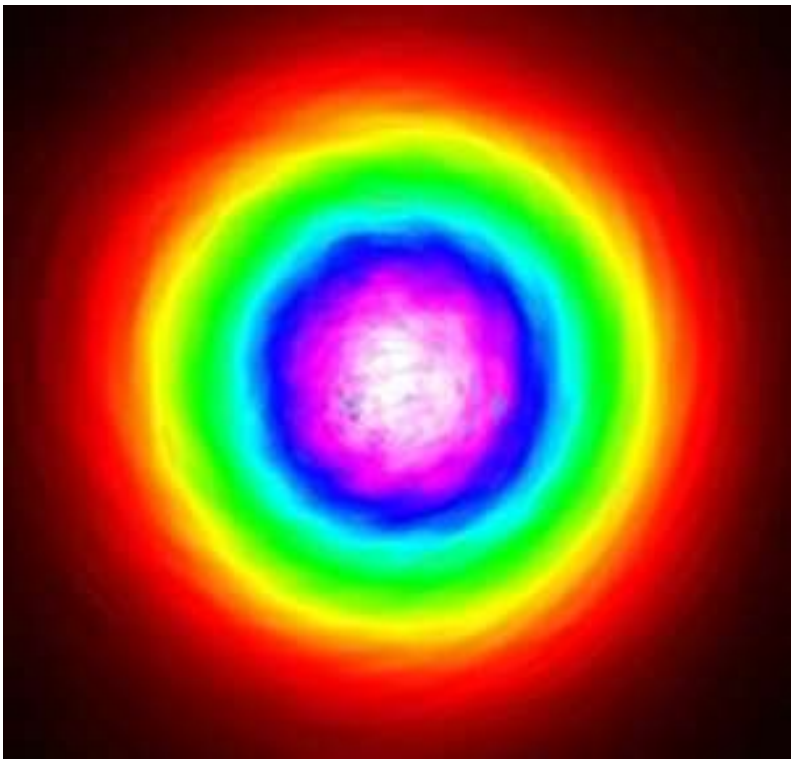

FIG. 2: This image was one of the first created with an SSC laser. The image shows off the device’s ability to produce light of different wavelengths and, therefore, different visible colors. (Image credit: Applied Atomics.)

complexity of a DVD player—retail for about $1 million each. Still, most university laboratories are buying them because they have become essential to stay competitive against other university labs in applying for large federally funded grants.

Previously, Applied Atomics and Iridion Instruments both made SSC-laser projectors and lemdar analyzers. Applied Atomics sold 60% of SSC-laser projectors and 40% of lemdar analyzers, while Iridion Instruments sold 40% of SSC-laser projectors and 60% of lemdar analyzers. As far as movie theaters and laboratories were concerned, each company's product was just as good as the other's. But pursuant to a new joint venture (JV) started a few months ago, the companies have begun specializing in just one product each: only SSC-laser projectors for Applied Atomics, and only lemdar analyzers for Iridion Instruments.

The JV entity is called Jacindor-Joule Corporation. It is owned in equal share by Applied Atomics and Iridion Instruments, and it has taken ownership of the '111, '222, '777, and '888 patents. Pursuant to the terms worked out in the JV agreement, Jacindor-Joule provides the following exclusive licenses: The '777 method is exclusively licensed to Applied Atomics; the '888 method is exclusively licensed to Iridion Instruments; the '111 and '222 patents are exclusively licensed to Applied Atomics for applications relating to cinema projectors and yet-to-be-developed image projection applications; and the '111 and '222 patents are exclusively licensed to Iridion for applications relating to lemdar analyzers. In the meantime, Jacindor-Joule has received $100 million of paid-in capital from each of the joint venturers and will use that capital to engage in research and development work to find new applications for scandium-sapphire-crystal lasers other than image projection and chemical analysis. Profits that result from new applications of SSC lasers will be split equally between Applied Atomics and Iridion Instruments as equal co-owners.

Since the creation of the joint venture, it is hard to say if the prices of lemdar analyzers have gone up. It's hard to say because, previously, lemdar analyzers were sold separately from subscription access to the reference database that enables lemdar data to provide definitive chemical identifications. There had been three different providers of reference-database subscription access, of which Iridion was one. Since the JV, however, Iridion now sells a lemdar analyzer only in combination with access to the Iridion reference database for the life of the analyzer. So the price has gone up somewhat, but with access to Iridion's database now included, labs have stopped subscribing to the other databases, and the total cost to purchasers of new lemdar analyzers has become a little lower overall. Iridion's CEO recently explained at an industry conference that bundling database access with the analyzers will allow Iridion to grow the database so as to deliver more value to customers: Whenever a new substance is not recognized based on its lemdar signature, but where the chemical composition can be determined some other way, a lab will end up contributing to Iridion's database just by entering the information in the lab's own analyzer. This will enable the Iridion database to grow over time, becoming more useful to researchers everywhere.

Iridion's database initiative caused some laboratory researchers to complain about wanting to keep confidential the identity of new chemical compounds they analyze. Iridion has responded to this concern with what it calls the Premium Proprietary

Package, which allows labs to pay an additional fee in return for keeping secret new chemical identities that they input for their own use—keeping them out of the general database that is common to all Iridion lemdar users. Iridion has said this arrangement is socially beneficial because, by default, it encourages openness, which should advance scientific research, but it nonetheless allows closed-access proprietary research that incentivizes innovation by allowing participating firms to reap a greater return on their research-and-development spending.

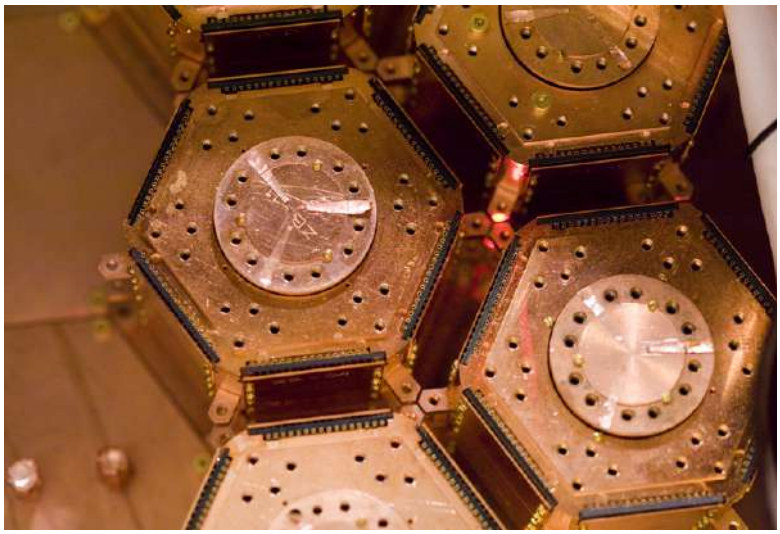

FIG. 3: Iridion Instruments manufactures scandium-sapphire crystals in these hexagonal copper-alloy pressure chambers using the method covered by the '888 patent. (Image credit: Iridion Instruments.)

Meanwhile, in the market for SSC-laser projectors, Applied Atomics has fostered competition—in a manner permitted by the JV agreement—by entering deals to sell SSC lasers to two rival digital cinema projector manufacturers: Dragon Dioptrics and Vision Ventures. Under the deal, Dragon Dioptrics and Vision Ventures will be supplied with SSC lasers to use as a component in cinema projectors, but the retail price of Dragon Dioptrics' and Vision Ventures' projectors, as well as those sold by Applied Atomics, will be set at a uniform level determined by Applied Atomics. At an industry trade show, Applied Atomics explained it was pursuing this arrangement so that its shareholders would receive a fair return on the Applied Atomics patent portfolio while encouraging Applied Atomics, Dragon Dioptrics, and Vision Ventures to all compete with one another on the basis of sales, service, and the quality of their finished products.

For movie-theater owners hoping for price competition, there is some hope on the horizon. Three companies—Hexetron Halogen (a chemical company), Omni Optics (a cinema projector manufacturer), and Tectonic Theaters (a large global movie theater owner)—have agreed to a seven-year deal by which Hexetron will be the exclusive supplier of scandium-sapphire crystals to Omni Optics, which will manufacture SSC-laser projectors. Omni Optics will then be the exclusive supplier of SSC-laser projectors to Tectonic Theaters. Hexetron has said that with this three-way commitment, it has the guaranteed market it needs to invest in building a scandium-sapphire crystal manufacturing facility that can produce scandium-sapphire crystals using a method that is relatively expensive, but which is not covered by either the '777 or the '888 patent. Hexetron has said it needs the commitment not only to spend $220 million on the new manufacturing facility, and millions more operating it, but also to spend what could be tens of millions of dollars to fight anticipated patent litigation brought by Jacindor-Joule on the basis of the '111 and '222 patents.

QUESTIONS

Provide analysis for the questions below. For all questions: **Omit discussion of remedies. Omit analysis and discussion of attempted monopolization.**

Read all the questions first and be prepared to **put your analysis where it belongs.** Label portions of your response by question number (e.g., "Question 1").

1. Discuss prospects for liability of Applied Atomics and Iridion Instruments under §1 of the Sherman Act with regard to their dealings with each other.
2. Discuss the prospects for liability of Jacindor-Joule, and its participants in forming it, with regard to monopolization under §2 of the Sherman Act.
3. Discuss the prospects for liability of Iridion Instruments under the Sherman Act (§1 & §2) with regard to its unilateral actions related to reference database access.
4. Discuss the prospects for liability of Applied Atomics under the Sherman Act (§1 & §2) with regard to its dealings with Dragon Dioptrics and Vision Ventures.
5. Discuss the prospects for liability of Hexetron Halogen, Omni Optics, and Tectonic Theaters under the Sherman Act (§1 & §2) with regard to their agreement.

Limit your discussion to the questions posed. For any given question, **limit your discussion to the parties specified in the question**. Do not speculate as to the liability of or possibility of recovery in favor of unmentioned third parties.

The questions are for organizing your analysis; they will not be separately weighted. Thus, **do not repeat yourself from question to question**. And, within any given question, please **do not repeat yourself when talking about a different party**. Instead, I strongly encourage you to incorporate previously stated analysis by reference as appropriate. If analysis of an issue is similar to but not exactly the same as what you have written previously, then I suggest you note your prior analysis and go on to discuss any differences. In addition, because the questions are not separately weighted, you should divide your time among the questions according to what requires the most discussion and analysis. **Do not expect that each question calls for an equal share of your time or words. Consider that any given question might require only a brief response.**

Some possibly helpful abbreviations:

AA	Applied Atomics
DD	Dragon Dioptrics
HH	Hexetron Halogen
II	Iridion Instruments
JJ	Jacindor-Joule
LPs	SSC-laser projectors
LAs	Lemdar analyzers
OO	Omni Optics
PPP	Premium Proprietary Package
SSC	scandium-sapphire crystal
TT	Tectonic Theaters
VV	Vision Ventures

NO CONTENT

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BACK COVER; DO NOT DISASSEMBLE

NOTE: *The following information is not part of the hypothetical facts of the exam:*
Image credits: Fig. 1: Unicorn drawing from archives of Pearson Scott Foresman via Wikimedia, rainbow alteration by Eric E. Johnson; Fig. 2: Lawrence Livermore National Laboratory image of 2002 test of rubidium vapor resonance-transition alkali laser; Fig 3: Fermilab image of detectors for cryogenic dark matter search experiment.