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Sample Questions For Ph.D. Entrance Examination-2012

Note : Sample questions are provided to give a general idea of the style of the questions that appear in the entrance test. These questions do not reflect the difficulty level of questions in the entrance test.

PHYSICS

1. **Name the process or processes which alternate (s) the passage of gamma rays through matter:**

   (1) Photoelectric effect   (2) Compton Recoils
   (3) Pair Production   (4) All of these

2. **How many quantum numbers do characterise an electron within an atom:**

   (1) Six   (2) Five
   (3) Four   (4) Three

3. **Write down the total number of particles inside the nucleus in terms of mass number(A) and atomic number Z:**

   (1) $A-2Z$ (2) $2A-Z$
   (3) $3A-2Z$ (4) None of these

4. **What is the name of the detecting device for discovery of positron:**

   (1) Electron Microscope   (2) Geiger-Muller Counter
   (3) Bubble Chamber   (4) Cloud Chamber

5. **Give the name of the process by which a positron and an electron coalesce to form photons:**

   (1) Pair Annihilation   (2) Compton Scattering
   (3) Bremhausstrahlung   (4) Rutherford Scattering

CHEMISTRY

6. **When solid sodium chloride crystallises from a saturated solution, the entropy change of the system:**

   (1) Decreases   (2) Increases
   (3) Zero   (4) Remains same with the surrounding

7. **Pure water has a P_H = 7 at 25^OC. The water is heated to 90^OC. Choose the right answer:**

   (1) K_w value will decrease and water will be alkaline
   (2) K_w Value will decrease but water will remain neutral
   (3) K_w Value will increase and water will be acidic
   (4) K_w value will increase but water will remain neutral

8. The vapour pressure of pure components 'X' and 'Y' are 100 torr and 50 torr respectively at a particular temperature. Assuming solution of X & Y obeying Raoult's law, the mole fraction of 'X' in the vapour phase in equilibrium with a solution containing equimoles of 'X' and 'Y' is:

   (1) 0.33   (2) 0.66
   (3) 0.80   (4) 0.50

9. The half life time for a reaction at initial conc. of 0.1 mole/litre and 0.4 mole/litre are 200 sec and 50 sec respectively. The order of the reaction is:

   (1) 0   (2) 1
   (3) 2   (4) 3

10. Under equilibrium condition for the reaction $2C(s) + O_2(g) \rightleftharpoons 2CO(g)$ the total pressure is 12 atm. The value of K_p is:

   (1) 16   (2) 0.5
   (3) 2   (4) 32

BIOLOGY

11. The salivary gland of leech secrete the anticoagulating factor:

   (1) Hypotoxin   (2) Antitoxin
   (3) Hirudin   (4) None of these

12. The beak is toothed in:

   (1) Ostrich   (2) Archaeopteryx
   (3) Penguin   (4) Kiwi

13. Bombykol is:

   (1) A hormone   (2) An enzyme
   (3) A pheromon   (4) None of these

14. The major constituent of blood plasma (more than half) is:

   (1) Protein   (2) Inorganic salts
   (3) Fatty substance (4) Sugar

15. Annual Ring indicates:

   (1) Age of the tree (2) Branching point
   (3) Scale bark   (4) Adventitious root

MATHEMATICS

16. If T is a real, skew-symmetric n×n matrix, then for n odd:

   (1) det T > o   (2) det T < o
   (3) det T = o   (4) None of these

17. The smallest subgroup which contains a fixed open subset of a topological group is:

   (1) Only open   (2) Is only closed
   (3) Is both open and closed (4) All of these are false

18. A subset S of real numbers has at least one limiting point if:

   (1) S is bounded (2) S is infinite set
   (3) S is bounded and finite (4) S is bounded and infinite

19. Let **F** be a field of real numbers and $\begin{pmatrix} 0 & 1 \\ -1 & 0 \end{pmatrix} \in F_2$, if **D** be the set of all matrices commuting

with $\begin{pmatrix} 0 & 1 \\ -1 & 0 \end{pmatrix} F_2$, then:

(1) D is isomorphic to the field of complex numbers   (2)   D is isomorphic to the field of real numbers
(3) D is not isomorphic to the field of complex numbers (4)   None of these

20. **If T is a linear transformation on an inner product space V(F), then which of the following is incorrect:**

(3) If T >o then Tr T <o   (4)   Not all the above are ture