STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI – 600 086.
(For candidates admitted during the academic year 2004-06)

SUBJECT CODE : **PH/MC/AN64**

B.Sc. DEGREE EXAMINATION APRIL 2007
BRANCH III - PHYSICS
SIXTH SEMESTER

REG. No._____

COURSE : **MAJOR – CORE**
PAPER : **ATOMIC AND NUCLEAR PHYSICS**
TIME : **30 MINS.** MAX. MARKS : 30

SECTION - A

TO BE ANSWERED IN THE QUESTION PAPER ITSELF

ANSWER ALL QUESTIONS: (30 x 1 = 30)

I CHOOSE THE CORRECT ANSWER:

1. Positive rays travel with a velocity about
a) 10^6 kms^{-1} b) 10^6 ms^{-1} c) 10^2 ms^{-1} d) 10^8 ms^{-1}

2. The photoelectric material sensitive to visible light in
a) zinc b) cadmium c) alkali metals d) carbon

3. The kinetic energy of a photo electron is equal to
a) $\frac{1}{2}mv^2 + \phi$ b) $\frac{1}{2}mv^2 - \phi$ c) $h\nu$ d) $h\nu - \phi$

4. For a first order scattered beam, Bragg law is given by the relation
a) $2dSin\theta = \lambda$ b) $dSin\theta = \lambda$ c) $dSin\theta = 2\lambda$ d) $dSin\theta = 1$

5. The ionisation potential of the hydrogen atom is
a) 10.2eV b) 12.09eV c) 13.6eV d) 3.4eV

6. The maximum number of electrons that can occupy a M-shell in an atom is
a) 2 b) 18 c) 32 d) 10

7. The Bohr magneton is equal to
a) $\frac{e\hbar}{2m}$ b) $\frac{eh}{2m}$ c) $\frac{e\hbar}{2\Pi m}$ d) $\frac{eh}{2\Pi m}$

λ

8. 1MeV of energy is equal to
a) 1.6x10^{-19}J b) 1.6x10^{-10}J c) 1.6x10^{-6}J d) 1.6x10^{-13}J

9. The volume energy Ev of a nucleus is proportional to

a) $A^{1/3}$ b) $A^{2/3}$ c) $A^{3/4}$ d) A

..2

10. _____ is not a magic number

a) 2 b) 8 c) 16 d) 20

11. Liquid drop model was proposed by

a) Ruther ford b) Neils Bohr c) Sommerfeld d) Pauli

12. The Baryon number of a proton is

a) 0 b) 1 c) -1 d) ½

13. The half life of a radio active substance is

a) 0.6931 days b) 0.6931 λ days c) $\frac{0.6931}{\lambda}$ d) $\frac{\lambda}{0.6931}$

14. β - particles are identical with

a) protons b) neutrons c) helium nucleus d) electrons

15. In a cyclotron, the time taken by the positive ion to travel the semicircular path is equal to

a) $\frac{Be}{\Pi m}$ b) $\frac{Be}{2\Pi m}$ c) $\frac{\Pi m}{Be}$ d) $\frac{2\Pi m}{Be}$

II FILL IN THE BLANKS:

16. The Einstein's photo electric equation is _____.

17. The splitting of spectral lines due to the action of an external electric field on the radiating substance is called _____.

18. The half life period of a neutron is about _____.

19. The minimum kinetic energy of the incident particle which will initiate an endoergic reaction is called _____.

20. The weakest interaction is _____.

III STATE WHETHER TRUE OR FALSE:

21. Nucleas forces is an example of strong interaction.

22. Bohr and Wheeler's theory successfully explained the phenomenon of nuclear fusion.

23. Ionization chamber can be used to detect r-rays.

24. Mosley's law relates frequency and atomic number.

25. Sommerfeld's theory explained complex spectra of alkali metals like sodium.

..3

IV ANSWER BRIEFLY:

26. What is photo electric effect?

27. Define ionization potential.

28. Define nuclear fusion.

29. Give the names of any two Leptons.

30. what is artificial transmutation of elements?

※※※※※※※※