

**NATIONAL BRAIN RESEARCH CENTRE(NBRC)**  
**NH-8, Manesar-122050, HARYANA**

**Sample Questions For Integrated Ph.D. Entrance Examination-2011**

**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. **The infrared spectrum falls between:**

- |                                     |                                    |
|-------------------------------------|------------------------------------|
| (1) Radio waves and micro waves     | (2) Micro waves and visible region |
| (3) Visible and ultraviolet regions | (4) Ultraviolet and x-rays         |

2. **The colour of a star indicates its:**

- |              |                 |
|--------------|-----------------|
| (1) Weight   | (2) Size        |
| (3) Distance | (4) Temperature |

3. **One star is going away from the Earth. Then the observer on the Earth will experience:**

- |                              |                             |
|------------------------------|-----------------------------|
| (1) Decrease in wave length  | (2) Increase in wave length |
| (3) No change in wave length | (4) None of these           |

4. **The terminal velocity of a spherical ball of radius  $r$  falling through a viscous liquid is proportional to:**

- |           |           |
|-----------|-----------|
| (1) $r$   | (2) $r^2$ |
| (3) $r^3$ | (4) $1/r$ |

5. **A 200 W lamp is connected to 100 volts supply. The number of electrons passing through the lamp in one minute is(charge of an electron =  $1.6 \times 10^{-19}$  C):**

- |                          |                        |
|--------------------------|------------------------|
| (1) $1 \times 10^{19}$   | (2) $2 \times 10^{15}$ |
| (3) $7.5 \times 10^{20}$ | (4) $1 \times 10^{12}$ |

**CHEMISTRY**

6. **Which of the following type of metals are the most efficient catalysts?**

- |                       |                          |
|-----------------------|--------------------------|
| (1) Alkali metal      | (2) Alkaline Earth metal |
| (3) Transition metals | (4) Metals of p-block    |

7. **The strongest bronsted base is:**

- |                      |                      |
|----------------------|----------------------|
| (1) $\text{ClO}_4^-$ | (2) $\text{ClO}_3^-$ |
| (3) $\text{ClO}^-$   | (4) $\text{ClO}_2^-$ |

8. **Mohr's salt is prepared in warm distilled water by the reaction of  $(\text{NH}_4)_2\text{SO}_4$  and:**

- |                     |                                  |
|---------------------|----------------------------------|
| (1) $\text{FeSO}_4$ | (2) $\text{Fe}_2(\text{SO}_4)_3$ |
| (3) $\text{CaSO}_4$ | (4) $\text{ZnSO}_4$              |

9. **Which among the following is correct order of reactivity with water according to electro chemical series:**

- |  |  |
|--|--|
| (1) $\text{Cu} > \text{Zn} > \text{Mg} > \text{K}$ | (2) $\text{K} > \text{Mg} > \text{Zn} > \text{Cu}$ |
| (3) $\text{Mg} > \text{Zn} > \text{Cu} > \text{K}$ | (4) $\text{K} > \text{Zn} > \text{Mg} > \text{Cu}$ |

10. The first order rate constant for the decomposition of  $N_2 O_5$  is  $6.2 \times 10^{-4} \text{ sec.}^{-1}$ . The half life period for the decomposition in seconds is:
- (1) 1117.7 (2) 111.7  
(3) 223.4 (4) 1609

## **BIOLOGY**

11. Which is not a root:

- (1) Potato (2) Carrot  
(3) Sweet Potato (4) Raddish

12. Stilt roots are found in:

- (1) Rice (2) Sugarcane  
(3) Groundnut (4) Gram

13. RIBOSOMES are made up of:

- (1) RNA and DNA (2) DNA and Protein  
(3) RNA and Protein (4) DNA alone

14. Nitrogen is available for plants in the form of:

- (1) Nitrogen gas (2) Nitrogen dioxide  
(3) Nitrate (4) Nitric acid

15. Karyokinesis means division of:

- (1) Cytoplasm into two (2) Nucleus into two  
(3) Protoplasm into two (4) None of these

16. The greatest source of variations is brought about by:

- (1) Mutation (2) Chromosomal aberrations  
(3) Meiosis (4) Poly ploidy

17. Cell wall of bacteria is made up of:

- (1) Cellulose (2) Pectin  
(3) Peptidoglycon (4) Chitin

18. Which of the following is not found in Rhizopus:

- (1) Sporangia (2) Rhizoids  
(3) Columella (4) Setae

19. When a pollen tube enters embryo sac by piercing through integument, it is called:

- (1) Mesogamy (2) Porogamy  
(3) Chalazogamy (4) Pseudogamy

20. The process in which virus are involved in sexual reproduction of bacteria called:

- (1) Transduction (2) Transcription  
(3) Transformation (4) Translation

## **MATHEMATICS**

21.  $\log \tan 1^\circ + \log \tan 2^\circ + \dots + \log \tan 89^\circ = \dots$ :
- (a) 1 (b) 0  
(c)  $\frac{\pi}{4}$  (d) None of these
22. If  $xy+yz+zx=1$  then  $\sum \frac{xy}{1-xy} = \dots$ :
- (a)  $\frac{1}{xyz}$  (b)  $\frac{4}{xyz}$   
(c)  $xyz$  (d) None of these
23. The maximum value of  $\sin^2 \theta + \cos^4 \theta$  is:
- (a) 0 (b) 1  
(c)  $\frac{3}{4}$  (d)  $\frac{\pi}{2}$
24. In a triangle ABC, the angle A is greater than angle B. If the values of the angles satisfy the equation  $3 \sin x - 4 \sin^3 x - K = 0$ ,  $0 < K < 1$  then the measure of angle C is:
- (a)  $\frac{\pi}{2}$  (b)  $\frac{\pi}{3}$   
(c)  $\frac{2\pi}{3}$  (d)  $\frac{5\pi}{6}$