

Menoufia University

**Nuclear Physics (P 253)**

Faculty of Science

Date: Jan. 2019

Physics Department

Time: 2 hrs

الامتحان من صفتين (الصفحة الاولى)

Answer the following questions:

Q-1 Which of the following statements are true ( $\checkmark$ ) and which are false ( $\times$ ); correct the false ones: [36 Marks]

- 1-Activity is reduced to  $0.125 A_0$  after  $3T$ .
- 2-Neutrinos and gammas are having the same origin.
- 3-Positive ions are produced in the EC process.
- 4-Both of nuclear mass and nuclear volume proportional to  $A$ .
- 5-AL is a good shield for gamma rays.
- 6-Saturation property is found in the proportional counter.
- 7-Exposure to neutrinos are not hazardous.
- 8-In pairs annihilation  $e^-$  and  $e^+$  are resulted.
- 9-The relativistic kinetic energy  $K = \sqrt{C^2 P^2 + m_0 C^2} - m_0 C^2$ .
- 10-IC process is a source of monoenergetic electrons.
- 11-The function of the PMT is to enlarge the energy of gamma ray.

Q-2 Why are the following statements correct? [42 Marks]

- 1-Nuclear densities are much greater than Bulk densities.
- 2-In magnetic spectrograph  $K_\alpha \propto r$  (radius of curvature).
- 3-Rate of energy loss of  $\alpha >$  that of  $\beta$  of same velocities.
- 4-Atoms are considered as empty objects.
- 5-Free neutrons can decay while free protons can not.
- 6-Nuclear force is of a saturation property.
- 7-Ratio of nuclear radii of  $^{24}\text{Na}$  to  $^3\text{He}$  is 2.
- 8-Growth curve can be represented by  $N_0 (1 - e^{-\lambda t})$ .

