受験番号：24IPE001

問１）

1. An AC arc welding device comprising:

a welding control unit;

a memory unit;

an AC frequency setting unit that sets an AC frequency;

a reversed polarity period setting unit that sets a reversed polarity period;

a calculation unit that calculates a straight polarity period and a reversed polarity period and outputs them to the welding control unit; and

a selection unit that selects one of a plurality of outputs of the memory unit and outputs it to the calculation unit,

wherein the welding control unit conducts a straight polarity base current that is lower than a peak current of the straight polarity period before a polarity reversal when the straight polarity period finishes, and conducts a reversed polarity base current that is lower than a peak current of the reversed polarity period before a polarity reversal when the reversed polarity period finishes,

wherein the memory unit

(a) stores a plurality of combinations of a straight polarity base ratio that is a ratio of a period during which the straight polarity base current is conducted during the straight polarity period, and a reversed polarity base ratio that is a ratio of a period during which the reversed polarity base current is conducted during the reversed polarity period, or

(b) stores a plurality of combinations of a straight polarity peak period that is a period during which the peak current is conducted during the straight polarity period, a straight polarity base period that is a period during which the straight polarity base current is conducted, a reversed polarity peak period that is a period during which the peak current is conducted during the reversed polarity period, and a reversed polarity base period that is a period during which the reversed polarity base current is conducted, and

wherein the selection unit is configured to select one of the plurality of combinations stored in the memory unit based on an inductance on a welding load side.

問２）

In a conventional surveillance system where the sensor is installed, for example, at a gate of a parking lot, when a vehicle is detected at the gate, the mobile robot arrives at the gate where the sensor is installed. The robot processes the photographs it has taken on the way, determines the body color of the vehicle, and can then transmit that information to a control center. In such a case, it is desirable that the surveillance system can take photographs that provide information useful in identifying the vehicle.

However, depending on the personality of the thief and state of the parking lot, the way the vehicle will be parked cannot be predicted in advance. It may therefore be difficult for the mobile robot to photograph the vehicle such that the body color of the vehicle can be determined.

For example, when photographing a vehicle using a visible light color camera to determine the body color, its hue may differ between photographs obtained in the daytime and photographs obtained in the evening due to the influence of the sunlight, such that a white vehicle may appear orange when photographed in the evening. There was also a problem in that during nighttime, light components from lighting systems installed at the parking lot, electronic billboards installed on the walls of nearby commercial buildings and the like could cause a hue that looked different than when observed with the naked eye.

問３）

When supercooling interruption is detected, the food temperature Th_2 immediately after the supercooling was interrupted corresponds to the freezing point of the food. Based on this temperature, the target temperature Tc_set in the bottom container of the chilling compartment is set to a temperature capable of melting ice crystals without cell damage, for example Th_2 + 2°C (S9). Such a set temperature of the refrigerator interior capable of melting ice crystals without cell damage is referred to herein as an ice crystal-melting refrigerator interior temperature.

Next, when melting of the ice crystals that formed in the food is finished and the food temperature begins to rise, the target temperature Tc_set of the bottom

container of the chilling compartment is maintained at Th_2 + 2°C until for example the food temperature Th rises to a temperature Th_2 + 1°C which is lower than the ice crystal-melting refrigerator interior temperature and at which melting of ice crystals is determined (S10). To create this state, the temperature in the bottom container of the chilling compartment is increased, by for example maintaining the damper in a completely closed state. When the food temperature Th after supercooling interruption becomes equal to or greater than Th_2 + 1°C, supercooling introduction and checking for the occurrence of supercooling interruption is resumed again by the control process of steps S1 to S8.