

2022 IUT Admission Test(SOCIE)

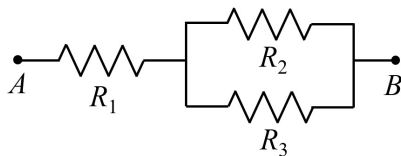
<Multiple choice Types> There is only one correct answer per each question. Mark your answer choice on the OMR answer sheet.

For each correct answer, you will get the points indicated next to each question number.

No penalty point is applied to an incorrect answer.

1. [1 point]

Find the equivalent resistance between points A and B in the following circuit when $R_1 = 2 \Omega$, $R_2 = 1 \Omega$, $R_3 = 1 \Omega$.



- 2 Ω 2.5 Ω 3 Ω 3.5 Ω 4 Ω

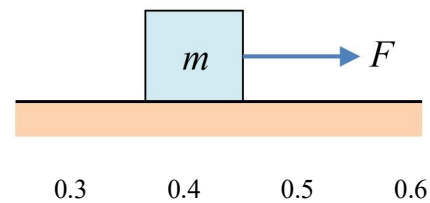
2. [1 point]

What is the wavelength of an electromagnetic wave with a frequency of 2.0 GHz? Note that the speed of the electromagnetic wave is 3.0×10^8 m/s.

- 0.05 m 0.10 m 0.15 m
0.20 m 0.30 m

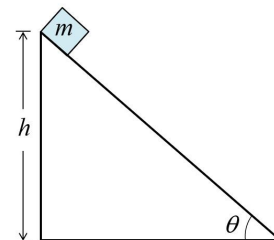
3. [2 points]

An object with mass $m = 2$ kg is pulled to the right along a rough surface by a force F of 10 N, as shown in the diagram below. If the acceleration of the object is 3 m/s^2 , determine the coefficient of kinetic friction between the object and the surface. Assume that the magnitude of gravitational acceleration is 10 m/s^2 .



4. [2 point]

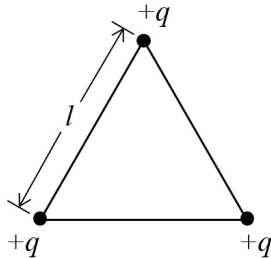
A block of mass $m = 2.0$ kg is free to slide down a frictionless plane that is inclined at an angle $\theta = 30^\circ$ to the horizontal, as shown in the following figure. If the height of the plane is $h = 5$ m and the block is released from rest at the top, what will be its speed when it reaches the bottom? (Assume that the magnitude of gravitational acceleration is 10 m/s^2)



- 5 m/s $2\sqrt{3}$ m/s 8 m/s
10 m/s $4\sqrt{3}$ m/s

5. [3 point]

Three charges, each with charge $+q$, are placed at the three corners of an equilateral triangle of edge length l . Find the magnitude of the force on any one charge arising from the other two.



$$\frac{1}{4\pi\epsilon_0}q^2/l^2 \quad \frac{\sqrt{2}}{4\pi\epsilon_0}q^2/l^2 \quad \frac{\sqrt{3}}{4\pi\epsilon_0}q^2/l^2$$
$$\frac{1}{2\pi\epsilon_0}q^2/l^2 \quad \frac{\sqrt{2}}{2\pi\epsilon_0}q^2/l^2$$

6. [3 point]

A capacitor of $3\text{-}\mu\text{F}$ capacitance is connected to a 12-V battery. When the capacitor is fully charged, it is disconnected from the battery and then connected to the second, uncharged capacitor of $6\text{-}\mu\text{F}$ capacitance. After a long time, the amount of the charge remained in the first capacitor is

$$4 \mu\text{C} \quad 8 \mu\text{C} \quad 12 \mu\text{C}$$
$$18 \mu\text{C} \quad 24 \mu\text{C}$$