

Part I 單選題 (5% each, 15% total)

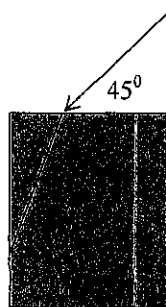
請於試卷上「選擇題作答區」依序作答。

1. Beta decay of a certain type of nuclei means: (A) Loss of one orbiting electron from the atom; (B) Loss of a helium nucleus; (C) Adding the atomic number by one; (D) Subtracting the atomic number by two.
2. Change of angular momentum per unit time is equal to: (A) angular acceleration; (B) the applied force; (C) momentum acceleration; (D) torque exerted.
3. Choose the electromagnetic wave that shows the longest wavelength: (A) microwave; (B) X-ray; (C) infrared; (D) ultraviolet.

Part II 計算與問答題 (85% total)

請於試卷上「非選擇題作答區」依序作答，並應註明作答之題號。

1. (20%) For a thin spherical shell with radius R and mass M to be rotated around an axis passing the spherical center, symbolically derive its rotational inertia.
2. (30%) (a) (10%) For an acoustic source generating a sound wave at frequency of f , when it is moving toward an observer at a speed of v_s , derive the sound frequency f' as heard by the observer. (b) (10%) Do the above derivation for a static acoustic source, with the observer moving toward the source at a speed of v_o . (c) (10%) Are the two answers identical? Why or why not?
3. (20%) A light ray falls on a square glass slab from air as shown below. If total reflection occurs at the vertical face, calculate the requirement of the index of refraction for the glass.



4. (15%) The energy required to remove an electron from sodium is 2.3 eV. Does sodium show a photoelectric effect for orange light whose wavelength is 680 nm? Why or why not? Planck's constant is 6.626×10^{-34} Joule-second. The electron charge is equal to 1.6×10^{-19} coulomb.

Good luck!

試題隨卷繳回