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Name..... 71 .....

Reg. No.....

FOURTH SEMESTER B.Sc. DEGREE EXAMINATION, APRIL/MAY 2015

(UG—CCSS)

Complementary Course—Physics

PH 4C 07—ELECTRICITY, MAGNETISM AND NUCLEAR PHYSICS

(2009—2012 Admissions)

Time : Three Hours

Maximum : 30 Weightage

Section A

I. Answer *all* 12 questions :

- 1 As distance between two charges is doubled force between them becomes \_\_\_\_\_.
- 2 On an equipotential surface, potential difference between two points is \_\_\_\_\_.
- 3 Which one is a unit of potential ?  
(a) J/C. (b) N/C.  
(c) NC. (d) JC.
- 4 Resistivity of a metal wire depend on :  
(length, area of cross-section, both length and area, none of the above)
- 5 A galvanometer is converted into a voltmeter by connecting a resistance in \_\_\_\_\_.
- 6 In a diamagnetic material magnetic susceptibility is \_\_\_\_\_.
- 7 In a stable nucleons, mass of nucleons, is \_\_\_\_\_ than mass of nucleus.
- 8 In a cyclotron, field applied is :  
(E only, B only, E and B, none of the above)
- 9 In a nuclear reactor, \_\_\_\_\_ slows down the highly energetic neutrons.
- 10 Protons and neutrons are :  
(a) Leptons. (b) Mesons.  
(c) Baryons.
- 11 What are the original three quarks ?
- 12 The nuclear reaction taking place in hydrogen bomb is \_\_\_\_\_.

(12 × ¼ = 3 weightage)

Turn over

**Section B**

II. Short answer type questions. Answer *all* nine questions :

- 13 How can we convert a galvanometer into an ammeter ?
- 14 Draw the schematic diagram of Carey Foster bridge.
- 15 What is tan A position of deflection magnetometer ?
- 16 What is declination ?
- 17 How nucleus is stable ?
- 18 Mention four properties of  $\beta$ -rays.
- 19 Explain latitude effect.
- 20 Controlled nuclear reaction is difficult in practice-Why ?
- 21 Write a note on carbon dating.

(9 × 1 = 9 weight)

**Section C**

III. Short essay or paragraph questions. Answer any *five* questions from 7 :

- 22 Two equal charges placed at distance of 1 m repel each other by a force of  $9 \times 10^{-3}$  N. Find the magnitude of charge.
- 23 Explain with a practical application, electrostatic shielding.
- 24 A galvanometer has resistance of  $30 \Omega$  and current of 2 mA is needed to give full scale deflection. What is the resistance needed and how is it to be connected to convert the galvanometer's
  - (a) into ammeter of 0.3 amperes.
  - (b) into voltmeter of 0.2 V range.
- 25 Briefly explain the origin of universe.
- 26 A tangent galvanometer has coil 50 turns of mean radius 10cm. If the value of  $B_H$  at a place is 0.3 G. Calculate the current in ampere to produce a deflection  $45^\circ$ .
- 27 The half life of a radioactive sample is 4 days. What fraction of 1 gm sample will remain after 20 days.
- 28 Write a note on Cosmic rays.

(5 × 2 = 10 weight)

**Section D**

IV. Essay questions. Answer any *two* questions from 3 :

- 29 State Gauss's theorem. Derive equation for electric field intensity due to two parallel sheets of charge.
- 30 Write and explain the principle of potentiometer. How can we measure resistance using a potentiometer ?
- 31 Write and explain the working of a cyclotron.

(2 × 4 = 8 weight)