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[1] (50 points) The following is a text of the Commencement address by the late Steve Jobs at the Stanford University on June 12, 2005. Read the text and answer the questions. Answer (I) by symbols. Answer (II), (III), (IV) and (V) in English which correspond to underlined parts.

I am honored to be with you today at your commencement(1) from one of the finest universities in the world. I never graduated from college. Truth be told, this is the closest I've ever gotten to a college graduation. Today I want to tell you three stories from my life. That's it. No big deal. Just three stories.

The first story is about connecting the dots.(II)

I dropped out of Reed College after the first 6 months, but then stayed around as a drop-in for another 18 months or so before I really quit. So why did I drop out?

It started before I was born. My biological mother was a young, unwed college graduate student, and she decided to put me up for adoption. She felt very strongly that I should be adopted by college graduates, so everything was all set for me to be adopted at birth by a lawyer and his wife. Except that when I popped out they decided at the last minute that they really wanted a girl. So my parents, who were on a waiting list, got a call in the middle of the night asking: "We have an unexpected baby boy; do you want him?" They said: "Of course." My biological mother later found out that my mother had never graduated from college and that my father had never graduated from high school. She refused to sign the final adoption papers. She only relented(2) a few months later when my parents promised that I would someday go to college.

And 17 years later I did go to college. But I naively chose a college that was almost as expensive as Stanford, and all of my working-class parents' savings were being spent on my college tuition.(3) After six months, I couldn't see the value in it. I had no idea what I wanted to do with my life and no idea how college was going to help me figure it out. And here I was spending all of the money my parents had saved their entire life. So I decided to drop out and trust that it would all work out OK. It was pretty scary at the time, but looking back it was one of the best decisions I ever made. The minute I dropped out I could stop taking the required classes that didn't interest me, and begin dropping in on the ones that looked interesting.

It wasn't all romantic. I didn't have a dorm room, so I slept on the floor in friends' rooms, I returned coke bottles for the 5¢ deposits to buy food with, and I would walk the 7 miles across town every Sunday night to get one good meal a week at the Hare Krishna temple. I loved it. And much of what I stumbled into by following my curiosity and intuition turned out to be priceless(4) later on. Let me give you one example:

Reed College at that time offered perhaps the best calligraphy(5) instruction in the country. Throughout the campus every poster, every label on every drawer, was beautifully hand calligraphed. Because I had dropped out and didn't have to take the normal classes, I decided to take a calligraphy class to learn how to do this. I learned about serif and san serif typefaces, about varying the amount of space between different letter combinations, about what makes great typography great. It was beautiful, historical, artistically subtle in a way that science can't capture, and I found it fascinating.(6)

None of this had even a hope of any practical application in my life. But ten years later, when we were designing the first Macintosh computer, it all came back to me. And we designed it all into the Mac. It was the first computer with beautiful typography. If I had never dropped in on that single course in college, the Mac would have never had multiple typefaces or proportionally spaced fonts. And since Windows just copied the Mac, it's likely that no personal computer would have them. If I had never dropped out, I would have never dropped in on this calligraphy class, and personal computers might not have the wonderful typography that they do. Of course it was impossible to connect the dots looking forward when I was in college. But it was very, very clear looking backwards ten years later.

Again, you can't connect the dots looking forward; you can only connect them looking backwards. So you have to trust that the dots will somehow connect in your future. You have to trust in something — your gut, destiny, life, karma.(7) whatever. This approach has never let me down, and it has made all the difference in my life.

(背面仍有題目,請繼續作答)

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My second story is about love and loss.

I was lucky — I found what I loved to do early in life. Woz and I started Apple in my parents garage when I was 20. We worked hard, and in 10 years Apple had grown from just the two of us in a garage into a \$2 billion company with over 4000 employees. We had just released our finest creation — the Macintosh — a year earlier, and I had just turned 30. And then I got fired. How can you get fired from a company you started? Well, as Apple grew we hired someone who I thought was very talented to run the company with me, and for the first year or so things went well. But then our visions of the future began to diverge and eventually we had a falling out. When we did, our Board of Directors sided with(8) him. So at 30 I was out. And very publicly out. What had been the focus of my entire adult life was gone, and it was devastating.

I really didn't know what to do for a few months. I felt that I had let the previous generation of entrepreneurs down - that I had dropped the baton as it was being passed to me. I met with David Packard and Bob Noyce and tried to apologize for screwing up so badly. I was a very public failure, and I even thought about running away from the valley. But something slowly began to dawn on me — I still loved what I did. The turn of events at Apple had not changed that one bit. I had been rejected, but I was still in love. And so I decided to start over.

I didn't see it then, but it turned out that getting fired from Apple was the best thing that could have ever happened to me. The heaviness of being successful was replaced by the lightness of being a beginner again, less sure about everything. It freed me to enter one of the most creative periods of my life.

During the next five years, I started a company named NeXT, another company named Pixar, and fell in love with an amazing woman who would become my wife. Pixar went on to create the world's first computer animated feature film, Toy Story, and is now the most successful animation studio in the world. In a remarkable turn of events, Apple bought NeXT, I returned to Apple, and the technology we developed at NeXT is at the heart of Apple's current renaissance. And Laurene and I have a wonderful family together.

I'm pretty sure none of this would have happened if I hadn't been fired from Apple. It was awful tasting medicine, but I guess the patient needed it.(III) Sometimes life hits you in the head with a brick. Don't lose faith. I'm convinced that the only thing that kept me going was that I loved what I did. You've got to find what you love. And that is as true for your work as it is for your lovers. Your work is going to fill a large part of your life, and the only way to be truly satisfied is to do what you believe is great work. And the only way to do great work is to love what you do. If you haven't found it yet, keep looking. Don't settle.(9) As with all matters of the heart, you'll know when you find it. And, like any great relationship, it just gets better and better as the years roll on. So keep looking until you find it. Don't settle.

My third story is about death.

When I was 17, I read a quote that went something like: "If you live each day as if it was your last, someday you'll most certainly be right." It made an impression on me, and since then, for the past 33 years, I have looked in the mirror every morning and asked myself: "If today were the last day of my life, would I want to do what I am about to do today?" And whenever the answer has been "No" for too many days in a row, I know I need to change something.

Remembering that I'll be dead soon is the most important tool I've ever encountered to help me make the big choices in life. Because almost everything — all external expectations, all pride, all fear of embarrassment or failure - these things just fall away in the face of death, leaving only what is truly important. Remembering that you are going to die is the best way I know to avoid the trap of thinking you have something to lose. You are already naked. There is no reason not to follow your heart.

About a year ago I was diagnosed with cancer. I had a scan at 7:30 in the morning, and it clearly showed a tumor on my pancreas. I didn't even know what a pancreas was. The doctors told me this was almost certainly a type of cancer that is incurable, and that I should expect to live no longer than three to six months. My doctor advised me to go

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home and get my affairs in order, which is doctor's code for prepare to die. It means to try to tell your kids everything you thought you'd have the next 10 years to tell them in just a few months.(IV) It means to make sure everything is buttoned up so that it will be as easy as possible for your family. It means to say your goodbyes.

I lived with that diagnosis all day. Later that evening I had a biopsy, where they stuck an endoscope down my throat, through my stomach and into my intestines, put a needle into my pancreas and got a few cells from the tumor.(10) I was sedated, but my wife, who was there, told me that when they viewed the cells under a microscope the doctors started crying because it turned out to be a very rare form of pancreatic cancer that is curable with surgery. I had the surgery and I'm fine now.

This was the closest I've been to facing death, and I hope it's the closest I get for a few more decades. Having lived through it, I can now say this to you with a bit more certainty than when death was a useful but purely intellectual concept:

No one wants to die. Even people who want to go to heaven don't want to die to get there. And yet death is the destination we all share. No one has ever escaped it. And that is as it should be, because Death is very likely the single best invention of Life. It is Life's change agent. It clears out the old to make way for the new. Right now the new is you, but someday not too long from now, you will gradually become the old and be cleared away. Sorry to be so dramatic, but it is quite true.

Your time is limited, so don't waste it living someone else's life. Don't be trapped by dogma(11) — which is living with the results of other people's thinking. Don't let the noise of others' opinions drown out your own inner voice. And most important, have the courage to follow your heart and intuition.(12) They somehow already know what you truly want to become. Everything else is secondary.

When I was young, there was an amazing publication called The Whole Earth Catalog, which was one of the bibles of my generation. It was created by a fellow named Stewart Brand not far from here in Menlo Park, and he brought it to life with his poetic touch. This was in the late 1960's, before personal computers and desktop publishing, so it was all made with typewriters, scissors, and polaroid cameras. It was sort of like Google in paperback form, 35 years before Google came along: it was idealistic, and overflowing with neat tools and great notions.

Stewart and his team put out several issues of The Whole Earth Catalog, and then when it had run its course, they put out a final issue. It was the mid-1970s, and I was your age. On the back cover of their final issue was a photograph of an early morning country road, the kind you might find yourself hitchhiking on if you were so adventurous. Beneath it were the words: "Stay Hungry. Stay Foolish." It was their farewell message as they signed off. Stay Hungry. Stay Foolish. And I have always wished that for myself. And now, as you graduate to begin anew, I wish that for you.

Stay Hungry. Stay Foolish.(V)

Thank you all very much.

QUESTIONS

(I) (12 points) Find a synonym. Four answer choices are given below.

- (1) commencement : (A) initiation (B) completion (C) ending (D) meeting
- (2) relented : (A) continued (B) worried (C) complied (D) increased
- (3) tuition : (A) fee (B) class (C) credits (D) board
- (4) priceless : (A) cheap (B) treasured (C) replaceable (D) serious
- (5) calligraphy : (A) mathematics (B) painting (C) handwriting (D) calculation

(背面仍有題目,請繼續作答)

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(6) fascinating : (A) repulsive (B) intriguing (C) fashionable (D) boring

(7) karma : (A) feeling (B) philosophy (C) literature (D) patience

(8) sided with : (A) ignored (B) took advantage of (C) disliked (D) supported

(9) settle : (A) destroy (B) confuse (C) end (D) lose

(10) tumor : (A) swelling (B) brick (C) blood (D) vacuum

(11) dogma : (A) history (B) emotion (C) science (D) doctrine

(12) intuition: (A) happiness (B) instinct (C) pathos (D) knowledge

(II) (8 points) What did the speaker mean by “connecting the dots”?

(III) (5 points) This part is a metaphor. State what the speaker meant by clarifying “medicine” and “the patient”.

(IV) (5 points) Describe your thoughts why the speaker urgently felt so, by projecting yourself onto his situation.

(V) (20 points) State your interpretation of what the speaker wanted to address the audiences by saying “Stay Hungry. Stay Foolish.” Use less than 100 words.

[2] (20 points) A word or phrase is missing in each of the sentences below. Four answer choices are given below each sentence. Select the best answer to complete the sentence.

1 Sports play an important ____ in social life.

(a) part (b) role (c) work (d) portion

2 Nuclear fusion, the same process that powers the sun, could provide us ____ limitless energy.

(a) to (b) with (c) in (d) from

3 There is no greater grief than to recall a time of happiness when __ misery.

(a) of (b) on (c) to (d) in

4 The meeting will be ____ in the town hall.

(a) heard (b) taken (c) held (d) seen

5 South Africa has a large ____ of wildlife.

(a) kind (b) variety (c) many (d) much

6 Life can only be understood ____ but can only be lived forward.

(a) backward (b) backwards (c) after (d) afterwards

7 What time do you expect to arrive ____ London?

(a) in (b) on (c) to (d) of

8 Before you run ____ the street, look to the left and to the right.

(a) in (b) against (c) on (d) at

9 Please come to see me ____ ten tomorrow morning.

(a) at (b) behind (c) in (d) on

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10 My hometown is about 20 km ___ the east of Kaohsiung.

- (a) for (b) at (c) in (d) to

11 Mike went to the picnic with ___ boys.

- (a) two little other (b) other little two (c) other two little (d) two other little

12 The experimental results compare ___ with the theoretical prediction.

- (a) favor (b) favored (c) favorable (d) favorably

13 Senate has ___ approved the legislation to protect environment.

- (a) commonly (b) anonymously (c) critically (d) unanimously

14 ___ there had not been a secret energy task force, there would not have been the oil spill in the gulf of Mexico.

- (a) Unless (b) If (c) Even (d) While

15 Because of ___ charge and large mass, alpha particles are easily absorbed by materials.

- (a) them (b) they (c) their (d) themselves

16 A top economic adviser to President Obama says there are three unemployed people for every job ___.

- (a) open (b) openly (c) opening (d) opened

17 ___ all the planets the most similar to Earth is Mars.

- (a) Between (b) On (c) Through (d) Of

18 The experimental project ___ to be completed by the end of 2039.

- (a) expects (b) is expecting (c) expected (d) is expected

19 It must be emphasized that these tumors are seen very ___ in patients younger than 15 years old.

- (a) weakly (b) hardly (c) infrequently (d) uneasily

20 It is common ___ to offer guests some refreshment.

- (a) usage (b) ground (c) practice (d) manner

[3] (30 points) The following passage is from R. D. Knight, *Physics for Scientists and Engineers*, 3rded. (Addison Wesley, 2012). Read the passage and answer the questions. Answer (I) in Chinese. Answer (II),(III) and (IV) in English.

Isaac Newton was born to a poor farming family in 1642, the year of Galileo's death. He entered Trinity College at Cambridge University at age 19 as a "subsizar", a poor student who had to work his way through school. Newton graduated in 1665, at age 23, just as an outbreak of plague in England force the universities to close for two years. He returned to his family farm for that period, during which he made important experimental discoveries(1) in optics, laid the foundations of his theories of mechanics(2) and gravitation(3) and made major progress toward his invention of calculus(4) as a whole new branch of mechanics.

A popular image has Newton thinking of the idea of gravity after an apple fell on his head. This amusing story is at least close to the truth. Newton himself said that the "notion of gravitation" came to him as he "sat in a contemplative mood" and "was occasioned by the fall of an apple." It occurred to him that, perhaps, the apple was attracted to the *center* of the earth but was prevented from getting there by the earth's surface. And if the apple was so attracted, why not the moon?

(背面仍有題目,請繼續作答)

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Robert Hook, discoverer of Hooke's law, had already suggested that the planets might be attracted the sun with a strength proportional to the inverse square of the distance between the sun and the planet. This seems to have been a hunch rather than being based on any particular evidence, and Hooke failed to follow up on the idea. Newton's genius was not just his successful application of Hooke's suggestion, but his sudden realization(5) that the force of the sun on the planets was identical(6) to the force of the earth on the apple. In other words, gravitation is a universal force between all objects in the universe! This is not shocking today, but no one before Newton had ever thought that the -mundane motion of objects on earth had any connection at all with the stately motion of the planets around the sun.

Newton reasoned along the following lines. Suppose the moon's circular motion around the earth is due to the pull of the earth's gravity. Then the force on the moon has magnitude(7) $F = mg_{@moon}$, where $g_{@moon}$ is the acceleration due to the earth's gravity at the distance of the moon. We cannot assume that $g_{@moon}$ is the familiar 9.80 m/s^2 . If the strength of gravity diminishes with distance, as Hooke had suggested, then the acceleration due to gravity will also decrease.

The moon's acceleration, which is found from Newton's second law, is $\vec{a} = \vec{F} / m = (\vec{g}_{@moon}, \text{ toward the earth})$. This centripetal acceleration(8) has only the radial component $a_r = g_{@moon}$. The centripetal acceleration of an object in uniform circular motions is

$$a_r = g_{@moon} = \frac{v_m^2}{r_m}$$

The moon's speed is related to the radius r_m and period T_m of its orbit by $v_m = (\text{circumference/period}) = 2\pi r_m / T_m$. Combining these, Newton found

$$g_{@moon} = \frac{4\pi^2 r_m}{T_m^2} = \frac{4\pi^2 (3.84 \times 10^8 \text{ m})}{(2.36 \times 10^6 \text{ s})^2} = 0.00272 (\text{m/s}^2).$$

Astronomical measurements had established a reasonably good value for r_m by the time of Newton, and the period $T_m = 27.3$ days was quite well known.

The moon's centripetal acceleration is significantly less than the acceleration due to gravity on the earth's surface. In fact,

$$\frac{g_{@moon}}{g_{earth}} = \frac{0.00272 (\text{m/s}^2)}{9.80 (\text{m/s}^2)} = \frac{1}{3600}$$

This is an interesting result, but it was Newton's next step that was critical. He compared the radius of the moon's orbit to the radius of the earth

$$\frac{r_m}{R_{earth}} = \frac{3.84 \times 10^8 (\text{m})}{6.37 \times 10^6 (\text{m})} = 60.2$$

Newton recognized that 60.2^2 is almost exactly 3600. Thus he reasoned:

- * If g has the value 9.80 at the earth's surface, and
- * If the force of gravity and g decrease in size depending inversely on the square of the distance from the center of the earth,
- * Then g will have exactly the value it needs at the distance of the moon to cause the moon to orbit the earth with a period of 27.3 days.

His two ratios were not identical (because the earth isn't a perfect sphere(9) and the moon's orbit isn't a perfect circle), but he found them to "answer pretty nearly" and knew that he had to be on the right track.

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This flash of insight(10) changed our most basic understanding of the universe. Copernicus displaced the earth from the center of the universe and now Newton had shown that the laws of the heavens and laws of earth are the same. Nonetheless, Newton did not publish his results for a long 22 years. The issue that troubled him was treating the sun, the earth, and other planets as if they were single particles with all their mass at the center. If this idea about a universal force was correct, then *every atom* in the earth exerts a force on *every atom* in the moon. Newton had to show that all of these forces add up to give a result that is identical with treating the bodies as single particles. This is a problem in integral calculus, and Newton had first to develop the necessary mathematics. He did eventually succeed, and his theory of gravitation was published in 1687 along with his theory of mechanics (which we know as Newton's law) in his great work *Philosophia Naturalis Principia Mathematica* (Mathematical Principles of Natural Philosophy). The rest is history.

QUESTIONS

(I)(10 points) Translate the underlined words in the passage into Chinese.

(1) discoveries (2) mechanics (3) gravitation (4) calculus (5) realization (6) identical (7) magnitude
(8) centripetal acceleration (9) sphere (10) insight

(II)(10 points) Our popular image is that Newton realized the universal law of gravity immediately after an apple fell. However, as described above, the reality is that he had a step by step thinking in reaching his discovery. Summarize Newton's logical steps described in the passage in less than 50 words.

(III)(5 points) Why did Newton end up in inventing calculus?

(IV)(5 points) According to the passage, what is the most significant part of Newton's discovery in the law of gravity?