

別紙解答用紙に解答すること。

問1 第一志望の学部・学科を明記し、その学問分野を志望する理由を述べなさい。さらに、あなたがスポーツ活動を通じて得られた経験が、志望する分野の勉学や将来の進路にどのように還元できるか述べなさい。

問2 以下の英文を読み、設問(1)~(4)に日本語で答えなさい。

The human body is made to move, and physical activity is a requirement for lifelong health. But exercise-related injuries are a significant concern few people think about until it's too late. Even a mild sprain can sideline an athlete for weeks, and a sports-related injury can be debilitating for an older adult. ①“I think a lot of people, especially those in their 20s and 30s, are interested in doing a lot of exercise but they’re not really thinking about injuries.” says Dr. Brian Werner, an orthopedic surgeon and sports medicine specialist at the University of Virginia.

Running, for example, is among the most popular forms of exercise in America. But up to half of all runners are injured each year, according to a 2010 study in *Current Sports Medicine Reports*. “I’m a long-distance runner myself, but it’s a high-impact form of exercise and it’s not optimal for people trying to avoid getting hurt,” Werner says. Also, many runners tend to overdo it. When it comes to running’s longevity benefits, researchers have found that running two or three times per week at a slow or moderate pace is optimal.

Especially for those age 40 and older, exercises that place heavy amounts of stress on the knees, shoulders and other joints are going to come with a high risk of injury, Werner says. Examples he raises are basketball, soccer, tennis, or other sports that involve lots of jumping, twisting, or quick changes of direction.

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sprain: 捻挫, sideline: 欠場させる, debilitate: 衰弱させる, orthopedic surgeon: 整形外科医, longevity: 寿命

- (1) 下線部①を日本語に訳しなさい。
- (2) 研究者によると、長寿のためにはランニングはどのように行うのが最適とされているかを記しなさい。
- (3) ワーナー(Werner)博士が、40歳以上の人にとって怪我をする恐れが高いとして例示している競技の名称と、そう考える理由を記しなさい。
- (4) スポーツ競技における怪我を少なくするため科学技術がどのように貢献できるかについて、あなたの考えを述べなさい。

問3 次の設問(1)~(4)に答えなさい。

- (1) 点(1, 7)を通り、円 $x^2 + y^2 = 25$ に接する直線の方程式を求めなさい。
- (2) $\lim_{x \rightarrow 0} \frac{\sin x}{x} = 1$ であることを利用して、極限 $\lim_{x \rightarrow 0} \frac{x^2}{1 - \cos x}$ を求めなさい。
- (3) 関数 $y = \left(\frac{x^2-1}{x^2+1}\right)^2$ を微分しなさい。
- (4) 放物線 $y = -x^2 + 2x$ と x 軸で囲まれた図形の面積を求めなさい。

以上