

**WE ARE PLACING TWO SAMPLE QUESTIONS FOR EACH
SUBJECT TOWARDS KVPY SB STREAM BOTH IN 1 MARK AND 2
MARKS CATEGORY**

SAMPLE QUESTIONS – STREAM SB&SB+2

1 MARK EACH

MATHEMATICS

1.

If the slope of one of the lines represented by $4ax^2 + xy + 4y^2 = 0$ is the square of the other, then a equals

A $1/8$ B $1/4$ C $-1/4$ D $-1/8$

2.

If $f(n) = \frac{1}{n} \{(2n+1)(2n+2) \cdots (2n+n)\}^{\frac{1}{n}}$, then $\lim_{n \rightarrow \infty} f(n)$ equals

A $4/e$ B $27/4e$ C $27e/4$ D $4e$

PHYSICS

1.

A block of mass m sliding down an incline at constant speed is initially at a height h above the ground. The coefficient of kinetic friction between the mass and the incline is μ . If the mass continues to slide down the incline at a constant speed, the energy dissipated by friction by the time the mass reaches the bottom of the incline is

A mgh/μ B mgh C $\mu mgh/\sin \theta$ D $mgh \sin \theta$

2.

Two polaroids are placed 90° to each other and the transmitted intensity is zero. One more polaroid is placed between them bisecting the angle between them. Let I be the intensity of light just after the first polaroid. The fraction of I transmitted by the system is

- A** 0 **B** $\frac{1}{4}$ **C** $\frac{1}{2}$ **D** $\frac{1}{8}$

CHEMISTRY

1.

The pH of a 0.1M solution of a weak monoprotic acid having a degree of dissociation of 0.1 in water, is

- A** 4.4 **B** 4.0 **C** 2.4 **D** 2.0

2.

According to Bohr's theory, the angular momentum of the electron in the ground state of the hydrogen atom is

- A** 0 **B** 1 **C** 2 **D** 3

BIOLOGY

1.

During exercise when body temperature rises, the skin capillaries dilate and receive more blood resulting in increased heat loss. Which of the following is NOT associated with the maintenance of the body temperature in general?

- A** Eccrine and apocrine sweat glands.
- B** Release of bradykinin, a potent vasodilating peptide
- C** Sebum secretion from sebaceous glands
- D** Sub-cutaneous fat

2.

If the blood group of father is 'A' and that of mother is 'B'. The blood group of their child could be

- A** A or B or AB
- B** AB only
- C** A or B or AB or O
- D** A or B only

2 MARK EACH

MATHEMATICS

1.

If a, b and c are nonzero real numbers such that $ab = 2(a + b)$, $bc = 3(b + c)$ and $ca = 4(c + a)$ then the value of $5a + 7b + c$ is

- A** 48
- B** 72
- C** 108
- D** 120

2.

All the inner angles of a 7-gon are obtuse, their sizes in degree being distinct integers divisible by 9. What is the sum (in degrees) of the largest two angles?

- A** 300
- B** 315
- C** 330
- D** 335

PHYSICS

1.

A cylinder of mass M and the radius R has a radially dependent density. The cylinder starts from rest and rolls without slipping down an inclined plane of height H . At the bottom of the plane its translational speed is $(8gH/7)^{1/2}$. The rotational inertia of the cylinder is

A $\frac{1}{2} MR^2$ **B** $\frac{3}{4} MR^2$ **C** $\frac{7}{8} MR^2$ **D** MR^2

2.

A particular ideal gas is supplied 10.61 J of heat at a constant pressure of 1.01×10^5 Pa. If the volume of the gas increases by 3×10^{-5} m³, the gas consists of

- A** monatomic molecules.
- B** diatomic molecules.
- C** polyatomic molecules.
- D** a mixture of mono and diatomic molecules.

CHEMISTRY

1.

Optically pure 3-bromopent-1-ene upon addition of 1 mole of Br₂ produces a tribromo compound. The number of stereoisomers in the product is

- A** 2 **B** 4 **C** 6 **D** 3

2.

$\text{Ir}(\text{CO})\text{Cl}(\text{PPh}_3)_2$ when reacts with O_2 , the oxidation state and coordination number of Iridium, respectively, become

- A** +1 and 5 **B** +2 and 5 **C** +4 and 6 **D** +3 and 6

BIOLOGY

1.

If our body fluid were alcohol instead of water, which of the following would happen to our body temperature if everything else in the body remains the same

- A** Temperature control would be maintained as well as it happens now
B We will maintain a constant temperature of 37°C
C Fluctuations of body temperature will be more since alcohol has a lower specific heat capacity
D We will feel feverish all the time

2.

During the course of intensive exercise, muscle fatigue occurs because,

- A** During exercise entire deposit of glucose is converted to CO_2 and H_2O
B O_2 deficiency results in accumulation of lactic acid in the muscles
C O_2 deficiency results in accumulation of citric acid in the muscles
D Excessive utilization of glucose results excessive production of acetylCoA which is not fully utilized by the TCA cycle (Krebs cycle).