

# 平成29年度 入学試験問題

## 医学部 (Ⅱ期)

### 英語・数学

#### 注意事項

1. 試験時間 平成29年3月4日、午前9時30分から11時50分まで
2. 配付した試験問題(冊子)、解答用紙の種類はつぎのとおりです。
  - (1) 試験問題(冊子、左折り)(表紙・下書き用紙付)
    - 英語
    - 数学(その1, その2)
  - (2) 解答用紙
    - 英語 1枚(上端黄色)(右肩落とし)
    - 数学(その1) 1枚(上端茶色)(右肩落とし)
    - ” (その2) 1枚(上端茶色)(左肩落とし)
3. 下書きが下書き用紙で足りなかったときは、試験問題(冊子)の余白を使用して下さい。
4. 試験開始2時間以降は退場を許可します。但し、試験終了10分前からの退場は許可しません。
5. 受験中にやむなく途中退室(手洗い等)を望むものは挙手し、監督者の指示に従って下さい。
6. 休憩のための途中退室は認めません。
7. 退場の際は、この試験問題(冊子)を一番上へのせ、挙手し、監督者の許可を得てから、試験問題(冊子)、受験票、下書き用紙および所持品を携行の上、退場して下さい。
8. 試験終了のチャイムが鳴ったら、直ちに筆記をやめ、おもてのまま上から解答用紙(英語、数学(その1)、数学(その2))、試験問題(冊子)の順にそろえて確認して下さい。確認が終っても、指示があるまでは席を立たないで下さい。
9. 試験問題(冊子)はお持ち帰り下さい。
10. 監督者退場後、試験場で昼食をとることは差支えありません。ゴミ入れは場外に設置してあります。
11. 午後の集合は1時です。

## 英 語

1 次の各組の単語について、(1)~(2)は下線部の発音が他と異なるものを、(3)~(5)は一番強いアクセントの位置が他と異なるものを、それぞれ1つずつ選び、記号で答えなさい。

- (1) A. onion      B. policy      C. novel      D. modern      E. knowledge  
(2) A. decision      B. business      C. foreigner      D. guilty      E. women  
(3) A. fa-tigue      B. ca-reer      C. ca-nal      D. des-ert      E. com-mon  
(4) A. ac-ces-so-ry      B. del-i-ca-cy      C. ac-com-mo-date  
D. o-rig-i-nal      E. bi-og-ra-phy  
(5) A. com-fort-a-ble      B. vol-un-tar-y      C. mel-an-chol-y  
D. com-pli-cat-ed      E. pho-tog-ra-pher

2 次の各文の( )の中に入れるのに最も適切な表現を1つずつ選び、記号で答えなさい。

- (1) It was very kind ( ) you to see me off at the airport.  
A. from      B. for      C. of      D. about      E. on
- (2) There were words upon his lips that he seemed ( ) to say.  
A. frightening      B. to frighten      C. frighten  
D. to be frightening      E. frightened
- (3) ( ) food for the party, that's all being taken care of.  
A. According to      B. With all      C. In case of  
D. By means of      E. As for
- (4) The prime minister ( ) forth his views in the television broadcast this evening.  
A. set      B. came      C. brought      D. sent      E. passed
- (5) Other things ( ) equal, the simplest explanation is the best.  
A. be      B. is      C. are  
D. being      E. have been



- (6) 傘を開くと、強風で傘が外側に反り曲がった(おちょこになった)。

When I ( き ) my umbrella up, strong wind blew it ( く ) out.

- (7) 子供たちに山積みした洋服を見せなさい。子供をひとり呼んでカーディガンの着かたとボタンの留めかたを実際にやらせてみなさい。

Show children the pile of clothes. Invite a child to demonstrate how to put on a cardigan and ( け ) a button.

- (8) 専業主婦の家庭が少なくなっている。

There are ( こ ) families with a full-time homemaker parent.

- (9) 付き合う人でその人の人柄がわかる。

You can judge a man by the company he ( さ ) .

- (10) 本日のこの受賞の栄誉は、私にとってこの上ない誇りであり、この機会を与えて下さった委員のみなさまには心からの感謝を申し上げます。受賞にあたって、この名誉に恥じないようによりいっそう精進いたします。

There is no greater honor for me ( し ) to receive this award today. I would like to express my heartfelt (g す ) to the committee members for giving me this opportunity. (R せ )the award will make me only more determined to work harder to (l そ )up to this honor.

4 以下の文章を読んで、下の問題に答えなさい。

- [1] Mount Fuji, medieval castles and amusement parks are ( あ ) the most popular destinations for tourists coming to Japan. Now the government wants a visit to a clinic for a full-body medical checkup or a meeting with a nutritionist to become part of the itinerary\*.
- [2] The 2015 Japan Revitalization Strategy, a government policy strategy announced last month, says the health care sector — which has long been heavily regulated and shielded from pressures of capitalism — should be turned into a moneymaker and even a driver of national economic growth.
- [3] “Health care and nursing care fields are facing a big turning point,” declares the document, adopted by the Cabinet on June 30. “Medical needs are diversifying on the back of rise in public awareness on health and preventive medicine, while demand for health care services has gone up rapidly due to population aging. We need to think about how to revitalize healthcare as an industry and raise its productivity.” In particular, the government wants to boost medical tourism, or the acceptance of foreign tourists at hospitals and clinics in Japan, and help Japanese medical institutions branch out overseas, especially in emerging economies where medical needs are surging.
- [4] Doctors and hospitals should change their mindsets and look overseas for business, said Koji Fujimoto, a counselor for the Cabinet Secretariat’s Office of Health Care Policy. Formerly a bureaucrat at the Ministry of Economy, Trade and Industry, Fujimoto said the current health insurance scheme is not sustainable, as 40 percent of its annual ¥39 trillion in costs are financed through taxes. Also, universal health care, introduced in 1961, is out of touch with the medical needs of today, he said. For example, while more patients are aging and in need of longtime management for chronic conditions, many hospitals still focus on emergency care, he said, noting that there is an excess of acute-stage care in regions such as Kansai and Hokkaido.
- [5] But if hospitals start cutting back on acute-stage care, Japan as a whole would lose opportunities to maintain its medical standards in the field. It needs to export its health care overseas to make up for falling demand at home, Fujimoto argued. “Domestic pharmaceutical companies are already reluctant to develop drugs for children because the market is shrinking,” he said. “If we keep going as it is there will be even fewer drugs for children. But if we decide to be the center of pediatric care in Asia, opportunities would open up. We need to look outside Japan to protect health care at home.”
- [6] The government believes Japan’s health care industry can potentially access ¥20 trillion

of the global market for medical services, assuming 5 percent of the affluent class around the world would buy health care services and equipment from Japan. While medical tourism in Japan is still in its ( ㄨ ), some hospitals are ahead of others in accepting patients from abroad. In May 2013, St. Luke's International Hospital created a new department to deal exclusively with non-Japanese patients. The hospital's international department has five full-time and three part-time staffers, who provide on-site translations and handle all the paperwork in foreign languages, such as settling insurance claims.

[7] At St. Luke's main hospital in Tokyo's Tsukiji district, all signs are in four languages, with English shown most prominently at the top, followed by Japanese, Chinese and Korean. The hospital also has a growing number of patients from Russia, especially from the eastern cities of Vladivostok and Khabarovsk, said Pavel Kovalenko, an executive medical coordinator at the hospital. "Many Russian patients want to speak Russian when they receive care and have felt frustrated not being able to communicate their medical needs well in Japan," he said. Kovalenko added that Japan's health care has a good public image in Russia, helped by the image of Japanese automakers and other manufacturing companies, which are known for their rigorous quality control.

[8] But some experts are skeptical. John Wocher, executive vice president at Kameda Medical Center in Kamogawa, Chiba Prefecture, said Japan's push for medical tourism is "( ㄱ )" Wocher said the nation's stakeholders, including government agencies, hospitals and doctors, are in disarray over basic stances on medical tourism. The Japan Medical Association, comprised mostly of doctors in private practice and whose members have huge influence over the Liberal Democratic Party-led government policy, has long been opposed to expansion of medical tourism, on grounds it could erode universal health care. The association is known as a vote-gathering machine for the LDP.

[9] "Although the prime minister's heart is in the right place, and the Ministry of Economy, Trade and Industry sees this as a potential growth engine for Japan's economy, I don't think this is very well supported by the Japan Hospital Association, the Japan Medical Association or any of the hospitals that might receive foreign patients," Wocher said.

[10] In addition, compared with established medical tourism destinations such as Singapore, South Korea, Thailand and India, Japanese hospitals lack price competitiveness due to their high personnel costs, he said. He added that they also have too few staff capable of dealing with patients in foreign languages or a system to deal with the often-rigorous demands of medical travelers.

[Adapted from Tomoko Otake. Japan's hospitals weigh overseas branches, medical tourism in search for profit. *The Japan Times*. July 19, 2015]

NOTES

**itinerary:** a plan of a journey

**egalitarian:** believing that everyone is equal

- (1) [1]段落の空所( あ )に適切な前置詞を一語入れなさい。
- (2) [2]段落の下線部 driver と同じ意味で使われている語句を, [6]段落より下の本文中から抜き出しなさい。
- (3) [4]段落の下線部を日本語に訳しなさい。
- (4) [6]段落の空所( い )に入る語を1つ選び, 記号で答えなさい。  
A. childhood                      B. infancy                      C. adolescence  
D. maturity                      E. adulthood
- (5) [8]段落の下線部 skeptical の理由として本文の内容に則しているものを1つ選び, 記号で答えなさい。  
A. There exists a huge gap between hospitals and patients on whether medical tourism revitalizes the Japan's economy.  
B. The Liberal Democratic Party has long been against the expansion of medical tourism.  
C. Japanese hospitals are no match for other hospitals in Asia in an outright price war because of their high personnel costs.  
D. Only a few Japanese doctors can communicate with patients in their languages.  
E. The medical tourism patients do not necessarily have excessive expectations of Japanese health care.
- (6) [8]段落の空所( う )に入る語句を1つ選び, 記号で答えなさい。  
A. make haste slowly  
B. kill two birds with one stone  
C. so many men, so many minds  
D. seeing is believing  
E. too little, too late
- (7) 本文で述べられている, 医療ツーリズムに対する賛成意見と反対意見をそれぞれ60字以内で簡潔にまとめなさい。

# 数 学 (その1)

1 次の各問いに答えよ。ただし、答は結果のみを解答欄に記入せよ。

(1) A さん, B さんは仲の良い友達である。イベントに二人を誘うとき, A さんが来る確率は 0.5, B さんが来る確率は 0.6 であるという。また, A さんが来るという条件の下で B さんが来る確率は 0.9 であるという。

(1-1) A さん, B さんが 2 人とも来る確率を求めよ。

(1-2) A さん, B さんの少なくとも 1 人が来る確率を求めよ。

(1-3) B さんが来るという条件の下で A さんが来る確率を求めよ。

(2) 空間内に 2 定点 A, B があり, 原点 O とで三角形をなすとする。空間にある点 P が

$$\vec{OP} \cdot \vec{AP} + \vec{AP} \cdot \vec{BP} + \vec{BP} \cdot \vec{OP} = 0$$

を満たしているとき, 動点 P の存在範囲を求め, どのような図形になるか答えよ。



2 次の問いに答えよ。ただし、答は結果のみを解答欄に記入せよ。

(1) ド・モアブルの定理より、 $(\cos \theta + i \sin \theta)^5 = \cos 5\theta + i \sin 5\theta$  が成り立つ。

この等式の虚数部分を比較することによって、 $\frac{\sin 5\theta}{\sin \theta}$  を  $\cos \theta$  の式で表せ。

ただし、答は実数係数の範囲で因数分解した形で答えよ。

(2) (1)の結果を用いて、次の式の値を求めよ。

$$\left(1 - \cos \frac{\pi}{5}\right) \left(1 - \cos \frac{2\pi}{5}\right) \left(1 - \cos \frac{3\pi}{5}\right) \left(1 - \cos \frac{4\pi}{5}\right)$$

(3) ド・モアブルの定理より、 $(\cos \theta + i \sin \theta)^n = \cos n\theta + i \sin n\theta$  が成り立つ。

この等式の虚数部分を比較することによって、 $\frac{\sin n\theta}{\sin \theta}$  を  $\cos \theta$  の式で表せ。ただし、答は実数係数の範囲で因数分解した形で答えよ。

(4) (3)の結果を用いて次の式の値を  $n$  の式で簡潔に表せ。

$$\underbrace{\left(1 - \cos \frac{\pi}{n}\right) \left(1 - \cos \frac{2\pi}{n}\right) \cdots \left(1 - \cos \frac{(n-1)\pi}{n}\right)}_{n-1 \text{ 項の積}}$$

## 数 学 (その2)

3 次の各問いに答えよ。ただし、答は結果のみを解答欄に記入せよ。

(1) 2つの自然数  $A, B$  について  $[A * B]$  は  $A, B$  のうち大きい方の数を小さい方の数で除した余りを表す。例えば  $[19 * 8] = 3$  となる。ただし、 $A = B$  のときは  $[A * B] = 0$  とする。

(1-1)  $[N_1 * 41] = 5$  となる 100 以下の自然数  $N_1$  は全部で何個あるか求めよ。

(1-2)  $[N_2 * 48] = [N_2 * 84]$  となる 2017 以下の自然数  $N_2$  は全部で何個あるか求めよ。

(2) 正十二面体の辺の数を求めよ。なお、正十二面体の頂点の数は 20 である。

(3) 2次方程式  $x^2 - (t - 7)x + 1 = 0$  の2つの解を  $\alpha, \beta$  とするとき

$$(1 - t\alpha + \alpha^2)(1 - t\beta + \beta^2)$$

の値を求めよ。

4 次の各問いに答えよ。ただし、答は結果のみを解答欄に記入せよ。

(1)  $\sin \theta + \sin^2 \theta = 1$  のとき  $\cos^2 \theta + \cos^8 \theta$  の値を求めよ。

(2)  $(\log_2 x)^2 + (\log_2 y)^2 = \frac{9}{5}$  のとき、 $x^2 y$  の取りうる範囲を求めよ。

(3) 関数

$$f(x) = \frac{e^x}{\sin x}$$

の  $0 < x < \pi$  における最小値を求めよ。

(4)  $0 < k < 2$  であるとき、 $y = -x^2 + 2x$  と  $y = kx$  とで囲まれる図形の面積を  $S_1$ 、

$y = -x^2 + 2x$  と  $y = kx$  と  $x = 2$  とで囲まれる図形の面積を  $S_2$  とするとき、 $S_1 + S_2$  を最小にする  $k$  の値を求めよ。

(5) 整式  $f(x)$  が

$$f(0) = 0, \quad xf(x) + \int_x^0 f(t) dt = 9x^4 - 6x^2$$

を満たしている。このとき  $x$  軸と  $y = f(x)$  のグラフとで囲まれる部分の面積を求めよ。